

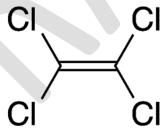
Office of Chemical Safety and Pollution Prevention

Draft Risk Evaluation for Perchloroethylene

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Fate and Transport Studies

CASRN: 127-18-4



April 2020

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Study Reference:	adsorption of	vironmen	1994). Competitive ironments. Water Res 1354(94)90166-X			
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance source and purity (reagent grade) were reported.	1	1	1
Test Design	3. Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1

	6. Testing Conditions	High	Testing conditions were reported and appropriate for the method.	1	2	2
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1
	8. System Type and Design	High	System design was reported and appropriate.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1
	12. Sampling Methods	High	Sampling was reported and appropriate.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability and uncertainty in the study were considered and accounted for in data evaluation.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, and mass balance were not reported; however, these omissions were not likely to have had a substantial impact on the study results.	2	2	4

	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	18	23
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.28	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Farrell, J; Reinhard, M. (1994). Desorption of halogenated organics from model solids, sediments, and soil under unsaturated conditions. 1. Isotherms. Environ Sci Technol 28: 53-62. http://dx.doi.org/10.1021/es00050a009 HERO ID: 2803271						
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score	
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2	
	2. Test Substance Purity	High	The source and purity of the test substance were reported.	1	1	1	
Test Design	3. Study Controls	Not rated	The study did not require concurrent control groups.	NR	NR	NR	
	4. Test Substance Stability	High	Test substance stability was considered in this study.	1	1	1	
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1	
	6. Testing Conditions	Medium	Some details were limited; however, this did not limit the interpretation of the results.	2	2	4	
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1	
	8. System Type and Design	High	System design was reported and appropriate.	1	1	1	
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR	
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR	
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1	
	12. Sampling Methods	Medium	Some details were limited; however, this did not limit the interpretation of the results.	2	1	2	

Confounding/	13	Not rated	Not applicable; this	NR	NR	NR
Variable	Confounding	110014004	study evaluated an	1111	1111	1111
Control	Variables		experimental system.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	1.0014004	applicable to this	1111		1111
	Exposure		study type.			
Data	15. Data	High	Desorption	1	2	2
Presentation	Reporting	J	isotherms were			
and Analysis	1 0		reported.			
	16. Statistical	High	The analysis of data	1	1	1
	Methods and	Ö	was clearly			
	Kinetic		described.			
	Calculations					
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	14	15	18
High	Medium	Low	Overall Score = Sum	1.2	Overall	1.2
			of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	

Study Reference:	sediments, an 28: 53-62. htt HERO ID: 280	nd soil under unsa p://dx.doi.org/10 3271	Desorption of haloge aturated conditions. 1 0.1021/es00050a009	. Isotherm	s. Environ Sci	i Technol
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The source and purity of the test substance were reported.	1	1	1
Test Design	3. Study Controls	Not rated	The study did not require concurrent control groups.	NR	NR	NR
	4. Test Substance Stability	High	Test substance stability was considered in this study.	1	1	1
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1
	6. Testing Conditions	Medium	Some details were limited; however, this did not limit the interpretation of the results.	2	2	4
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1
	8. System Type and Design	High	System design was reported and appropriate.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1
	12. Sampling Methods	Medium	Some details were limited; however, this did not limit the interpretation of the results.	2	1	2

Confounding/	13	Not rated	Not applicable; this	NR	NR	NR
Variable	Confounding	not ratea	study evaluated an	1414	1110	1111
Control	Variables		experimental system.			
Control	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	NotTateu		INIX	INIX	INIX
			applicable to this			
Date	Exposure	TT: 1	study type.	1	2	2
Data	15. Data	High	Desorption	1	2	2
Presentation	Reporting		isotherms were			
and Analysis			reported.			
	16. Statistical	High	The analysis of data	1	1	1
	Methods and		was clearly			
	Kinetic		described.			
	Calculations					
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	14	15	18
High	Medium	Low	Overall Score = Sum	1.2	Overall	1.2
Ö			of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	Č
					Level:	

Study Reference:	Wang, G; Allen-King, RM; Choung, S; Feenstra, S; Watson, R; Kominek, M. (2013). A practical measurement strategy to estimate nonlinear chlorinated solvent sorption in low foc sediments. Ground Water Monit Remediat 33: 87-96. http://dx.doi.org/10.1111/j.1745-6592.2012.01413.x HERO ID: 3564246						
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score	
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2	
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1	
Test Design	3. Study Controls	High	Control experiments were performed.	1	2	2	
	4. Test Substance Stability	High	The test substance stability was considered in this study and test substance preparation was reported.	1	1	1	
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1	
	6. Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.	1	2	2	
	7. Testing Consistency	High	Test conditions were consistent across samples or study groups.	1	1	1	
	8. System Type and Design	High	The system type and design were capable of appropriately maintaining substance concentrations.	1	1	1	
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR	
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR	
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1	

	12. Sampling Methods	High	The sampling was suitable for the study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability and uncertainty in the study were considered and accounted for in data evaluation.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	A sorption data set (foc, kd) was reported.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	14	Overall Score (Rounded):	18 1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Tetrachloroe https://echa. dossier/1430	ECHA (European Chemicals Agency). (2017). Adsorption/desorption: Tetrachloroethylene. Helsinki, Finland. Retrieved from https://echa.europa.eu/registration-dossier/-/registered- dossier/14303/5/5/2# HERO ID: 3970786						
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	Unacceptable	Test substance reported as unnamed constituent.	4	2	8		
	2. Test Substance Purity	Low	The source and purity of the test substance were not reported or verified by analytical means.	3	1	3		
Test Design	3. Study Controls	Medium	Concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4		
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2		

Test Conditions	5. Test Method Suitability	Unacceptable	The test method was not reported.	4	1	4
	6. Testing Conditions	Unacceptable	Testing conditions were not reported, and data provided were insufficient to interpret results.	4	2	8
	7. Testing Consistency	Unacceptable	Critical exposure details across samples or study groups were not reported.	4	1	4
	8. System Type and Design	Unacceptable	The system type and design were not reported.	4	1	4
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	Adsorption coefficient values were reported.	1	1	1
	12. Sampling Methods	Low	Details regarding sampling methods were not fully reported, and the omissions were likely to have had a substantial impact on the study results.	3	1	3
Confounding/ Variable Control	13. Confounding Variables	Not rated	Sources of variability and uncertainty in the measurements were not reported.	NR	NR	NR

	14.6		l			
	14. Outcomes	Not rated	The metric is	NR	NR	NR
	Unrelated to		not applicable			
	Exposure		to this study			
	_		type.			
Data	15. Data	Low	Insufficient data	3	2	6
Presentation and	Reporting		were reported			
Analysis			to evaluate.			
·	16. Statistical	Low	Statistical	3	1	3
	Methods and		analysis or			
	Kinetic		kinetic			
	Calculations		calculations			
	Garculations		were not			
			described.			
Other	17.	Low	No information	3	1	3
other		LOW		3	1	3
	Verification or		was reported to			
	Plausibility of		evaluate			
	Results		results.			
	18. QSAR	Not rated	The metric is	NR	NR	NR
	Models		not applicable			
			to this study			
			type.			
			Sum of scores:	40	17	53
High	Medium	Low	Overall Score =	3.12	Overall	4
			Sum of		Score	
			Weighted		(Rounded):	
			Scores/Sum of			
			Metric			
			Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Unacceptable ¹
					Quality	
					Level:	
				l	EC V CI.	

¹The study's overall quality rating was downgraded. Rationale: Limited information reported in this secondary source and unable to confirm study results with cited reference HEROID 3839195, ECB (2005). European Union risk assessment report: Tetrachloroethylene. Part 1 - Environment. United Kingdom, European Commission – Joint Research Centre Institute for Health and Consumer Protection European Chemicals Bureau. 57. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, five of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	Dobbs, RA; Wang, L; Govind, R. (1989). Sorption of toxic organic compounds on wastewater solids: Correlation with fundamental properties. Environ Sci Technol 23: 1092-1097. http://dx.doi.org/10.1021/es00067a004 HERO ID: 4140494					
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name and CASRN.	1	2	2
	2. Test Substance Purity	Medium	The test substance specific source and purity not clearly reported.	2	1	2
Test Design	3. Study Controls	Medium	Minor loss was indicated in concentrations reported for equilibration experiments with standards and whole samples; the discussion indicated that no significant loss was due to volatilization or biodegradation and differences were discussed.	2	2	4
	4. Test Substance Stability	High	The test substance stability was considered in this study.	1	1	1
Test Conditions	5. Test Method Suitability		The test method was suitable for the test substance.	1	1	1
	6. Testing Conditions	High	Testing conditions were reported and appropriate for the method.	1	2	2
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1
	8. System Type and Design	High	System design was reported and appropriate.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1
	12. Sampling Methods	Medium	Some details were limited; however, this did not limit the interpretation of the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability and uncertainty in the study were considered and accounted for in data evaluation.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Concentrations for PCE over time were not reported.	2	2	4
·	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	18	24
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.33	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	degradation p http://dx.doi.o HERO ID: 7338	Lu, C; Bjerg, PL; Zhang, F; Broholm, MM. (2011). Sorption of chlorinated solvents and degradation products on natural clayey tills. Chemosphere 83: 1467-1474. http://dx.doi.org/10.1016/j.chemosphere.2011.03.007 HERO ID: 733896							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Medium	The source of the test substance was not reported, although it may be available in the supplemental information.	2	1	2			
Test Design	3. Study Controls	Medium	Control group details were not included; however, it may be found in the Supp Info.	2	2	4			
	4. Test Substance Stability	High	The test substance preparation was reported.	1	1	1			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1			
	6. Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.	1	2	2			
	7. Testing Consistency	High	Test conditions were consistent across samples or study groups.	1	1	1			
	8. System Type and Design	High	The system type and design were capable of appropriately maintaining substance concentrations.	1	1	1			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			

Outcome	11. Outcome	High	The outcome	1	1	1
Assessment	Assessment	Ü	assessment was			
	Methodology		appropriate for this			
			study.			
	12. Sampling	Medium	Limited details	2	1	2
	Methods		regarding this metric			
			were reported;			
			however, the			
			omissions were			
			unlikely to have			
			hindered			
			interpretation of the			
			results.			
Confounding/	13.	High	Sources of variability	1	1	1
Variable	Confounding		and uncertainty in			
Control	Variables		the study were			
			considered and			
			accounted for in data			
			evaluation.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Medium	Some details were in	2	2	4
Presentation	Reporting		the supporting			
and Analysis	. 0		document, which was			
			not readily available.			
	16. Statistical	Not rated	No statistical	NR	NR	NR
	Methods and		methods or kinetic			
	Kinetic		calculations (due to			
	Calculations		rapid equilibration)			
			were reported.			
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	17	17	23
High	Medium	Low	Overall Score = Sum	1.35	Overall	1.4
			of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	-
					Level:	

Study Reference:	elimination o In R Haque (F	of selected water j Ed.), Dynamics, ex In Arbor, MI: Ann 150	acek, KJ; Carroll, JJ. (2 pollutants by bluegill xposure and hazard a Arbor Science.	sunfish (Le ssessment (epomis macro of toxic chem	ochirus). icals (pp.
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name	1	2	2
	2. Test Substance Purity	High	The source of the test substance was reported; the purity was omitted; however, this omission was not likely to have had a substantial impact on the study results.	1	1	1
Test Design	3. Study Controls	Medium	Negative controls were employed in the study. Some control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not discussed; however, the omissions were not likely to have hindered the interpretation of the results	2	1	2
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1
	6. Testing Conditions	High	Test conditions were monitored and documented, including dissolved oxygen, water temperature, and pH.	1	2	2

	7 Tecting	High	Test conditions were	1	1	1
	7. Testing	High	consistent across	1	1	1
	Consistency					
			study groups and			
			aquaria, and			
			exposure conditions			
			were monitored.			
	8. System	High	The test system	1	1	1
	Type and		(modified continual-			
	Design		flow, proportional			
			dilution closed			
			system) was			
			appropriate for the			
			test substance and			
			capable of			
			maintaining the			
			appropriate			
			exposure			
			concentration.			
Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to this			
	Degradation		study type.			
	10. Test	High	Routine organism	1	2	2
	Organism		was used; details	_		_
	Partitioning		were provided,			
	T di titioning		including source, wet			
			weight and standard			
			length, acclimation			
			details, and physical			
			condition.			
Outcome	11. Outcome	High	The outcome	1	1	1
Assessment	Assessment	111611	assessment	1	_	1
Assessment	Methodology		methodology clearly			
	Wethodology		reported the			
			intended outcome of			
			interest.			
	12. Sampling	High	The study used	1	1	1
	Methods	High		1	1	1
	Methous		widely accepted			
			methods for the			
			chemical and			
			medium being			
			analyzed; no notable			
			limitations were			
			expected to have			
			influenced the study			
0 6 31 1	40	NT	results.	MD	MA	ND
Confounding/	13.	Not rated	No confounding	NR	NR	NR
Variable	Confounding		variables were			
Control	Variables		noted.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			

Data	15. Data	High	The study reported	1	2	2
Presentation	Reporting		the mean chemical			
and Analysis			concentration and			
			the calculated BCF.			
	16. Statistical	Medium	Actual	2	1	2
	Methods and		concentrations			
	Kinetic		measured			
	Calculations		throughout the study			
			were not reported;			
			however, these			
			details were not			
			likely to have been			
			severe or have had a			
			substantial impact			
			on the study results.			
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility		criteria for high			
	of Results		confidence as			
			expected for this			
			type of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.	4=	10	22
1	3.6 11	-	Sum of scores:	17	19	23
High	Medium	Low	Overall Score =	1.21	Overall	1.2
			Sum of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
51 1 .1 7	>17 1 -2 2	52.2 J -2	Weighting Factors:		011	II: -l-1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	$High^1$
					Quality	
					Level:	

¹This study is related to another study, HERO ID 3970785, Echa. Bioaccumulation: aquatic/sediment: Tetrachloroethylene. 2017.

Study Reference:	bioconcentra 1113- 1115. h HERO ID: 187	tion potential of o http://dx.doi.org/ 37	GE. (1974). Partition organic chemicals in f /10.1021/es60098a0	fish. Enviroi 08	n Sci Technol	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The purity of the test substance was confirmed by analytical methods.	1	1	1
Test Design	3. Study Controls	Medium	Study controls were not included but this did not limit the interpretation of the results.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this did not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	Medium	Test method was described elsewhere; additional investigation would need to be performed to accurately rate this metric.	2	1	2
	6. Testing Conditions	Medium	Information regarding this metric was limited; the method was described elsewhere; omissions were not likely to have had an impact on the study results. Concentration of test material not reported, may be in the test method source.	2	2	4
	7. Testing Consistency	High	Duplicate/consistent tests were run for two concentrations.	1	1	1

The state of the s	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	High	Information was reported; routine test organism was used.	1	2	2
Outcome Assessment	11. Outcome Assessment Methodology	Medium	The outcome of interest and its basis were reported; the final BCF was calculated from two separate experiments at two different exposure concentrations that were not reported. Results were interpretable.	2	1	2
	12. Sampling Methods	Medium	Details regarding this metric were limited but not likely to have had a substantial impact on the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	Sources of variability and uncertainty in the measurements were not reported.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Low	Lipid normalized BCF was not reported; concentration- specific endpoint data were not included; precise interpretation of the results may be limited.	3	2	6

	16. Statistical Methods and Kinetic Calculations	Medium	Average of two different exposure levels were reported. Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The experimental data in this paper was used to create a linear regression between log Kow and log BCF for use in estimating BCF.	NR	NR	NR
			Sum of scores:	23	19	32
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.68	Overall Score (Rounded):	1.7
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium

Study Reference:	of Japan: An a	pproach to struc x.doi.org/10.101 312	nces with the test sch ture-activity correla 6/0147-6513(80)90	tions. Ecoto		Saf 4: 444-
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name and CASRN.	1	2	2
	2. Test Substance Purity	Medium	Not reported; however, this was not expected to have had a substantial impact on the interpretation of the results.	2	1	2
Test Design	3. Study Controls	Medium	Not reported; however, the book source for this test method indicates appropriate use of controls.	2	2	4
	4. Test Substance Stability	Medium	Not reported; however, this omission was not likely to have influenced the study results.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR

	10. Test Organism Partitioning	High	This metric met the criteria for high confidence as expected for this	1	2	2
			type of study. The organism was routinely used for this method.			
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Not reported; however, this omission was not likely to have influenced the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Limited details were reported; however, further investigation of original book source provided details.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Not rated	No statistical methods or kinetic calculations were reported.	NR	NR	NR
Other	17. Verification or Plausibility of Results	High	Reliable source; test details can be found in referenced book.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	18	25
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.39	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High ¹

¹The BCF study is also available from the NITE website (https://www.nite.go.jp/en/chem/chrip/chrip_search/srhInput).

Study Reference:	Saisho, K; Hasegawa, Y; Saeki, M; Toyoda, M; Saito, Y. (1994). [Bioaccumulation of volatile chlorinated hydrocarbons in blue mussel, Mytilus edulis and killifish, Oryzias latipes]. Jpn J Toxicol Environ Health 40: 274-278. http://dx.doi.org/10.1248/jhs1956.40.274 HERO ID: 2803478								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	Substance Identity	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
	2. Test Substance Purity	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
Test Design	3. Study Controls	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
	4. Test Substance Stability	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
Test Conditions	5. Test Method Suitability	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
	6. Testing Conditions	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
	7. Testing Consistency	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
	8. System Type and Design	Not rated	Not applicable, foreign language paper.	NR	NR	NR			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	Details regarding this metric were not reported.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	Details regarding this metric were limited or unclear.	NR	NR	NR			
	12. Sampling Methods	Not rated	Details regarding this metric were not reported.	NR	NR	NR			
Confounding/ Variable Control	13. Confounding Variables	Not rated	Details regarding this metric were limited or unclear.	NR	NR	NR			

	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	110014004	applicable to this	1111	1111	1111
	Exposure		study type.			
Data	15. Data	Not rated	Lipid normalized	NR	NR	NR
Presentation	Reporting		BCF was not			
and Analysis			reported.			
	16. Statistical	Not rated	Details regarding	NR	NR	NR
	Methods and		this metric were			
	Kinetic		limited or			
	Calculations		unclear.			
Other	17. Verification	Not rated	Details regarding	NR	NR	NR
	or Plausibility		this metric were			
	of Results		limited or			
			unclear.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	0	0	0
High	Medium	Low	Overall Score =		Overall	4
			Sum of		Score	
			Weighted		(Rounded):	
			Scores/Sum of			
			Metric			
			Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Unacceptable ¹
					Quality	
10 . 1		, ,		1	Level:	1 1 1

¹Foreign language paper with abstract and data tables in English. Full text article review needed when available in English. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, all of the metrics were not able to be rated. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	Determination	n of bioconcentra osphere 33: 865-	M; Koshikawa, H; Sat ation potential of tetr 877. http://dx.doi.or	achloroethy	ylene in mari	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	Source and purity of the test chemical were reported.	1	1	1
Test Design	3. Study Controls	High	The study employed negative controls, as well as solvent controls, appropriately.	1	2	2
	4. Test Substance Stability	Medium	Limited details were included describing test substance stability; however, these factors were not likely to have had a substantial impact on the study results.	2	1	2
Test Conditions	5. Test Method Suitability	Medium	Target chemical concentrations were greater than the aqueous solubility, but these deviations were not likely to have had a substantial impact on the results.	2	1	2
	6. Testing Conditions	Medium	Limited details were provided describing test conditions, although temperature and light:dark cycles were provided.	2	2	4
	7. Testing Consistency	High	Test conditions were consistent across sample groups, and exposure conditions were documented.	1	1	1

	8. System Type and	High	The system design was capable of	1	1	1
	Design		maintaining appropriate test substance concentrations.			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	High	The strains and source of the test organism (algae) were provided.	1	2	2
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes of interest.	1	1	1
	12. Sampling Methods	High	Sampling methods were adequately described and employed standard approaches for the chemical and media addressed.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	Sources of uncertainty and variability were not applicable to this study type.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	Data were adequately reported, including measurement precision, algae growth curves compared to controls, concentrations, and BCFs.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Medium	Value in text (101) and table (118) did not match.	2	1	2
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR

			Sum of scores:	18	19	24
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.26	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High



Study Reference:	Determinatio 13C. Chemosp HERO ID: 357	Wang, X; Harada, S; Watanabe, M; Koshikawa, H; Sato, K; Kimura, T. (1996). Determination of bioconcentration potential of tetrachloroethylene in marine algae by 13C. Chemosphere 33: 865-877. http://dx.doi.org/10.1016/0045-6535(96)00230-5 HERO ID: 3572691								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score				
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2				
	2. Test Substance Purity	High	Source and purity of the test chemical were reported.	1	1	1				
Test Design	3. Study Controls	High	The study employed negative controls, as well as solvent controls, appropriately.	1	2	2				
	4. Test Substance Stability	Medium	Limited details were included describing test substance stability; however, these factors were not likely to have had a substantial impact on the study results.	2	1	2				
Test Conditions	5. Test Method Suitability	Medium	Target chemical concentrations were greater than the aqueous solubility, but these deviations were not likely to have a substantial impact on results.	2	1	2				
	6. Testing Conditions	Medium	Limited details were provided describing test conditions, although temperature and light:dark cycles were provided.	2	2	4				
	7. Testing Consistency	High	Test conditions were consistent across sample groups, and exposure conditions were documented.	1	1	1				

	8. System Type and Design	High	The system design was capable of maintaining appropriate test	1	1	1
			substance concentrations.			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	High	The strains and source of the test organism (algae) were provided.	1	2	2
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes of interest.	1	1	1
	12. Sampling Methods	High	Sampling methods were adequately described and employed standard approaches for the chemical and media addressed.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	Sources of uncertainty and variability were not applicable to this study type.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	Data were adequately reported, including measurement precision, algae growth curves compared to controls, concentrations, and BCFs.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	19	23
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.21	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High



Study Reference:	Dow Chem Co. (1973). UPTAKE, CLEARANCE AND BIOCONCENTRATION OF DOW-PER (PERCHLOROETHYLENE) IN RAINBOW TROUT, SALMO GAIRDNERI RICHARDSON. (OTS: OTS0517166; 8EHQ Num: NA; DCN: 86-870002077; TSCATS RefID: 309906; CIS: NA). HERO ID: 4214291							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	Test substance identified by chemical name and CASRN.	1	2	2		
	2. Test Substance Purity	High	The test substance source was reported.	1	1	1		
Test Design	3. Study Controls	Medium	A concurrent negative control group was included in the study; however, control data were not reported.	2	2	4		
	4. Test Substance Stability	Medium	The test substance stability and storage conditions were not reported; however, these factors were not likely to have had a substantial impact on the test results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	Test method was suitable for the test substance.	1	1	1		
	6. Testing Conditions	High	Test conditions were monitored and reported, including temperature and dissolved oxygen.	1	2	2		
	7. Testing Consistency	High	Test conditions were consistent across samples/study groups. Exposure conditions were documented.	1	1	1		
	8. System Type and Design	High	The test system and design (proportional dilution apparatus) was capable of appropriately maintaining substance concentration.	1	1	1		

Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism Degradation		applicable to this study type.			
	10. Test Organism Partitioning	Medium	The test organism was a routine species commonly used in similar studies; however, minimal details were provided aside from length.	2	2	4
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.	1	1	1
	12. Sampling Methods	High	Sampling methods used addressed the outcome of interest and were widely accepted.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	Not applicable; uncertainty and variability were not addressed in the study.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Low	Analytical method was not reported; lipid content or lipid normalized BCF was not reported. Chemical concentrations in water were reported for each time period.	3	2	6
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Medium	No analytical details were provided; therefore, it was hard to interpret the results.	2	1	2
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	20	19	29

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.53	Overall Score (Rounded):	1.6
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	weighting Factors:		Overall Quality Level:	High



Study Reference:	Dickson, AG; Riley, JP. (1976). The distribution of short-chain halogenated aliphatic hydrocarbons in some marine organisms. Mar Pollut Bull 7: 167-169. http://dx.doi.org/10.1016/0025-326X(76)90212-5 HERO ID: 58130 Metric Qualitative Comments Metric Metric Weighted							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	Source and purity were not reported or verified; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2		
Test Design	3. Study Controls	Not rated	Data for study controls were not included.	NR	NR	NR		
	4. Test Substance Stability	Not rated	The test substance preparation and storage conditions were not reported; however, these factors were not likely to have had a substantial impact on the study results.	NR	NR	NR		
Test Conditions	5. Test Method Suitability	Medium	The test method was not suited well for precise understanding/measure ment of bioconcentration.	2	1	2		
	6. Testing Conditions	Unacceptable	Test substance concentration in sea water was not detailed.	4	2	8		
	7. Testing Consistency	Not rated	The metric is not applicable to this study type (monitoring study).	NR	NR	NR		
	8. System Type and Design	Medium	Concentrations were measured in biota only and not in waters where biota were collected.	2	1	2		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	Test organisms were reported; however, this metric is not applicable to this study type (monitoring study).	NR	NR	NR		

Outcome	11.	Low	BAF/BCF were not	3	1	3
Assessment	Outcome	20	reported.	o o	_	
	Assessment Methodology					
	12. Sampling Methods	Unacceptable	Serious uncertainties or limitations were identified in sampling methods were likely to have had a substantial impact on the results.	4	1	4
Confounding/ Variable Control	13. Confounding Variables	Medium	Sources of variability and uncertainty in the measurements were reported in the study and were not likely to have had a substantial impact on the study results.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting		Serious uncertainties or limitations were identified in analytical and sampling methods of the outcome of interest and these were likely to have had a substantial impact on the results, resulting in serious flaws that made the study unusable.	4	2	8
	16. Statistical Methods and Kinetic Calculations	Not rated	Statistical analysis or kinetic calculations were not described.	NR	NR	NR
Other	17. Verification or Plausibility of Results	Not rated	Omitted details hindered the evaluation of the validity of the results.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	24	12	33
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2.75	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹The test substance concentration in seawater was not reported. Results provided are a range of BCF (2-25X) that are not test compound or organism specific. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, three of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.



Study Reference:	Pearson, CR; Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proc Biol Sci 189: 305-332. HERO ID: 75062							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	The test substance purity and source were not reported; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2		
Test Design	3. Study Controls	Low	The study did not include or report control groups.	3	2	6		
	4. Test Substance Stability	Medium	Details regarding this metric were not reported.	2	1	2		
Test Conditions	5. Test Method Suitability	Unacceptable	The test method was not described.	4	1	4		
	6. Testing Conditions	Low	Details regarding this metric were very limited if present at all.	3	2	6		
	7. Testing Consistency	Medium	Test conditions were consistent; however, all conditions were not clearly reported.	2	1	2		
	8. System Type and Design	Medium	Details regarding this metric were not reported and said to be similar to acute toxicity studies.	2	1	2		

Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to			
J	Degradation		this study type.			
	10. Test	Unacceptable	Details	4	2	8
	Organism	•	regarding this			
	Partitioning		metric were not			
			reported.			
Outcome	11. Outcome	Low	Details	3	1	3
Assessment	Assessment		regarding this			
	Methodology		metric were			
			limited or			
			unclear.			
	12. Sampling	Unacceptable	Details	4	1	4
	Methods	•	regarding this			
			metric were not			
			reported.			
Confounding/	13. Confounding	Low	Details	3	1	3
Variable	Variables		regarding this			
Control			metric were			
			limited or			
			unclear.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to			
	Exposure		this study type.			
Data	15. Data	Medium	Lipid	2	2	4
Presentation	Reporting		normalized BCF		_	-
and Analysis			was not			
			reported.			
	16. Statistical	Low	Details	3	1	3
	Methods and		regarding this			
	Kinetic		metric were			
	Calculations		limited or			
			unclear.			
Other	17. Verification	Low	Details	3	1	3
	or Plausibility		regarding this			
	of Results		metric were			
			limited or			
			unclear.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to			
			this study type.			
			Sum of scores:	41	20	54
High	Medium	Low	Overall Score =	2.7	Overall	4
			Sum of		Score	
			Weighted		(Rounded):	
			Scores/Sum of			
			Metric			
			Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Unacceptable ¹
					Quality	p
					Level:	

¹The study did not report crucial details on method, sampling and organisms. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, three of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.



Study Reference:	of organic ch behaviour of	emicals: an expe organic chemica C labelled chemi	H; Korte, F. (1985). Erimental method for als in the ecoshpere b cals. Chemosphere 14	the assessi y means of	ment of the simple labor	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	Low	No information was provided about the test substance other than a statement indicating that some test substances were bought, and some were synthesized in the lab.	3	2	6
	2. Test Substance Purity	Low	The source and purity of the test substance were not explicitly reported or verified by analytical means.	3	1	3
Test Design	3. Study Controls	Unacceptable	No information was provided regarding this metric.	4	2	8
	4. Test Substance Stability	Not rated	No information was provided regarding this metric.	NR	NR	NR
Test Conditions	5. Test Method Suitability	Not rated	No information was provided but may be available in referenced sources.	NR	NR	NR
	6. Testing Conditions	Unacceptable	No information was provided regarding this metric.	4	2	8
	7. Testing Consistency	Not rated	No information was provided regarding this metric.	NR	NR	NR
	8. System Type and Design	Not rated	No information was provided but may be available in referenced sources.	NR	NR	NR
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR

	10. Test Organism Partitioning	Medium	The test organism was a routine species commonly used in similar studies; however, minimal details were provided.	2	2	4
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	Little to no information was provided but may be available in referenced sources.	NR	NR	NR
	12. Sampling Methods	Not rated	No information was provided but may be available in referenced sources.	NR	NR	NR
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	No information was provided.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	A single data point (BCF = 90) was provided.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Not rated	Little to no information was provided.	NR	NR	NR
Other	17. Verification or Plausibility of Results	Not rated	Little to no information was provided; therefore, it was difficult to interpret the results.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	11	33
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	3	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	, , , , , , , , , , , , , , , , , , , ,		Overall Quality Level:	Unacceptable ¹

¹Limited study information provided (i.e. study controls not reported). Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	chlorinated of under sulfide	ethenes and immogenic conditions i.org/10.1021/es	gathos, SN; Gottschal, j obilization of nickel i s. Environ Sci Technol 6010184x	n anaerobi	c sediment co	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not specifically reported; however, a general statement on the chemicals used was made and therefore, the omissions were not likely to have had a substantial impact on the study results.	2	1	2
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1
	6. Testing Conditions	High	The conditions were suitable for the test substance.	1	2	2
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	111811	criteria for high	-	_	-
0 1 G 444101110	Degradation		confidence as			
	.8		expected for this			
			type of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism	TrotTutcu	applicable to this	1111		1111
	Partitioning		study type.			
Outcome	11. Outcome	Low	Specific results	3	1	3
Assessment	Assessment	LOW	stating degradation	3	1	3
7133C33IIICIIC	Methodology		rates and/or half-			
	Methodology		lives were not			
			reported.			
	12. Sampling	High	This metric met the	1	1	1
	Methods	nigii		1	1 1	1
	Methous		criteria for high confidence as			
			expected for this			
Carefo 31 /	12	Ţ	type of study.	2	1	2
Confounding/	13.	Low	PCE was not the	3	1	3
Variable	Confounding		primary/sole test			
Control	Variables		substance and was			
			added in addition to			
			TCE.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting		criteria for high			
and Analysis			confidence as			
			expected for this			
			type of study.			
	16. Statistical	High	The analysis of data	1	1	1
	Methods and		was clearly			
	Kinetic		described.			
	Calculations					
Other	17.	Low	Limited analytical	3	1	3
	Verification		data were presented			
	or Plausibility		on the specific			
	of Results		dehalogenation of			
			PCE.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	22	20	27
High	Medium	Low	Overall Score =	1.35	Overall	2.3
	cuidiii	2017	Sum of Weighted	1100	Score	2.0
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:		(Mounteu).	
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	Weighting Lactors.		Overall	Low ¹
21 anu <1.7	21.7 anu \2.5	22.5 and 25			Quality	LOW
					Level:	
			ded Rationale: Specific		L L	

¹The study's overall quality rating was downgraded. Rationale: Specific results stating degradation rates and/or half-lives were not reported.

Study Reference:	Cheng, D; Chow, WL; He, J. (2010). A Dehalococcoides-containing co-culture that dechlorinates tetrachloroethene to trans-1,2-dichloroethene. ISME J 4: 88-97. http://dx.doi.org/10.1038/ismej.2009.90								
Domain	HERO ID: 379 Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance purity and source were reported.	1	1	1			
Test Design	3. Study Controls	High	Abiotic controls were included in this study.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1			
	6. Testing Conditions	High	The conditions were suitable for the test substance.	1	2	2			
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	Medium	The study used enriched cultures.	2	2	4			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	Low	Limited details were reported regarding this metric; the study described species specific dechlorination.	3	1	3			
	12. Sampling Methods	Medium	Limited details were reported regarding this metric.	2	1	2			

Confounding/ Variable	13. Confounding	High	No confounding variables were	1	1	1
Control	Variables 14. Outcomes	Not rated	noted. The metric is not	NR	NR	NR
	Unrelated to Exposure	Not rated	applicable to this study type.	NIC	WK	WK
Data Presentation and Analysis	15. Data Reporting	Medium	Limited details were reported regarding this metric.	2	2	4
·	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.	3	1	3
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	20	29
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.45	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Due to limited information, evaluation of the reasonableness of the study results was not possible.

Study Reference:	Cheng, D; Chow, WL; He, J. (2010). A Dehalococcoides-containing co-culture that dechlorinates tetrachloroethene to trans-1,2-dichloroethene. ISME J 4: 88-97. http://dx.doi.org/10.1038/ismej.2009.90 HERO ID: 379893							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Fest Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	Purity was not reported but the omissions or identified impurities were not likely to have had a substantial impact on the study results.	2	1	2		
Test Design	3. Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1		
	6. Testing Conditions	High	The conditions were suitable for the test substance.	1	2	2		
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		

Test	9. Test	Medium	The test inoculum	2	2	4
Organisms	Organism	110414111	source was reported	_		-
8.	Degradation		but was not			
			routinely used for			
			similar study types;			
			however, the			
			deviation was not			
			likely to have had a			
			substantial impact			
			on the study results.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment		criteria for high			
	Methodology		confidence as			
			expected for this			
			type of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this			
			type of study.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this			
	11.0		type of study.	115		
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
D .	Exposure	77. 1	study type.	4	2	2
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting		criteria for high confidence as			
and Analysis						
			expected for this			
	16. Statistical	Medium	type of study. Standard deviations	2	1	2
	Methods and	Mediuiii	were shown in	۷	1	2
	Kinetic		figures but not			
	Calculations		reported in study.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high	*	-	-
	or Plausibility		confidence as			
	of Results		expected for this			
			type of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	19	20	26
High	Medium	Low	Overall Score =	1.3	Overall	1.3
8			Sum of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:		`	

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3		Overall	High
				Quality	
				Level:	



Study Reference:	de Bruin, WP; Kotterman, MJ; Posthumus, MA; Schraa, G; Zehnder, AJ. (1992). Complete biological reductive transformation of tetrachloroethene to ethane. Appl Environ Microbiol 58: 1996-2000. HERO ID: 4140300							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Γest Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance purity and source were reported.	1	1	1		
Test Design	3. Study Controls	Low	The study did not include or report control groups; there was no positive or negative control for biodegradation validation.	3	2	6		
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1		
	6. Testing Conditions	High	The conditions were suitable for the test substance.	1	2	2		
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		

Test	9. Test	High	This metric met	1	2	2
Organisms	Organism	6	the criteria for	_	_	_
S	Degradation		high confidence as			
			expected for this			
			type of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism	110014004	applicable to this	1111	1111	
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met	1	1	1
Assessment	Assessment	Iligii	the criteria for	1	1	1
Assessment	Methodology		high confidence as			
	Methodology		expected for this			
			type of study.			
	12. Sampling	Medium	Frequency and	2	1	2
	Methods	Medium	timing were	2	1	2
	Methous		omitted; however,			
			the omissions were			
			not likely to have			
			had a substantial			
			impact on the			
C	12	N - + + - J	results.	ND	MD	ND
Confounding/ Variable	13.	Not rated	No confounding variables were	NR	NR	NR
	Confounding					
Control	Variables	N l	noted.	ND	ND	ND
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			_
Data	15. Data	Medium	The target	2	2	4
Presentation	Reporting		chemical and			
and Analysis			transformation			
			product(s)			
			extraction			
			efficiency and			
			percent recovery			
			were not reported;			
			however, these			
			omissions were			
			not likely to have			
			had a substantial			
			impact on the			
			study results		_	
	16. Statistical	High	The analysis of	1	1	1
	Methods and		data was clearly			
	Kinetic		described.			
	Calculations					
Other	17.	High	This metric met	1	1	1
	Verification or		the criteria for			
	Plausibility of		high confidence as			
	Results		expected for this			
			type of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	19	19	27

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.42	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: No control groups or validation were reported.



Study Reference:	Parsons, F; Wood, PR; Demarco, J. (1984). Transformations of tetrachloroethene and trichloroethene in microcosms and groundwater. J Am Water Works Assoc 762: 56-59. HERO ID: 75110								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Low	The source and purity of the test substance were not reported.	3	1	3			
Test Design	3. Study Controls	Medium	A sterile (autoclaved) control group was included in the study.	2	2	4			
	4. Test Substance Stability	Medium	The test substance stability and storage were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1			
	6. Testing Conditions	Low	Anaerobic conditions were assumed and not determined analytically or strictly set up experimentally.	3	2	6			
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

Test	9. Test	Medium	The source of test	2	2	4
Organisms	Organism	Medium	organisms was		2	-
O' gainsins	Degradation		reported but not			
	Degradation		routinely used for			
			similar study types.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism	Notracca	applicable to this	1414	1414	IVIC
	Partitioning		study type.			
Outcome	11. Outcome	Medium	Appropriate for	2	1	2
Assessment	Assessment	110010111	identification of	_	_	_
	Methodology		potential			
	33 33 33		degradation			
			pathways; however,			
			there may be other			
			pathways.			
	12. Sampling	Low	Note from report:	3	1	3
	Methods	-	Sampling procedure			
			resulted in			
			increasing			
			headspace and was			
			not used in later			
			work			
Confounding/	13.	Low	Loss of mass balance	3	1	3
Variable	Confounding		was noted and			
Control	Variables		attributed to			
			adsorption; this may			
			have been due to			
			volatilization during			
			sampling.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Medium	Some information	2	2	4
Presentation	Reporting		was not reported			
and Analysis			(i.e., mass balance);			
			however, these			
			omissions were not			
			likely to have had a			
			substantial impact			
			on the study results.	_		_
	16. Statistical	Medium	Limited calculation	2	1	2
	Methods and		details were			
	Kinetic		reported; but this			
	Calculations		was not likely to			
			have impacted the			
Other	17	M - 1:	study results.	2	4	2
Other	17.	Medium	Loss (at time 0) and	2	1	2
	Verification		gain (at end of			
	or Plausibility		study) of test			
	of Results		material hindered			
			the validity of the			
			study results.			

	18. QSAR Models		The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	30	20	40
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2	Overall Score (Rounded):	2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium



Study Reference:	Isalou, M; Sleep, BE; Liss, SN. (1998). Biodegradation of high concentrations of tetrachloroethene in a continuous flow column system. Environ Sci Technol 32: 3579- 3585.								
Domain	HERO ID: 1166109 Metric Qualitative Determination		Comments	Metric Score	Metric	Weighted			
		[i.e., High, Medium, Low, Unacceptable, or Not rated]		Score	Weighting Factor	Score			
Test Substance	Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1			
Test Design	3. Study Controls	Not rated	No controls were reported; however, the basis of this experimental study did not require controls.	NR	NR	NR			
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this did not limit the interpretation of the	2	1	2			
Test Conditions	5. Test Method Suitability	High	results. The test method was suitable for the test substance.	1	1	1			
	6. Testing Conditions	Medium	Some testing conditions were not provided; however, the omissions were not likely to have had a substantial impact on the study results.	2	2	4			
	7. Testing Consistency	Not rated	Not applicable; this study evaluated a treatment system.	NR	NR	NR			
	8. System Type and Design	Not rated	Not applicable; this study evaluated a treatment system.	NR	NR	NR			
Test Organisms	9. Test Organism Degradation	High	The biomass source was reported.	1	2	2			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1			

	12. Sampling Methods	High	The sampling was reported and suitable for the study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	Not applicable; this study evaluated a treatment system.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type; the study evaluated a treatment system.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study. Removal rates were reported.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	Kinetic calculations were clearly described and addressed the dataset.	1	1	1
Other	17. Verification or Plausibility of Results	Low	Continuous flow reactor with a sand column that was fed PCE and methanol; experiment was more	3	1	3
			of a treatment system. The study may not be relevant to fate and environmental degradation and therefore not applicable for a fate assessment.			
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	15	15	20
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.33	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Continuous flow reactor with a sand column that's fed PCE and methanol; experiment a treatment system, the study may not be relevant to fate and environmental degradation and therefore not applicable to fate assessment.

Study Reference:	Edwards, EA; Liang, LN; Dunia, GG. (1992). Anaerobic microbial transformation of aromatic hydrocarbons and mixtures of aromatic hydrocarbons and halogenated solvents. (CE319). Arlington, VA: Air Force Office of Scientific Research. https://ntrl.ntis.gov/NTRL/dashboard/searchResults.xhtml?searchQuery=ADA2604 98 HERO ID: 1070096								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test	1. Test	High	The test substance	1	2	2			
Substance	Substance	o o	was identified by						
	Identity		chemical name.						
	2. Test	High	The test substance	1	1	1			
	Substance	<i>8</i>	source was reported.			_			
	Purity		13,71134						
Test Design	3. Study	High	A sterile control was	1	2	2			
	Controls	6	included.	_	_	=			
	4. Test	Medium	The test substance	2	1	2			
	Substance		stability,						
	Stability		homogeneity,						
			preparation and						
			storage conditions						
			were not reported.						
Test	5. Test Method	High	The test method was	1	1	1			
Conditions	Suitability		suitable for the test						
			substance and the						
			target chemical was	ľ					
			tested at						
			concentrations below						
			its aqueous solubility						
			(206 mg/L at 25 °C).						
	6. Testing	High	This metric met the	1	2	2			
	Conditions		criteria for high						
			confidence as						
			expected for this type						
			of study.			_			
	7. Testing	High	Test conditions were	1	1	1			
	Consistency		run in duplicate or						
	0.6.	771 3	triplicate.			4			
	8. System	High	This metric met the	1	1	1			
	Type and		criteria for high						
	Design		confidence as						
			expected for this type						
Took	O Tost	11: -1-	of study.	1	2	2			
Test Organisms	9. Test	High	This metric met the	1	2	2			
Organisms	Organism		criteria for high confidence as						
	Degradation		expected for this type						
	I	I	levherien ini mis rahe	1	I	l			

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcomes of interest.	1	1	1
	12. Sampling Methods	High	Adequate sampling to obtain transformation rates.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability in the study designs (i.e. regarding substrates and microcosms) were discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Extraction efficiency, percent recovery, and mass balance were not reported. Analytical method was not specifically reported for PCE.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described for PCE experiments.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	20	24
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.2	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	Weighting Lactures.		Overall Quality Level:	High

Study Reference:	Edwards, EA; Liang, LN; Dunia, GG. (1992). Anaerobic microbial transformation of aromatic hydrocarbons and mixtures of aromatic hydrocarbons and halogenated solvents. (CE319). Arlington, VA: Air Force Office of Scientific Research. https://ntrl.ntis.gov/NTRL/dashboard/searchResults.xhtml?searchQuery=ADA2604 98 HERO ID: 1070096								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance source was reported.	1	1	1			
Test Design	3. Study Controls	High	A sterile control was included.	1	2	2			
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported.	2	1	2			
Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance and the target chemical was tested at concentrations below its aqueous solubility (206 mg/L at 25 °C).	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	Test conditions were run in duplicate or triplicate.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcomes of interest.	1	1	1
	12. Sampling Methods	High	Adequate sampling to obtain transformation rates.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability in the study designs (i.e. regarding substrates and microcosms) were discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Extraction efficiency, percent recovery, and mass balance were not reported. Analytical method was not specifically reported for PCE.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described for PCE experiments.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	20	24
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.2	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	reigning ractors.		Overall Quality Level:	High

Study Reference:	Edwards, EA; Liang, LN; Dunia, GG. (1992). Anaerobic microbial transformation of aromatic hydrocarbons and mixtures of aromatic hydrocarbons and halogenated solvents. (CE319). Arlington, VA: Air Force Office of Scientific Research. https://ntrl.ntis.gov/NTRL/dashboard/searchResults.xhtml?searchQuery=ADA2604 98 HERO ID: 1070096								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test	1. Test	High	The test substance	1	2	2			
Substance	Substance Identity	8	was identified by chemical name.		_	_			
	2. Test Substance Purity	High	The test substance source was reported.	1	1	1			
Test Design	3. Study Controls	High	A sterile control was included.	1	2	2			
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported.	2	1	2			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance and the target chemical was tested at concentrations below its aqueous solubility (206 mg/L at 25 °C).	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	Test conditions were run in duplicate or triplicate.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcomes of interest.	1	1	1
	12. Sampling Methods	High	Adequate sampling to obtain transformation rates.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability in the study designs (i.e. regarding substrates and microcosms) were discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Extraction efficiency, percent recovery, and mass balance were not reported. Analytical method was not specifically reported for PCE.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described for PCE experiments.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	20	24
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.2	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	reigning ractors.		Overall Quality Level:	High

Study Reference:	DiStefano, TD; Gossett, JM; Zinder, SH. (1992). Hydrogen as an electron donor for dechlorination of tetrachloroethene by an anaerobic mixed culture. Appl Environ Microbiol 58: 3622-3629. HERO ID: 1142166								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified definitively with established nomenclature.	1	2	2			
	2. Test Substance Purity	High	The source and purity of the test substance were reported.	1	1	1			
Test Design	3. Study Controls	High	Concurrent negative controls were used.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance; the target chemical was tested at concentrations below its aqueous solubility.	1	1	1			
	6. Testing Conditions	High	Testing conditions were monitored and reported in detail.	1	2	2			
	7. Testing Consistency	High	Test conditions were consistent across samples or study groups.	1	1	1			
	8. System Type and Design	Medium	Some system details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2			
Test Organisms	9. Test Organism Degradation	High	Testing conditions were monitored, reported, and appropriate for the method.	1	2	2			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			

Outcome	11. Outcome	High	The outcome	1	1	1
Assessment	Assessment Methodology	Ü	assessment methodology addressed or reported the intended outcome(s) of interest.			
	12. Sampling Methods	High	The study reported the use of sampling methods that address the outcome(s) of interest and used widely accepted methods/approaches for the chemical and media being analyzed.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Transformation products and their concentrations were reported, analytical methods were suitable; LOD was not reported.	2	2	4
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	16 1.16	19 Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Constitutive of methanogenic http://dx.doi	van Eekert, MHA; Schröder, TJ; van Rhee, A; Stams, AJM; Schraa, G; Field, JA. (2001). Constitutive dechlorination of chlorinated ethenes by a methanol degrading methanogenic consortium. Bioresour Technol 77: 163-170. http://dx.doi.org/10.1016/S0960-8524(00)00149-8 HERO ID: 1166576							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified definitively with established nomenclature.	1	2	2			
	2. Test Substance Purity	Medium	The source of the test substance was reported. The purity of the test substance was not reported; however, the test substance was measured analytically.	2	1	2			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study. Controls were included in this study.	1	2	2			
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance; the target chemical was tested at concentrations below its aqueous solubility.	1	1	1			

	6. Testing Conditions	High	Testing conditions were monitored, reported, and	1	2	2
			appropriate for the method.			
	7. Testing Consistency	High	Test conditions were consistent across samples or study groups.	1	1	1
	8. System Type and Design	Medium	Some system details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	High	Test organism information and inoculum source were reported.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.	1	1	1
	12. Sampling Methods	Low	Details regarding sampling methods were not fully reported. The omissions were likely to have had a substantial impact on the study results.	3	1	3
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques and between study groups (if applicable) were considered and accounted for in data evaluation.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Data	15. Data	Medium	The frequency of	2	2	4
Presentation and Analysis	Reporting		sampling, target chemical and transformation product(s)			
			concentrations were reported in a graph.			
	16. Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset(s).	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	21	20	27
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.35	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	on methanog Environ Micr	Fathepure, BZ; Boyd, SA. (1988). Dependence of tetrachloroethylene dechlorination on methanogenic substrate consumption by Methanosarcina sp. strain DCM. Appl Environ Microbiol 54: 2976-2980. HERO ID: 1168294							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified definitively with established nomenclature.	1	2	2			
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1			
Test Design	3. Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on study results; the vehicle was not likely to have influenced the study results.	2	2	4			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	0			
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance; the target chemical was tested at concentrations below its aqueous solubility.	1	1	1			

	6. Testing Conditions	Medium	There were reported deviations or omissions in testing conditions (incubation temperature, pH) not specified for the test, however, sufficient data were not reported to determine that the deviations and omissions were not likely to have had a substantial impact on the study results.		2	4
	7. Testing Consistency	High	Testing conditions were consistent across samples.	1	1	1
	8. System Type and Design	Medium	Some system details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	Unacceptable	Pure culture study; Methanosarcina sp. strain was used in this study.	4	2	8
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.	1	1	1

	12. Sampling Methods	High	The study reported the use of sampling methods that address the outcome of interest and used widely accepted methods/approaches for the chemical and media being analyzed; no notable	1	1	1
			uncertainties or limitations were expected to have influenced results.			
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques and between study groups were considered and accounted for in data evaluation; all reported variability or uncertainty was not likely to have influenced the outcome assessment.		1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	Concentration of transformation product was monitored with suitable analytical methods with sensitive enough detection limits were used.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	21	19	30
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.58	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Species specific biodegradation study excluded. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics was rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	DiStefano, TD; Gossett, JM; Zinder, SH. (1991). Reductive dechlorination of high concentrations of tetrachloroethene to ethene by an anaerobic enrichment culture in the absence of methanogenesis. Appl Environ Microbiol 57: 2287-2292. HERO ID: 1196100							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1		
Test Design	3. Study Controls	Not rated	The study did not require concurrent control groups.	NR	NR	NR		
	4. Test Substance Stability	Medium	Not reported; however, omissions were not likely to have hindered the interpretation of the results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study; initial headspace concentration was verified.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study; duplicate cultures were performed similarly.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	Medium	Enrichment culture was used in this study.	2	2	4		

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Medium	This was a non- standard biodegradation test evaluating organism strains and growth conditions.	2	1	2
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Medium	Limited information was presented regarding this metric; variability and uncertainty in the measurements between triplicate tests were not reported; an average of the tests was reported	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Calculations for the rate of dechlorination were not explained.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	17	23
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.35	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Long, JL; Stensel, HD; Ferguson, JF; Strand, SE; Ongerth, JE. (1993). Anaerobic and aerobic treatment of chlorinated aliphatic compounds. J Environ Eng 119: 300-320. http://dx.doi.org/10.1061/(ASCE)0733-9372(1993)119:2(300) HERO ID: 1717600								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			

Outcores	11 0	II! =1.	This we study + +1-	-1	1 1	1
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	20	22
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.1	Overall Score (Rounded):	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Long, JL; Stensel, HD; Ferguson, JF; Strand, SE; Ongerth, JE. (1993). Anaerobic and aerobic treatment of chlorinated aliphatic compounds. J Environ Eng 119: 300-320. http://dx.doi.org/10.1061/(ASCE)0733-9372(1993)119:2(300) HERO ID: 1717600							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	-0	criteria for high			-
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this type			
0 6 11 /	4.0	*** 1	of study.	4		
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this type			
	14. Outcomes	Not rated	of study. The metric is not	NR	NR	NR
	Unrelated to	Notrateu	applicable to this	IVIX	IVIX	IVIX
	Exposure		study type.			
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting	****	criteria for high	-		_
and Analysis			confidence as			
			expected for this type			
			of study.			
	16. Statistical	Medium	Some details were	2	1	2
	Methods and		omitted; however,			
	Kinetic		these omissions were			
	Calculations		not likely to have had			
			a substantial impact			
0.1	45 11 10 11	***	on the study results.	4		
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility of Results		criteria for high confidence as			
	of Results		expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models	NotTated	applicable to this	1111	1414	1110
	riodels		study type.			
			Sum of scores:	17	20	22
High	Medium	Low	Overall Score = Sum	1.1	Overall	1.1
J			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	

Study Reference:	Long, JL; Stensel, HD; Ferguson, JF; Strand, SE; Ongerth, JE. (1993). Anaerobic and aerobic treatment of chlorinated aliphatic compounds. J Environ Eng 119: 300-320. http://dx.doi.org/10.1061/(ASCE)0733-9372(1993)119:2(300) HERO ID: 1717600							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	-0	criteria for high			-
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this type			
0 6 11 /	4.0	*** 1	of study.	4		
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this type			
	14. Outcomes	Not rated	of study. The metric is not	NR	NR	NR
	Unrelated to	Notrateu	applicable to this	IVIX	IVIX	IVIX
	Exposure		study type.			
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting	****	criteria for high	-		_
and Analysis			confidence as			
			expected for this type			
			of study.			
	16. Statistical	Medium	Some details were	2	1	2
	Methods and		omitted; however,			
	Kinetic		these omissions were			
	Calculations		not likely to have had			
			a substantial impact			
0.1	45 11 10 11	***	on the study results.	4		
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility of Results		criteria for high confidence as			
	of Results		expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models	NotTated	applicable to this	1111	1414	1110
	riodels		study type.			
			Sum of scores:	17	20	22
High	Medium	Low	Overall Score = Sum	1.1	Overall	1.1
J			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	

Study Reference:	aerobic treat http://dx.doi	Long, JL; Stensel, HD; Ferguson, JF; Strand, SE; Ongerth, JE. (1993). Anaerobic and aerobic treatment of chlorinated aliphatic compounds. J Environ Eng 119: 300-320. http://dx.doi.org/10.1061/(ASCE)0733-9372(1993)119:2(300) HERO ID: 1717600							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	17	20 Overall Score (Rounded):	22 1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	grung i uctors.		Overall Quality Level:	High

Study Reference:	Deipser, A; Stegmann, R. (1997). Biological degradation of VCCs and CFCs under simulated anaerobic landfill conditions in laboratory test digesters. Environ Sci Pollut Res Int 4: 209-216. http://dx.doi.org/10.1007/BF02986348 HERO ID: 1739087								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name and CASRN.	1	2	2			
	2. Test Substance Purity	Low	The source and purity of the test substance were not reported nor verified by analytical means.	3	1	3			
Test Design	3. Study Controls	Unacceptable	The study did not include or report control groups to validate the system used	4	2	8			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	Medium	Some details were omitted (temp); however, sufficient data were presented to determine that the omissions were not likely to have had a substantial impact on the study results.	2	2	4			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	Unacceptable	The test inoculum was not routinely used for similar study types; degradation capability was not confirmed using controls.	4	2	8			

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Unacceptable	Outcome assessment was unable to be evaluated due to no detail or reference to methods for analysis besides a statement that "standard analytical methods used."	4	1	4
	12. Sampling Methods	Low	Details regarding sampling and analysis methods of the outcome were not fully reported, and the omissions were likely to have had a substantial impact on the study results.	3	1	3
Confounding/ Variable Control	13. Confounding Variables	Low	Only very low concentrations of perc initially added were found in the gas phase, attributed to adsorption and rapid decomposition; no validation with quantitative data.	3	1	3
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Unacceptable	The target chemical and transformation product concentrations, extraction efficiency, percent recovery, and mass balance were not reported.	4	2	8
	16. Statistical Methods and Kinetic Calculations	Low	Statistical analysis or kinetic calculations were not fully described, and the omissions may have had a substantial impact on the study results.	3	1	3

Other	17.	Not rated	Due to limited	NR	NR	NR
	Verification or		information,			
	Plausibility of		evaluation of the			
	Results		reasonableness of the			
			study results was not			
			possible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this study			
			type.			
			Sum of scores:	35	19	50
High	Medium	Low	Overall Score = Sum	2.63	Overall	4
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	Unacceptable ¹
	<2.3				Quality	
					Level:	

¹The study did not include or report control groups to validate the system used. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, four of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	Krumholz, LR; Sharp, R; Fishbain, SS. (1996). A freshwater anaerobe coupling acetate oxidation to tetrachloroethylene dehalogenation. Appl Environ Microbiol 62: 4108-4113. HERO ID: 1743881							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Limited sampling details but omissions were not likely to have had a substantial impact on the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Analytical methods used were suitable for detection and quantification of the target chemical and transformation product(s); detection limits were not reported.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical methods and kinetic calculations details were not reported.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	18	23
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.28	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Vogel, TM; McCarty, PL. (1985). Biotransformation of tetrachloroethylene to trichloroethylene, dichloroethylene, vinyl chloride, and carbon dioxide under methanogenic conditions. Appl Environ Microbiol 49: 1080-1083. HERO ID: 1744339							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1		
Test Design	3. Study Controls	Not rated	Control group details were not included; however, this study described a nonstandard/guideline test.	NR	NR	NR		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on the study results.	2	2	4		
	7. Testing Consistency	Medium	Details between test conditions across samples or study groups were not reported but these omissions were not likely to have had a substantial impact on the study results.	2	1	2		

Test	8. System Type and Design 9. Test	Medium Medium	Some system design details were not provided; however, the omissions were not likely to have had a substantial impact on the study results. Organism	2	2	2
Organisms	Organism Degradation		information was not detailed for this non-standard test; however, the omission was not likely to have had a substantial impact on interpretation of the results.			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Medium	This non-standard test used continuous-flow fixed-film methanogenic column, applicable to a treatment system.	2	1	2
	12. Sampling Methods	Medium	Limited sampling details were described for this non-standard test; however, the omissions were not likely to have had a substantial impact on the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Some information was not reported (i.e., detailed quantification of degradation products); however, these omissions were not likely to have had a substantial impact on the study results.	2	2	4

	16. Statistical Methods and	High	This metric met the	1	1	1
	Kinetic		criteria for high confidence as			
	Calculations		expected for this type			
			of study.			
Other	17. Verification	Not rated	Due to limited	NR	NR	NR
	or Plausibility		information,			
	of Results		evaluation of the			
			reasonableness of the			
			study results was not			
			possible.			
	18. QSAR	High	This metric met the	1	1	1
	Models		criteria for high			
			confidence as			
			expected for this type			
			of study.			
			Sum of scores:	20	17	27
High	Medium	Low	Overall Score = Sum	1.59	Overall	1.6
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	

Study Reference:	trichloroethy methanogeni	Vogel, TM; McCarty, PL. (1985). Biotransformation of tetrachloroethylene to trichloroethylene, dichloroethylene, vinyl chloride, and carbon dioxide under methanogenic conditions. Appl Environ Microbiol 49: 1080-1083. HERO ID: 1744339								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score				
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2				
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1				
Test Design	3. Study Controls	Low	Control groups/details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	3	2	6				
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2				
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2				

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Some sampling details were omitted but this was unlikely to have impacted the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	17 1.26	19 Overall Score (Rounded):	24 2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Control groups were not reported, limiting study evaluation.

Study Reference:	Kim, Y; Arp, DJ; Semprini, L. (2000). Chlorinated solvent cometabolism by butane- grown mixed culture. J Environ Eng 126: 934-942. http://dx.doi.org/10.1061/(ASCE)0733-9372(2000)126:10(934) HERO ID: 1747865							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	Medium	There were omissions in the reporting of test conditions.	2	2	4		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	20	23
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.15	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Bouwer, EJ; McCarty, PL. (1983). Transformations of 1- and 2-carbon halogenated aliphatic organic compounds under methanogenic conditions. Appl Environ Microbiol 45: 1286-1294. HERO ID: 18060							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by common name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported (reagent grade).	1	1	1		
Test Design	3. Study Controls	High	Unseeded sterile controls were used for comparison with each haloalkane tested.	1	2	2		
	4. Test Substance Stability	High	Samples were kept in the dark although CT is "generally inert" according to toxnet.nlm.nih.gov.	1	1	1		
Test Conditions	5. Test Method Suitability	High	Tested at 149 ug/L, well below the experimental water solubility.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	No inconsistencies were reported across studies. Conditions were well reported.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome	11. Outcome	High	Concentration of the	1	1	1
Assessment	Assessment	****	starting material was	_	1	-
	Methodology		measured with GC,			
			which demonstrated			
			the ability (or lack			
			thereof) of the			
			bacteria to transform			
			the test item.			
	12. Sampling	High	Degradation rates	1	1	1
	Methods	mgn	were not reported for	1	1	1
	Methous		this part of the study,			
			but sampling methods were			
			sufficient for			
			determining the			
			ability of the bacteria			
			to transform the			
			starting material at			
			all.			
Confounding/	13.	Medium	Uncertainties of one	2	1	2
Variable	Confounding		standard deviation			
Control	Variables		were given for			
			concentration			
			measurements for the			
			haloalkanes. No			
			variability between			
			tests was noted in the			
			study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	High	This metric met the	1	2	2
Presentation		ingn	criteria for high	1	_	_
and Analysis	Reporting		confidence as			
ana maiysis			expected for this type			
			of study.			
	16. Statistical	Medium	Kinetic data were not	2	1	2
	Methods and	Medium	provided for this part		1	2
	Kinetic		of the study (the			
	Calculations		batch study).			
Oals		11: -1.		1	1	1
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility		criteria for high			
	of Results		confidence as			
			expected for this type			
	10.0315	NT : 2	of study.	375	175	***
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	17	20	22
High	Medium	Low	Overall Score = Sum	1.1	Overall	1.1
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:	I	·	

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3		Overall	High
				Quality	
				Level:	



Study Reference:	Haas, JR; Shock, EL. (1999). Halocarbons in the environment: Estimates of thermodynamic properties for aqueous chloroethylene species and their stabilities in natural settings. Geochim Cosmo Act 63: 3429-3441. HERO ID: 1960428							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
Test Conditions	5. Test Method Suitability	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
	6. Testing Conditions	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
	7. Testing Consistency	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
	8. System Type and Design	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Outcome Assessment	11. Outcome Assessment Methodology	Low	This study presents energetic constraints that may have informed possible metabolism and transformation steps	3	1	3		

			under natural conditions.			
	12. Sampling Methods	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR
Confounding/ Variable Control	13. Confounding Variables	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation	15. Data Reporting	Not rated	Calculation.	NR	NR	NR
and Analysis	16. Statistical Methods and Kinetic Calculations	Low	Statistical analysis or kinetic calculations were not conducted or were not described clearly.	3	1	3
Other	17. Verification or Plausibility of Results	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR
			Sum of scores:	7	4	8
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Study reports calculated estimates with limited details for endpoints related to fate (thermodynamic property).

Study Reference:	Bouwer, EJ; McCarty, PL. (1982). Removal of trace chlorinated organic compounds by activated carbon and fixed-film bacteria. Environ Sci Technol 16: 836-843. http://dx.doi.org/10.1021/es00106a003 HERO ID: 1993341							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test	1. Test	High	The test substance	1	2	2		
Substance	Substance Identity	8	was identified by chemical name.		_			
	2. Test Substance Purity	Medium	The test substance source and purity were not reported; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2		
Test Design	3. Study Controls	High	Acceptable; although, the test parameters used were a control for another experiment in the study, the experiment used sodium acetate as a reference.	1	2	2		
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this did not limit the interpretation of the results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	Volatilization losses were eliminated accordingly.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		

Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	111611	criteria for high	_	_	_
B	Degradation		confidence as			
	8		expected for this type			
			of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	C	criteria for high			
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this type			
			of study.			
Confounding/	13.	Medium	Tetrachloroethylene	2	1	2
Variable	Confounding		was not the sole			
Control	Variables		source of carbon for			
			the experiment. The	<i>y</i>		
			substrate included			
			acetate and a cocktail			
			of chlorinated organic			
			compounds.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
_	Exposure		study type.		_	
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting		criteria for high			
and Analysis			confidence as			
			expected for this type			
	16 Chariaria al	11: -1-	of study.	1	1	1
	16. Statistical Methods and	High	This metric met the	1	1	1
	Methods and Kinetic		criteria for high confidence as			
	Calculations		expected for this type			
	Galculations		of study.			
Other	17. Verification	Not rated	Due to limited	NR	NR	NR
Juici	or Plausibility	rotrateu	information,	1414	1414	1111
	of Results		evaluation of the			
	or results		reasonableness of the			
			study results was not			
			possible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models	2.7.2.200	applicable to this			
			study type.			
			Sum of scores:	17	19	22
High	Medium	Low	Overall Score = Sum	1.16	Overall	1.2
8			of Weighted		Score	_
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3		Overall	High
				Quality	
				Level:	



Study Reference:	depends on to 57: 2039-204	Kästner, M. (1991). Reductive dechlorination of tri- and tetrachloroethylenes depends on transition from aerobic to anaerobic conditions. Appl Environ Microbiol 57: 2039-2046.								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score				
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2				
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1				
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2				
	4. Test Substance Stability	Medium	Stability information about the test substance was not described but was not expected to have impacted the results.	2	1	2				
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	6. Testing Conditions	Medium	Light conditions were not described; however, there omission is not likely to impact the study results.	2	2	4				
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	8. System Type and Design	Medium	Some system details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2				

			Scores/Sum of Metric Weighting Factors:		(Rounded):	
High	Medium	Low	Overall Score = Sum of Weighted	1.55	Overall Score	1.6
	Models		applicable to this study type. Sum of scores:	23	20	31
	of Results 18. QSAR	Not rated	confidence as expected for this type of study. The metric is not applicable to this	NR	NR	NR
Other	17. Verification or Plausibility	High	shown in figures. This metric met the criteria for high	1	1	1
	16. Statistical Methods and Kinetic Calculations	Medium	Some details about the statistical methods and kinetics missing and/or only	2	1	2
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Some sampling details were omitted but this was unlikely to have impacted the study results.	2	1	2
Outcome Assessment	11. Outcome Assessment Methodology	Medium	This study was a modified biodegradation test. There were adaptive transfers both with and without lactose.	2	1	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Organisms	Organism Degradation		standard test species that may have been adapted to the test substance. The deviation may have had a substantial impact on the study results.			
Test	9. Test	Low	The study used a non-	3	2	6

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3		Overall	High
				Quality	
				Level:	



Study Reference:	Balsiger, C; Holliger, C; Höhener, P. (2005). Reductive dechlorination of chlorofluorocarbons and hydrochlorofluorocarbons in sewage sludge and aquifer sediment microcosms. Chemosphere 61: 361-373. http://dx.doi.org/10.1016/j.chemosphere.2005.02.087 HERO ID: 2773669							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	Medium	Some details were omitted; however, sufficient data were reported to determine that the deviations and omissions were not likely to have had a substantial impact on the study results.	2	2	4		

	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Unacceptable	The biodegradation of perc was not reported.	4	1	4
	12. Sampling Methods	Medium	Limited sampling method details were reported; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Unacceptable	The biodegradation of perc was not reported.	4	2	8

	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	19	31
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.63	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Biodegradation results were not reported for perchloroethylene. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	Haston, ZC; McCarty, PL. (1999). Chlorinated ethene half-velocity coefficients (KS) for reductive dehalogenation. Environ Sci Technol 33: 223-226. http://dx.doi.org/10.1021/es9805876 HERO ID: 2777471							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1		
Test Design	3. Study Controls	Medium	Controls were not reported but were not likely to have impacted results.	2	2	4		
	4. Test Substance Stability	High	Not discussed but not likely to have impacted results.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	Low	The inoculum was not routinely used for similar study types. The deviation may have had a substantial impact on the study results.	3	2	6		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome	11. Outcome	Low	Results provided	3	1	3
Assessment	Assessment Methodology		maximum transformation rates under specific conditions and selected test species.			
	12. Sampling Methods	Medium	Sampling methods were not reported; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	21	20	29
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.45	Overall Score (Rounded):	1.5
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:		Owned Treatme	87). Estimating Volati nt Works (pp. 670-678			
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by common name.	1	2	2
	2. Test Substance Purity	Medium	The test substance purity and source were not reported; however, the omissions were not likely to have impacted study results.	2	1	2
Test Design	3. Study Controls	Medium	Controls were not used; however, the omissions were not likely to have impacted study results.	2	2	4
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type (monitoring).	NR	NR	NR
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Medium	Some testing conditions were not reported but were unlikely to have impacted the study results.	2	2	4
	7. Testing Consistency	Not rated	Not applicable; multiple study groups were not reported.	NR	NR	NR
	8. System Type and Design	Medium	Some system design details were not provided; however, this was not likely to have influenced the interpretation of the results.	2	1	2
Test Organisms	9. Test Organism Degradation	High	Inoculum source reported.	1	2	2

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Medium	Multiple removal processes using specific WWTP operational conditions were considered in this study that may have caused incomplete reporting of the biodegradation outcome.	2	1	2
	12. Sampling Methods	Medium	Sampling methods were not clearly reported but were not likely to have had a substantial impact on the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Low	There was insufficient evidence presented to confirm the processes causing disappearance of perc.	3	2	6
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	17. Verification or Plausibility of Results	Medium	The study results were reasonable; however, little information to evaluate or confirm partitioning or transformation were provided.	2	1	2
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	18	31

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.72	Overall Score (Rounded):	1.7
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	weighting Pactors.		Overall Quality Level:	Medium



Study Reference:	tetrachloroet conditions. A HERO ID: 280	hylene and trichl ppl Environ Micro 2294	Freedman, DL; Gossett, JM. (1989). Biological reductive dechlorination of tetrachloroethylene and trichloroethylene to ethylene under methanogenic conditions. Appl Environ Microbiol 55: 2144-2151. HERO ID: 2802294								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score					
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2					
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1					
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2					
	4. Test Substance Stability	Medium	The test substance stability and preparation were discussed; however, loss of volatiles was noted.	2	1	2					
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1					
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2					
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1					
	8. System Type and Design	Medium	Some system design details were not provided; however, omissions were not likely to have had a substantial impact on the study results.	2	1	2					
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2					

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Sampling methods were described, and losses were noted and attributed to sampling.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric	18 1.21	19 Overall Score (Rounded):	23 1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	Weighting Factors:		Overall Quality Level:	High

Study Reference:	Cichocka, D; Nikolausz, M; Haest, PJ; Nijenhuis, I. (2010). Tetrachloroethene conversion to ethene by a Dehalococcoides-containing enrichment culture from Bitterfeld. FEMS Microbiol Ecol 72: 297-310. http://dx.doi.org/10.1111/j.1574-6941.2010.00845.x HERO ID: 2951908							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	General sources and purity reported for all chemical in the study were reported; however, tetrachloroethene source and purity were not specified.	2	1	2		
Test Design	3. Study Controls	Low	Control did not report 0% loss; 70% loss was reported and attributed to sampling methods and/or adsorption. Details regarding steps to alleviate or account for this in the active tests were not discussed.	3	2	6		
	4. Test Substance Stability	Medium	Details regarding this metric were not discussed; however, this did not hinder the interpretation of the study.	2	1	2		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	Medium	Details regarding the test condition were not reported; however, these omissions were not likely to have hindered the interpretation of the results	2	2	4		

	7. Testing Consistency	Medium	Limited details were given for the substrate specific experiment; in the growth assay, one of three test results was negative, yet this appeared to be overlooked in the overall summary, which suggested that the culture invariably grew on tetrachloroethene.	2	1	2
	8. System Type and Design	Medium	Some system design issues were not reported, but the omissions were not likely to have had a substantial impact on the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	High	The source of the culture and enrichment methods were described and referenced.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Medium	Loss of the test material was not well defined with supporting analytical data.	2	1	2
	12. Sampling Methods	Low	Not reported; however, the sampling methods were attributed to loss during the control, which may also have influenced the experimental study results.	3	1	3

C C	10	T	T. 1:11 .	1	1	2
Confounding/	13.	Low	It did not appear that	3	1	3
Variable	Confounding		steps were taken to			
Control	Variables		account for or assess			
			the possibility that			
			loss during the			
			experiments was not			
			due to adsorption or			
			sampling, and			
			complete loss was			
			attributed to the			
			culture; this may have			
			limited the validity of			
			the results. Although			
			formation of products			
			was observed in the			
			experiments (and not			
			in the control), it was			
			possible that			
			sampling and			
			adsorption may have			
			played a role, yet this			
			uncertainty was not			
			addressed;			
			additionally, one of			
			three growth			
			experiments was			
			negative, suggesting			
			that the culture did			
			not grow invariably			
			on tetrachloroethene.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Low	The target chemical	3	2	6
Presentation	Reporting		initial concentrations,			
and Analysis			extraction efficiency,			
			percent recovery, and			
			mass balance were			
· ·			not reported and			
			there was insufficient			
			evidence presented to			
			confirm that parent			
			compound			
			disappearance was			
			not likely due to some			
			other process.			
	16. Statistical	Medium	Statistical analysis or	2	1	2
	Methods and	Medium	kinetic calculations			_
	Kinetic		details were not			
	Calculations		described.			
	Calculations		uesti ibeu.			

Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	29	19	39
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2.05	Overall Score (Rounded):	2.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium



Study Reference:	Cabirol, N; Perrier, J; Jacob, F; Fouillet, B; Chambon, P. (1996). Role of methanogenic and sulfate-reducing bacteria in the reductive dechlorination of tetrachloroethylene in mixed culture. Bull Environ Contam Toxicol 56: 817-824. http://dx.doi.org/10.1007/s001289900119 HERO ID: 3568089							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name and synonyms.	1	2	2		
	2. Test Substance Purity	High	Details on this metric were not entirely clear due to a possible typo; however, the source and purity were indicated.	1	1	1		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this did not limit the interpretation of the results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		

Test Organisms	9. Test Organism	High	This metric met the criteria for high	1	2	2
Organisms	Degradation		confidence as expected for this type of study; source and enrichment were described.			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Details regarding this metric were limited but this did not limit the interpretation of the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	Degradation results by various bacteria were analyzed and discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	16	19	21
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.11	Overall Score (Rounded):	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	aerobic perch	nloroethylene deg echnol 40: 7796-7 2948	arra, M; Caminal, G; Vi gradation by the white 7802. http://dx.doi.or	e-rot fungi	us Trametes v	versicolor.
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The source of the test substance was reported; source and purity of radiolabeled material were reported.	1	1	1
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	Inconsistencies were not reported or identified.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study. The organism and culture methods were	1	2	2
	10. Test Organism Partitioning	Not rated	described. The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Medium	This metric met the criteria for high confidence as expected for this type of study. Assessment and analytical methods were described.	2	1	2
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	Details regarding this metric were adequately reported.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	14 1.06	18 Overall Score (Rounded):	19 1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	reighting ractors.		Overall Quality Level:	High

Study Reference:	Lee, W; Park, SH; Kim, J; Jung, JY. (2015). Occurrence and removal of hazardous chemicals and toxic metals in 27 industrial wastewater treatment plants in Korea. Desalination Water Treat 54: 1141-1149. http://dx.doi.org/10.1080/19443994.2014.935810 HERO ID: 3580141							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were not reported; however, the test substance was detected by GC-MS analytical technique.	1	1	1		
Test Design	3. Study Controls	Medium	The use of controls was not reported but likely did not impact the study results.	2	2	4		
	4. Test Substance Stability	Medium	Sample storage conditions were not reported but were unlikely to have influenced the study results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	Medium	As this was a screening study looking at several WWTPs, specific conditions were not reported but were not critical to the study results.	2	2	4		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		

	8. System	Medium	Some system details	2	1	2
	Type and	Medium	were omitted but		1	
	Design		these omissions were			
			unlikely to have			
			impacted the study			
			results.			
Test	9. Test	Medium	Details regarding the	2	2	4
Organisms	Organism		test organisms at each			
	Degradation		WWTP were not			
			given but their			
			omission did not			
			likely impact the			
			study results.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	-	criteria for high			
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	Medium	Some sampling	2	1	2
	Methods		details were omitted			
			but this was unlikely			
			to have impacted the			
			study results.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this type			
	11.5		of study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
_	Exposure		study type.		_	_
Data	15. Data	Medium	Transformation	2	2	4
Presentation	Reporting		products were not			
and Analysis			reported, and			
			volatilization was			
			likely a large factor in the lower effluent			
			concentrations since			
			the removal rates			
			were proportional to air to water ratios.			
	16. Statistical	High	This metric met the	1	1	1
	Methods and	nıgıı	criteria for high	1	1	1
	Kinetic		confidence as			
	Calculations		expected for this type			
	Garcarations		of study.			
Other	17. Verification	High	This metric met the	1	1	1
Other	or Plausibility	111511	criteria for high	1	1	1
	of Results		confidence as			
	or results		expected for this type			
			of study.			
]		or study.			

	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	20	31
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.55	Overall Score (Rounded):	1.6
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High



Study Reference:	Parsons, F; Lage, GB; Rice, R. (1985). Biotransformation of chlorinated organic solvents in static microcosms. Environ Toxicol Chem 4: 739-742. http://dx.doi.org/10.1002/etc.5620040604 HERO ID: 3797820								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	Test substance purity was reported.	1	1	1			
Test Design	3. Study Controls	High	Solvent blank on non- viable microcosm controls were used.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	Medium	The authors noted subtle inconsistencies between the microcosms that may have caused extended lag periods from some.	2	1	2			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			

Outcome	11. Outcome	Medium	Concentration of the	2	1	2
Assessment	Assessment Methodology		test chemical was not monitored but			
			concentrations of			
			biodegradation			
			products were			
			measured throughout the study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods	mgn	criteria for high	1	1	1
	rictious		confidence as			
			expected for this type			
			of study.			
Confounding/	13.	Medium	There was large	2	1	2
Variable	Confounding		uncertainty in the			
Control	Variables		concentrations of the			
			perc degradation			
			products but this			
			likely did not impact			
			the study results.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure	15. 1	study type.			
Data	15. Data	Medium	Degradation products	2	2	4
	Reporting		were monitored but			
and Analysis			biodegradation rate			
			information was not			
	16. Statistical	High	reported. This metric met the	1	1	1
	Methods and	High	criteria for high	1	1	1
	Kinetic		confidence as			
	Calculations		expected for this type			
	Garculations		of study.			
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility		criteria for high			
	of Results		confidence as			
			expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	19	20	25
High	Medium	Low	Overall Score = Sum	1.25	Overall	1.3
			of Weighted		Score	
			Scores/Sum of Metric Weighting Factors:		(Rounded):	
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	-
					Level:	

Study Reference:	fate and pers Technol 17: 6 HERO ID: 379	istence of volatile 11-617. http://di 7829	s, JA. (1983). Mesocosi organic compounds i x.doi.org/10.1021/es(n coastal s 00116a00	seawater. Env 9	viron Sci
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The source and purity of the test substance were not reported; however, the test substance was identified by analytical means.	1	1	1
Test Design	3. Study Controls	Medium	Sterile control use reported; however, no reference substance was reported.	2	2	4
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	Medium	Limited detail was reported on the test method.	2	1	2
	6. Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on the study results.		2	4
	7. Testing Consistency	Medium	Control experiment was run on different dates, not correlating with other systems.	2	1	2
	8. System Type and Design	Medium	Details regarding the system type and design were limited; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2

Test	9. Test	Medium	The test organism,	2	2	4
Organisms	Organism Degradation		species, and inoculum source were reported,			
			but were not			
			routinely used for			
			similar study types;			
			however, the			
			deviation was not			
			likely to have had a			
			substantial impact on			
	10. Test	Not rated	the study results. The metric is not	NR	NR	NR
	Organism	Notrateu	applicable to this	INIX	INIX	NK
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	g	criteria for high	_	_	-
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	Medium	Limited details on the	2	1	2
	Methods		sampling methods			
			were reported.			
Confounding/	13.	Not rated	No confounding	NR	NR	NR
Variable	Confounding		variables were noted.			
Control	Variables	Maturitad	The second size of the second	ND	ND	ND
	14. Outcomes Unrelated to	Not rated	The metric is not applicable to this	NR	NR	NR
	Exposure		study type.			
Data	15. Data	Medium	Details regarding this	2	2	4
Presentation	Reporting	Picaram	metric were limited;	_	_	•
and Analysis			some of the data were			
			inferred from figures.			
	16. Statistical	Low	Rate constants and	3	1	3
	Methods and		half-lives were			
	Kinetic		calculated based on			
	Calculations		periods during the			
			experiments when			
			volatilization appears to be dominant.			
Other	17. Verification	Not rated	Due to limited	NR	NR	NR
ouici	or Plausibility	rottateu	information,	1910	IVIX	1111
	of Results		evaluation of the			
	or resource		reasonableness of the			
			study results was not			
			possible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.	_		_
			Sum of scores:	23	18	32
High	Medium	Low	Overall Score = Sum	1.78	Overall	1.8
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3		Overall	Medium
				Quality	
				Level:	



Study Reference:	fate and pers Technol 17: 6 HERO ID: 379	Wakeham, SG; Davis, AC; Karas, JA. (1983). Mesocosm experiments to determine the fate and persistence of volatile organic compounds in coastal seawater. Environ Sci Technol 17: 611-617. http://dx.doi.org/10.1021/es00116a009 HERO ID: 3797829							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The source and purity of the test substance were not reported; however, the test substance was identified by analytical means.	1	1	1			
Test Design	3. Study Controls	Medium	Sterile control used; however, use of a reference substance was not reported.	2	2	4			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	Medium	Limited detail was reported on the test method.	2	1	2			
	6. Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on the study results.	2	2	4			
	7. Testing Consistency	Medium	Control experiment was run on different dates, not correlating with other systems	2	1	2			
	8. System Type and Design	Medium	Some system design details were not provided; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2			

Test	9 Test	Medium	The test organism	2.	2	4
Test Organisms	9. Test Organism Degradation	Medium Not rated	The test organism, species, and inoculum source were reported, but were not routinely used for similar study types; however, the deviation was not likely to have had a substantial impact on the study results. The metric is not	2 NR	2 NR	4 NR
	Organism Partitioning	Not fated	applicable to this study type.	TVIC	IVIC	IVIC
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Limited details on the sampling methods were reported.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data	Medium	Data on the test substance concentration in different media were not reported; however, these omissions were not likely to have had a substantial impact on the study results.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Low	Rate constants and half-lives were calculated based on periods during the experiments when volatilization appears to dominant.	3	1	3
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR

			Sum of scores:	23	18	32
High	Medium	Low	Overall Score = Sum	1.78	Overall	1.8
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Medium
					Quality	
					Level:	



Study Reference:	tests: Tetrac	hloroethylene. H .europa.eu/regis	gency). (2017). Biode elsinki, Finland. Retri tration-dossier/-/reg	eved from	ossier/14303	_
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	Medium	Conflicting information about the test substance was provided (unnamed constituent).	2	2	4
Su Pu	2. Test Substance Purity	Medium	The test substance source and purity were not reported; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2
Test Design	3. Study Controls	Medium	Concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2
Test Conditions	5. Test Method Suitability	Unacceptable	The test method(s) were not well reported. These deviations or lack of information resulted in serious flaws that made the study unusable.	4	1	4

	6. Testing Conditions	Unacceptable	Modified shake flask study with no details reported to evaluate testing conditions.	4	2	8
	7. Testing Consistency	Not rated	Not applicable; multiple study groups were not reported.	NR	NR	NR
	8. System Type and Design	Unacceptable	Modified shake flask study with no system type or design details reported in this secondary source.	4	1	4
Test Organisms	9. Test Organism Degradation	Unacceptable	The test organism information was not reported in this secondary source; more details may be available in the primary source.	4	2	8
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	Due to limited information in this secondary source, evaluation of the reasonableness of the outcome assessment methodology was not possible.	NR	NR	NR
	12. Sampling Methods	Unacceptable	Not reported in this secondary source; more details may be available in the primary source.	4	1	4
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Not rated	Not reported.	NR	NR	NR

Other	17.	Not rated	Due to limited	NR	NR	NR
	Verification or		information,			
	Plausibility of		evaluation of the			
	Results		reasonableness of the			
			study results was not			
			possible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	29	15	42
High	Medium	Low	Overall Score = Sum	2.8	Overall	4
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Unacceptable ¹
					Quality	
					Level:	

¹Testing methods and conditions were not reported and data provided were insufficient to interpret results in this secondary source; citing HERO ID 18157, Mudder, T. I. and J. L. Musterman (1982). Abstracts of Papers of the American Chemical Society Development of empirical structure biodegradability relationships and biodegradability testing protocol for volatile and slightly soluble priority pollutants. Kansas City, MO, ACS. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, five of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	tetrachloroet	hylene by toluen echnol 18: 775–7 0340	arbieri, P; Wood, TK. (e-o-xylene monooxygo 78.			
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Medium	Some details were omitted; however, the omissions were not likely to have had a substantial impact on the interpretation of results.	2	2	4
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this	1	2	2

			type of study.			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Low	Details regarding this metric were limited or unclear. Pure cultures were evaluated in this study.	3	1	3
	12. Sampling Methods	Low	Details regarding this metric were limited or unclear.	3	1	3
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Data reported had limited details and/or were unclear.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Low	Details regarding this metric were limited; degradation and chloride concentrations were relative to replicates tested at different conditions.	3	1	3
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	19	29
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.53	Overall Score (Rounded):	1.5
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:		8). Tyndal AFB, F	degradation of C1 and L: Air Force Engineeri			carbons.
Domain	Metric Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Low	The test substance source and purity were not reported.	3	1	3
Test Design	3. Study Controls	Medium	Testing conditions were monitored, reported, and appropriate for the method; results indicated that leakage was a possible mechanism of test substance loss.	2	2	4
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	8. System	High	This metric met the	1	1	1
	Type and	.0	criteria for high	_	_	_
	Design		confidence as			
			expected for this type			
			of study.			
Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	· ·	criteria for high			
	Degradation		confidence as			
			expected for this type			
			of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	J	criteria for high			
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	Medium	Sampling details were	2	1	2
	Methods		not fully reported, but			
			these omissions were			
			unlikely to have)		
			impacted the study			
			results.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this type			
			of study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Low	Extraction efficiency,	3	2	6
Presentation	Reporting		percent recovery, and			
and Analysis			mass balance were			
			not reported;			
			analytical methods			
			were not reported.			
	16. Statistical	Medium	Calculations were	2	1	2
	Methods and		summarized, all			
	Kinetic		experimental values			
	Calculations		were not reported.			
Other	17. Verification	Low	Due to limited	3	1	3
	or Plausibility		information,			
	of Results		evaluation of the			
			reasonableness of the			
			study results was not			
			possible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	25	20	33

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.65	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Due to limited information, evaluation of the reasonableness of the study results was not possible.



Study Reference:	BY 1,1,1-TRIC PERCHLOROF	CHLOROETHANE, ETHYLENE, Part 2 FSCATS RefID: 30	HIBITION OF ANAEROE METHYLENE CHLORID . (OTS: OTS0517178; 8 9930; CIS: NA).	E, TRICH	LOROETHYLE	ENE AND
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Low	The source and purity of the test substance were not reported or verified by analytical means.	3	1	3
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2

Outcome Assessment Ass
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Diodegradation. 12. Sampling High This metric met the criteria for high confidence as expected for this type of study.
12. Sampling High This metric met the criteria for high confidence as expected for this type of study.
Methods Confounding/Variable Control It also be a confidence as expected for this type of study. Confounding/Variable Control It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this exposure It also be a confidence as expected for this type. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study. It also be a confidence as expected for this type of study.
Confounding/Variable Confounding Variables Lambda Presentation and Analysis Confounding/Data Presentation and Analysis Confounding/Variables Confounding Confounding Confounding Confounding Confounding Confounding Confounding Confidence as expected for this type of study. Not rated The metric is not applicable to this study type. Data Presentation and Analysis Confounding Confounding Confounding Confidence as expected for this type of study. Not rated The metric is not applicable to this study type. Data Presentation and Analysis Confidence as expected for this type of study. 16. Statistical High This metric met the 1 1 1 1
Confounding/ Variable Confounding This metric met the criteria for high confidence as expected for this type of study. The metric is not applicable to this study type. This metric met the criteria for high confidence as expected for this type of study. The metric is not applicable to this study type. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of study. This metric met the criteria for high confidence as expected for this type of
Confounding/Variable Control This metric met the criteria for high confidence as expected for this type of study. The metric is not applicable to this study type.
Confounding Variable Confounding Variable Control Variables Confounding Variables Confounding Variables Confidence as expected for this type of study. 14. Outcomes Unrelated to Exposure Data Presentation and Analysis Reporting Confidence as expected for this metric is not applicable to this study type. Confidence as expected for this type of study. Confidence as expected for this type of st
Control Confounding Criteria for high Control Variables Confidence as expected for this type of study.
Control Variables confidence as expected for this type of study. 14. Outcomes Unrelated to Exposure Data Presentation and Analysis High This metric met the criteria for high confidence as expected for this type of study. 16. Statistical High This metric met the 1 2 2 Criteria for high confidence as expected for this type of study. 16. Statistical High This metric met the 1 1 1
Lagrangian Lag
Data Presentation and Analysis 16. Statistical High This metric met the 1 1 1 1 1 1 1 1 1
14. Outcomes Unrelated to Exposure Data Presentation and Analysis 16. Statistical Not rated The metric is not applicable to this study type. Not rated The metric is not applicable to this study type. Not rated The metric is not applicable to this study type. Not rated The metric is not applicable to this study type. 15. Data Reporting Criteria for high confidence as expected for this type of study. 16. Statistical High This metric met the 1 1 1
Unrelated to Exposure study type. Data 15. Data High This metric met the criteria for high confidence as expected for this type of study. 16. Statistical High This metric met the 1 1 1 1
Exposure study type. Data Presentation and Analysis Figure
Data Presentation and Analysis 15. Data Reporting High Criteria for high confidence as expected for this type of study. 1 2 2 16. Statistical High This metric met the criteria for high confidence as expected for this type of study. 1 1 1
Presentation and Analysis Reporting Criteria for high confidence as expected for this type of study. 16. Statistical High This metric met the 1 1 1
and Analysis confidence as expected for this type of study. 16. Statistical High This metric met the 1 1 1
expected for this type of study. 16. Statistical High This metric met the 1 1 1
of study. 16. Statistical High This metric met the 1 1 1
16. Statistical High This metric met the 1 1 1
Methods and criteria for high
Kinetic confidence as
Calculations expected for this type
of study.
Other17. VerificationMediumThe extraction212
or Plausibility recovery was 50%.
of Results
18. QSAR Not rated The metric is not NR NR NR
Models applicable to this
study type.
Sum of scores: 21 20 26
High Medium Low Overall Score = Sum 1.3 Overall 2.3
of Weighted Score
Scores/Sum of Metric (Rounded):
Weighting Factors:
≥ 1 and < 1.7 ≥ 1.7 and < 2.3 ≥ 2.3 and ≤ 3 Overall Low ¹
Quality Level:

Study Reference:	biodegradation report CR806	on of the chlorina 890-01 coop agre F1-2A; DCN: 40-80	Company). (1980). Int ted methane, ethane a eement [TSCA Submiss)24098; TSCATS RefID	and ethen sion]. (OT	e compounds S: OTS05091'	:: Progress 77; 8EHQ
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The starting material had reported impurities; however, identified impurities were not likely to have had a substantial impact on the study results.	2	1	2
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Low	Testing conditions were not reported however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on study results.	3	2	6
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type	1	1	1
Test Organisms	9. Test Organism Degradation	High	of study. This metric met the criteria for high confidence as expected for this type	1	2	2
	10. Test Organism Partitioning	Not rated	of study. The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	18 1.25	20 Overall Score (Rounded):	25 1.7

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Medium ¹		
					Quality			
					Level:			
¹ The study's overall quality rating was downgraded. Rationale: The starting material had reported								
impurities.								



Study Reference:	halogenated a http://dx.doi	Bouwer, EJ; Rittmann, BE; McCarty, PL. (1981). Anaerobic degradation of halogenated 1- and 2-carbon organic compounds. Environ Sci Technol 15: 596-599. http://dx.doi.org/10.1021/es00087a012 HERO ID: 9818								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score				
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2				
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1				
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2				
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2				
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
Test Organisms	9. Test Organism Degradation	Medium	Organisms from laboratory scale digester were used in the study; however, the deviation was not likely to have had a substantial impact on the study results.	2	2	4				

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Some sampling details were omitted (sampling frequency was reported but method was not); however, these omissions were unlikely to have impacted the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	17 1.15	Overall Score (Rounded):	23 1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	halogenated a http://dx.doi	Bouwer, EJ; Rittmann, BE; McCarty, PL. (1981). Anaerobic degradation of halogenated 1- and 2-carbon organic compounds. Environ Sci Technol 15: 596-599. http://dx.doi.org/10.1021/es00087a012 HERO ID: 9818							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

Test Organisms	9. Test Organism Degradation	Medium	Organisms from laboratory scale digester were used in the study; however, the deviation was not likely to have had a substantial impact on the study results.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Some sampling details were omitted (sampling frequency was reported but method was not); however, these omissions were unlikely to have impacted the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	Low	Greater than 100% remaining relative to the controls after 25 weeks.	3	1	3
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR

			Sum of scores:	19	20	25
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.25	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Greater than 100% of test substance was remaining relative to the controls after 25 weeks.

Study Reference:	hydrocarboi	Jensen, S; Rosenberg, R. (1975). Degradability of some chlorinated aliphatic hydrocarbons in sea water and sterilized water. Water Res 9: 659-661.								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]		Metric Score	Metric Weighting Factor	Weighted Score				
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2				
	2. Test Substance Purity	Medium	The test substance source and purity were not reported; however, the test substance was measured analytically.	2	1	2				
Test Design	3. Study Controls	Low	Appropriate negative control but no positive or toxicity controls reported in this study.	3	2	6				
	4. Test Substance Stability	Low	The test substance stability, preparation, and storage conditions were not reported, and these factors were likely to have had an impact on the study results.	3	1	3				
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	6. Testing Conditions	Medium	Test conditions reported with some details omitted.	2	2	4				
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				

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	8. System	Medium	The test system	2	1	2
	Type and		was reported for			
	Design		both open and			
			closed systems			
			each under light			
			and dark condition			
			with some details			
			omitted; however,			
			omissions were not			
			likely to have had a			
			substantial impact			
			on the study			
			results.			
Test	9. Test	Low	The inoculum	3	2	6
Organisms	Organism	2011	source was not		_	· ·
018	Degradation		routinely used and			
	Degradation		was not validated			
			for microbial			
			action. The			
			deviation may have			
			had a substantial			
			impact on the			
	10 7	N 1	study results.	ND	MD	ND
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
_	Partitioning	_	study type.		_	
Outcome	11. Outcome	Low	This study included	3	1	3
Assessment	Assessment		multiple removal			
	Methodology		pathways, which			
			may have limited			
			evaluation of the			
			biodegradation			
			endpoint.			
	12. Sampling	Unacceptable	Serious	4	1	4
	Methods		uncertainties or			
			limitations were			
			identified in			
			sampling methods			
			of the outcome of			
			interest (leaks in			
			valves) and these			
			were likely to have			
			had a substantial			
			impact on the			
			results, resulting in			
			serious flaws			
			which made the			
			study unusable.			

Confounding/	13.	Low	Leaks were noted;	3	1	3
Variable Control	Confounding Variables		loss in open systems was attributed to possible volatilization; not controlled or quantified.			
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely due to some other process; this was noted by the authors and concluded that closed systems should be used to assess degradation.	3	2	6
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible (i.e., reference substance not used; loss was not confined to one process).	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	32 2.32	0verall Score (Rounded):	44
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Serious uncertainties or limitations were identified in sampling methods of the outcome of interest. In addition, loss from leaks in valves and open test systems were likely to have a substantial impact on the results, making the study unusable. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics was rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.



Study Reference:		ity pollutant com	CI; Barth, EF. (1981). pounds. J Water Pollu			
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	8	criteria for high	_	_	_
	Methodology		confidence as			
			expected for this type			
			of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this type			
			of study.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this type			
			of study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
_	Exposure	2.5. 11	study type.			
Data	15. Data	Medium	Some quantitative	2	2	4
Presentation	Reporting		details were omitted;			
and Analysis			however, overall			
			results were clearly			
	16 0 1 1 1	M 1:	reported.	2	1	2
	16. Statistical Methods and	Medium	Some details were		1	2
	Kinetic		omitted; however, these omissions were			
	Calculations		not likely to have had			
	Calculations		a substantial impact			
			on the study results.			
Other	17. Verification	High	This metric met the	1	1	1
other	or Plausibility	Iligii	criteria for high	1	1	1
	of Results		confidence as			
	or results		expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	18	20	24
High	Medium	Low	Overall Score = Sum	1.2	Overall	1.2
J			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	

Study Reference:	(1981). Intro	Wood, PR; Parsons, FZ; DeMarco, J; Harween, HJ; Lang, RF; Payan, IL; Ruiz, MC. (1981). Introductory study of the biodegradation of the chlorinated methane, ethane and ethene compounds. Paper presented at American Water Works Association Annual Conference and Exposition, June 7-11, 1981, St. Louis, MO. HERO ID: 9881							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Medium	The test substance source and purity were not reported; however, the test substance was detected by GC-MS analytical technique.	2	1	2			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	Low	There were some omissions in the reporting of test conditions. pH, specific temperature and light control were not reported.	3	2	6			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism Degradation		criteria for high confidence as expected for this type of study.			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Absorption was discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Specific chemical concentrations were not reported.	2	2	4
-	16. Statistical Methods and Kinetic Calculations	Medium	Half-life calculation was not described	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	20	20	28
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.4	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:		tile organic subst 142. 0427	a, JK; St. Pierre, CC; Zy ances in aqueous env		. Water Pollu	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1
Test Design	3. Study Controls	Medium	A control for error evaluation was performed at 40 °C.	2	2	4
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	Not rated	This metric met the criteria for high confidence as expected for this type of study.	NR	NR	NR
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Outcome	11. Outcome	Medium	An experimental	2	1	2
Assessment	Assessment		error of 5% was			
	Methodology		determined from			
			data gathered at 40			
			degrees C.			
	12. Sampling	Medium	Some details	2	1	2
	Methods		regarding this metric			
			were not reported;			
			however, the			
			omissions were			
			unlikely to have			
			hindered the			
			interpretation of			
C C 1' /	12	NT 1	results.	MD	ND	ND
Confounding/	13.	Not rated	No confounding	NR	NR	NR
Variable Control	Confounding		variables were noted.			
Control	Variables 14. Outcomes	Not rated	The metric is not	NR	ND	ND
	Unrelated to	Not rated		NK	NR	NR
			applicable to this study type.			
Data	Exposure 15. Data	Medium	Some data were not	2	2	4
Presentation	Reporting	Medium	reported (i.e., mean	۷	Z	4
and Analysis	Reporting		values reported);			
and Analysis			however, these			
			omissions were not			
			likely to have had a			
			substantial impact on			
			the study results.			
	16. Statistical	Medium	Experimental error of	2	1	2
	Methods and		5% determined from			
	Kinetic		data gathered at 40			
	Calculations		°C; however, the data			
			were not included.			
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility		criteria for high			
	of Results		confidence as			
			expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
*** 1	16.11		Sum of scores:	17	16	23
High	Medium	Low	Overall Score = Sum	1.44	Overall	1.4
			of Weighted		Score	
			Scores/Sum of Metric Weighting Factors:		(Rounded):	
1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	

Study Reference:	methylene ch tetrachloroet	lloride, chlorofor hylene, and other echnol 9: 833-83	llos, GJ. (1975). Evapo m, 1,1,1-trichloroetha r chlorinated compou 8. http://dx.doi.org/1	ne, trichl nds in dil	oroethylene, ute aqueous s	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	Test substance purity and source not reported; however, MS analysis performed at start of study, m/z corresponds to tetrachloroethylene.	2	1	2
Test Design	3. Study Controls	Not rated	Study controls were not reported for the hydrolysis study. Methanol was used as a co-solvent.	NR	NR	NR
	4. Test Substance Stability	High	The test substance preparation was reported, and MS analysis was performed at start of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	Water was purged with air 15 min prior to initiation of study; the authors appeared to be assuming that hydrolysis was followed by oxidation; thus, by having an abundance of oxygen, they ensured that the ratedetermining step was hydrolysis.	1	2	2

	7. Testing	High	This metric met the	1	1	1
	Consistency	0-*	criteria for high	_	_	-
			confidence as			
			expected for this type			
			of study.			
	8. System	High	This metric met the	1	1	1
	Type and	· ·	criteria for high			
	Design		confidence as			
			expected for this type			
			of study.			
Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to this			
J	Degradation		study type.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	The outcome of	1	1	1
Assessment	Assessment	****	interest and its basis		_	-
	Methodology		were reported.			
	12. Sampling	Medium	Details regarding this	2	1	2
	Methods	Medium	metric were limited		1	2
	Methods		but this did not limit			
			the interpretation of			
			the results.			
Confounding/	13.	Medium	Transformation	2	1	2
Confounding/ Variable	Confounding	Mediuiii			1	۷
Control	Variables		products were			
Control	variables		assumed; however,			
			they were never determined			
	14 0-4	Nattad	experimentally.	ND	ND	ND
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
-	Exposure	37 11	study type.			
Data	15. Data	Medium	Transformation	2	2	4
Presentation	Reporting		products were not			
and Analysis			identified.	_		
	16. Statistical	Medium	Statistical methods or	2	1	2
	Methods and		kinetic calculations			
	Kinetic		were not reported.			
	Calculations					
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility		criteria for high			
	of Results		confidence as			
			expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	18	16	22
High	Medium	Low	Overall Score = Sum	1.38	Overall	1.4
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:		(Rounded).	

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3		Overall	High
				Quality	
				Level:	



Study Reference:	Rate Constan Environ Sci T HERO ID: 661	ts for Selected Ch echnol 23: 965-9 098	vitch, LM; Wolfe, NL. (1 llorinated Methanes E 69. http://dx.doi.org/	thanes Et 10.1021/	henes and Pr es00066a00	opanes. 6
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name and CASRN.	1	2	2
	2. Test Substance Purity	Medium	The source and purity of the test substance were stated in a general manner relating to all materials in the study.	2	1	2
Test Design	3. Study Controls	Medium	Study controls were not included but this did not limit the interpretation of the results.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were limited but this did not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	High	The method was suitable for the substance; test substance concentration was no higher than 10% of its water solubility limit.	1	1	1
	6. Testing Conditions	Medium	Details regarding this metric were general but this did not limit the interpretation of the results.	2	2	4
	7. Testing Consistency	Medium	Details regarding this metric were general but this did not limit the interpretation of the results.	2	1	2
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to this			
J	Degradation		study type.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	8	criteria for high	-		_
	Methodology		confidence as			
	i rediredelegy		expected for this type			
			of study.			
	12. Sampling	Medium	Details regarding this	2	1	2
	Methods		metric were not	_	_	
			reported but this did			
			not limit the			
			interpretation of the			
			results.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding	<i>G</i> -	criteria for high			
Control	Variables		confidence as			
			expected for this type			
			of study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Low	Details regarding the	3	2	6
Presentation	Reporting		analytical procedure			
and Analysis	17 1 8		were very general;			
J			this may limit			
			meaningful/precise			
			interpretation of the			
			results.			
	16. Statistical	High	This metric met the	1	1	1
	Methods and		criteria for high			
	Kinetic		confidence as			
	Calculations		expected for this type			
			of study.			
Other	17. Verification	High	This metric met the	1	1	1
	or Plausibility		criteria for high			
	of Results		confidence as			
			expected for this type			
			of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.		<u> </u>	
			Sum of scores:	22	18	30
High	Medium	Low	Overall Score = Sum	1.67	Overall	1.7
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Medium
					Onality	
					Quality	

Study Reference:	Cook, A. (201 compounds a Water Res 46 HERO ID: 100	2). Recycled water: nd use of 1,4-dichlo: 93-106. http://dx.08978	usetti, F; Devine, B; Va potential health risks robenzene as treatmo doi.org/10.1016/j.wa	from vol ent perfo atres.201	latile organion rmance indion 1.10.032	cator.
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1
Test Design	3. Study Controls	Low	Limited details about the analytical standard were reported.	3	2	6
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Outcome Assessment	11. Outcome Assessment Methodology	Medium	WWTP monitoring study, could be considered site specific data.	2	1	2
	12. Sampling Methods	Medium	Some details were limited; however, this did not limit the interpretation of the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Some details were lacking, but this was not likely to have affected interpretation of the results.	2	2	4
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	17	25
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.47	Overall Score (Rounded):	1.5
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	compounds 1103-1111)	Tancrede, M; Yanagisawa, Y; Wilson, R. (1992). Volatilization of volatile organic compounds from showers: I. Analytical method and quantitative assessment (pp. 1103-1111). (BIOSIS/92/15798). Tancrede, M; Yanagisawa, Y; Wilson, R. HERO ID: 1023248							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]		Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance was identified by analytical mean.	1	1	1			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			

Outcome Assessment	11. Outcome Assessment Methodology	Low	Study investigated volatilization from shower water; this is an uncommon study type for a fate endpoint.	3	1	3
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Sources of variability were addressed in the study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Limited details were reported; data were mainly reported in figures.	2	2	4
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	18	22
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.22	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: Study investigated volatilization from shower water. Study results may not be relevant to a specific/designated Fate endpoint.

Study Reference:	compounds		ese powders in buffer	ed water	and in land	fill
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	Low	There was uncertainty regarding the radiolabeling and source of the test substance.	3	2	6
	2. Test Substance Purity	Low	The source and purity of the test substance were not reported or verified by analytical means.	3	1	3
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	Medium	Protection from light/photolysis was not addressed; however, not likely to have been a concern.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism	Hotracca	applicable to this	1111	1111	1111
0.18	Degradation		study type.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism	Hotracca	applicable to this	1111	1110	1111
	Partitioning		study type.			
Outcome	11. Outcome	Low	Incomplete	3	1	3
Assessment	Assessment	ПОМ	reporting of		1	
1133C33IIICIIC	Methodology		outcome assessment			
	Methodology		methods; however,			
			such differences or			
			absence of details			
			were not likely to			
			have been severe or			
			have a substantial			
			impact on the study			
			results. Could be			
			considered			
			hydrolysis study but			
			buffer was used.			
	12. Sampling	Medium	Sampling time and	2	1	2
	Methods	Medium	frequency were not		1	
	Methous		reported in method;			
			they were inferred			
			from figure.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding	nigii	criteria for high	1	1	1
Control	Variables		confidence as			
Control	variables		expected for this			
			type of study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	NotTateu	applicable to this	INK	INK	NK
Data	Exposure 15. Data	Medium	study type. Quantitative data for	2	2	4
Presentation		Medium	PCE was not fully		2	4
and Analysis	Reporting		reported or			
allu Allalysis			discussed beyond			
			figures.			
	16. Statistical	Medium	Quantitative	2	1	2
	Methods and	Medialli	calculations for PCE		1	
	Kinetic		were not fully			
	Calculations		reported or		1	1
	Calculations		discussed beyond		1	1
			figures.			
Other	17.	High	This metric met the	1	1	1
Other	Verification or	mgn	criteria for high	1	1	1
	Plausibility of		confidence as			
	Results		expected for this		1	1
	ivesnirs		-		1	1
	10 0010	Not noted	type of study.	NID	ND	MD
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.	2.4	10	24
L			Sum of scores:	24	18	31

High	Medium	Low	Overall Score =	1.72	Overall	1.7
			Sum of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Medium
					Quality	
					Level:	



Study Reference:		on Int 3: 231-236. ht	Kohnert, RL. (1980). I tp://dx.doi.org/10.10			
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]		Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Low	The test substance was identified by analytical means; however, limited data were reported about the analysis.	3	1	3
Test Design	3. Study Controls	Low	Study controls were not reported.	3	2	6
	4. Test Substance Stability	Medium	Test substance stability not discussed.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	20	18	26
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.44	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Dilling, WL. (1977). Interphase transfer processes. II. Evaporation rates of chloro methanes, ethanes, ethylenes, propanes, and propylenes from dilute aqueous solutions. Comparisons with theoretical predictions. Environ Sci Technol 11: 405-409. http://dx.doi.org/10.1021/es60127a009 HERO ID: 18370							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]		Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Low	There were possible mixture concerns since two to five compounds were run together.	3	1	3		
Test Design	3. Study Controls	Medium	A series of compounds were run, but no mention of controls.	2	2	4		
	4. Test Substance Stability	Medium	Not discussed but were not likely to have influenced the test results.	2	1	2		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as	1	1	1
			expected for this type of study.			
	12. Sampling Methods	Low	Sampling was not described and may have influenced the test results.	3	1	3
Confounding/ Variable Control	13. Confounding Variables	Low	Sources of variability and uncertainty in the measurements and statistical techniques and between study groups were not considered or accounted for in data evaluation.	3	1	3
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Statistics were not conducted/reported for the experimental study.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	23	18	28
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.56	Overall Score (Rounded):	1.6
1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Roose, P; Dewulf, J; Brinkman, UAT; Van Langenhove, H. (2001). Measurement of volatile organic compounds in sediments of the Scheldt Estuary and the Southern North Sea. Water Res 35: 1478-1488. http://dx.doi.org/10.1016/S0043-1354(00)00410-3							
Domain	HERO ID: 19 Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1		
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	Medium	Monitoring study; analytical method development was reported.	2	1	2		
	6. Testing Conditions	Medium	Some details were omitted; however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on the study results.	2	2	4		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Limitations of results were discussed.	1	1	1
Control	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study; noted that upon comparison of calculation of mass fractions in situ, partitioning into the sediment layer and the water column was higher than expected from equilibrium partitioning calculations from measured monitoring data.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	16	18	21

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric	1.17	Overall Score (Rounded):	1.2
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	



Study Reference:	reductive deh 2390-2396. ht	Leahy, JG; Shreve, GS. (2000). The effect of organic carbon on the sequential reductive dehalogenation of tetrachloroethylene in landfill leachates. Water Res 34: 2390-2396. http://dx.doi.org/10.1016/S0043-1354(99)00389-9 HERO ID: 1963430							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Low	Source and purity were not reported or verified by analytical methods.	3	1	3			
Test Design	3. Study Controls	Low	Appropriate use of sterile control, no positive control; analysis of the graphs showed that some loss appeared to occur in autoclaved samples; however, this was not discussed.	3	2	6			
	4. Test Substance Stability	Medium	The test substance stability, homogeneity, preparation and storage conditions were not reported; however, these factors were not likely to have influenced the test substance or were not likely to have had a substantial impact on the study results.	2	1	2			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			

	7. Testing	High	This metric met	1	1	1
	Consistency	Ö	the criteria for			
			high confidence as			
			expected for this			
			type of study.			
	8. System Type	High	This metric met	1	1	1
	and Design	111611	the criteria for	1	1	1
	and Design		high confidence as			
			expected for this			
			type of study.			
Test	9. Test	High	This metric met	1	2	2
Organisms	Organism	mgn	the criteria for	1	2	2
Organisms	•					
	Degradation		high confidence as			
			expected for this			
	10 T	N 1	type of study.	ND	ND	ND
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
•	Partitioning	· · · ·	study type.			
Outcome	11. Outcome	High	This metric met	1	1	1
Assessment	Assessment		the criteria for			
	Methodology		high confidence as			
			expected for this			
			type of study.			
	12. Sampling	High	This metric met	1	1	1
	Methods		the criteria for			
			high confidence as			
			expected for this			
			type of study.			
Confounding/	13. Confounding	Low	Loss of material in	3	1	3
Variable	Variables		control was not			
Control			addressed.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	High	This metric met	1	2	2
Presentation Presentation			the criteria for	_	_	_
and Analysis	. F :g		high confidence as			
			expected for this			
			type of study.			
	16. Statistical	High	This metric met	1	1	1
	Methods and	111811	the criteria for	1		1
	Kinetic		high confidence as			
	Calculations		expected for this			
	Galculations		type of study.			
Other	17. Verification	High	This metric met	1	1	1
ouler		півіі		I	1	1
	or Plausibility		the criteria for			
	of Results		high confidence as			
			expected for this			
	10.0015	37 . 7	type of study.	3.75	175	110
	18. QSAR	Not rated	The metric is not	NR	NR	NR
ľ	Models		applicable to this			
			study type.			
			Sum of scores:	22	20	29

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.45	Overall Score (Rounded):	1.5
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High



Study Reference:	Organics in t	he Wastewater and A 5). (NIOSH/00165921	SS; Hertzberg, VS; Ti Airspaces of Three W l).			
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1
Test Design	3. Study Controls	High	Control was used to determine detection limit.	1	2	2
	4. Test Substance Stability	Not rated	This is a field type study were stability was not considered.	NR	NR	NR
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	Medium	Equilibrium was not established or reported. This was an open system.	2	1	2
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Low	Study may have reported site-specific results.	3	1	3
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Confounding/ Variable Control	13. Confounding Variables	Low Not rated	The WWTP water is a mixture and may have impacted volatility of the test substance. Other variables may have possibly influenced volatility besides those reported. The metric is not	NR	1 NR	3 NR
	Unrelated to Exposure	110014004	applicable to this study type.			
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	17	22
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.29	Overall Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low ¹

¹The study's overall quality rating was downgraded. Rationale: The volatility is reported for 3 sites in open systems.

Study Reference:	He, Z; Yang, G; Lu, X; Zhang, H. (2013). Distributions and sea-to-air fluxes of chloroform, trichloroethylene, tetrachloroethylene, chlorodibromomethane and bromoform in the Yellow Sea and the East China Sea during spring. Environ Pollut 177: 28-37. http://dx.doi.org/10.1016/j.envpol.2013.02.008								
Domain	HERO ID: 21 Metric	Qualitative Determination [i.e., High, Medium, Low,	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
		Unacceptable, or Not rated]							
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1			
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Test Conditions	5. Test Method Suitability	Low	Many possible variables impacted the study results in this field study.	3	1	3			
	6. Testing Conditions	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	8. System Type and Design	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	Low	Flux from a field study was not specifically a fate outcome of interest.	3	1	3			
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

Confounding/ Variable	13.	High	This metric met the	1	1	1
Control	Confounding Variables		criteria for high confidence as expected for this type of study.			
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Some data were reported only in figures.	2	2	4
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	14	11	17
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.55	Overall Score (Rounded):	1.6
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	chemical mi 440-448. htt HERO ID: 21	xtures in soil and sed p://dx.doi.org/10.10 73000	,	nviron Sc	ri Technol 38	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]		Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	Source and purity were reported.	1	1	1
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Medium	Some details were omitted.	2	2	4
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	12. Sampling Methods	Medium	Some details omitted	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation	15. Data Reporting	High	Some details were omitted.	1	2	2
and Analysis	16. Statistical Methods and Kinetic Calculations	High	Some details were omitted.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	15	17	18
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.18	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	U.S. EPA (U.S. Environmental Protection Agency). (2012). Estimation Programs Interface Suite™ for Microsoft® Windows, v 4.11 [Computer Program]. Washington, DC. Retrieved from https://www.epa.gov/tsca-screening-tools/epi-suitetmestimation-program-interface HERO ID: 2347246							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
Test Conditions	5. Test Method Suitability	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
	6. Testing Conditions	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
	7. Testing Consistency	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
	8. System Type and Design	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
	12. Sampling Methods	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
Confounding/ Variable Control	13. Confounding Variables	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR		
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Data	15. Data	Not rated	The metric is not	NR	NR	NR
Presentation	Reporting		applicable to this			
and Analysis	16. Statistical	Not rated	study type (SAR). The metric is not	NR	NR	NR
	Methods and	Not rated	applicable to this	NK	NK	NK
	Kinetic		study type (SAR).			
	Calculations		study type (SIIIt).			
Other	17.	Not rated	The metric is not	NR	NR	NR
	Verification		applicable to this			
	or		study type (SAR).			
	Plausibility of					
	Results					
	18. QSAR	High	The models in EPI	1	1	1
	Models		Suite™ have defined			
			endpoints. Chemical domain and			
			performance			
			statistics for each			
			model are known,			
			and unambiguous			
			algorithms are			
			available in the EPI			
			Suite™			
			documentation			
			and/or cited			
			references to			
			establish their			
			scientific validity. Many EPI Suite™			
			models have			
			correlation			
			coefficients >0.7,			
			cross-validated			
			correlation			
			coefficients >0.5, and			
			standard error			
			values <0.3;			
			however, correlation			
			coefficients (r ² , q ²) for the regressions			
			of some			
			environmental fate			
			models (i.e. BIOWIN)			
			are lower, as			
			expected, compared			
			to regressions which			
			have specific			
			experimental values			
			such as water			
			solubility or log Kow			
			(octanol-water			
			partition coefficient).	0		4
			Sum of scores:	2	3	1

High	Medium	Low	Overall Score =	1	Overall	1
			Sum of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	



Study Reference:	volatile orga aeration and	mic compounds in ae I sludge addition. Cho i.org/10.1016/j.chei	ang, JC; Zhao, QL. (201 crobic biological treat emosphere 103: 92-9 nosphere.2013.11.03	tment pro 8.		
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1
Test Design	3. Study Controls	Medium	Analytical blanks were included; however, other study controls were not included.	2	2	4
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Medium	Some details were omitted; however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on the study results.	2	2	4
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	8	criteria for high	-	_	
	Degradation		confidence as			
			expected for this			
			type of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	Medium	There was	2	1	2
Assessment	Assessment		incomplete			
	Methodology		reporting of			
			measured)		
			concentrations in the			
	10.0		media analyzed			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this			
Comformal' /	12	11:_1	type of study.	1	1	1
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			expected for this			
	14. Outcomes	Not rated	type of study. The metric is not	NR	NR	NR
	Unrelated to	Not rated		NK	NK	NK
			applicable to this study type.			
Data	Exposure 15. Data	Medium	Concentrations of	2	2	4
Presentation	Reporting	Medium	the target chemical	2	2	4
and Analysis	Reporting		were not reported.			
anu Anarysis	16. Statistical	Medium	Some details were	2	1	2
	Methods and	Medium	omitted; however,	L	1	
	Kinetic		these omissions			
	Calculations		were not likely to			
	Carculations		have had a			
			substantial impact			
			interpretation of			
			study results.			
Other	17.	Medium	There was	2	1	2
	Verification or		incomplete			
	Plausibility of		reporting of			
	Results		measured			
			concentrations in the			
			media analyzed;			
			mass distributions			
			were reported, no			
			serious study			
			deficiencies were			
			identified, and the			
			value was plausible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
I			study type.			
			Sum of scores:	21	20	29

High	Medium	Low	Overall Score =	1.45	Overall	1.5
			Sum of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	High
					Quality	
					Level:	



Study Reference:			JP; Melcer, H. (1993) ed sludge plants. Wa			
Domain	HERO ID: 28 Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1
Test Design	3. Study Controls	Medium	Chemical name(s) of external control(s) not reported.	2	2	4
	4. Test Substance Stability	Not rated	This is a field type study where stability was not considered.	NR	NR	NR
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Unacceptable	Testing conditions were not well reported (pH, temperature, sludge concentrations).	4	2	8
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	8. System Type and Design	Medium	Likely an open system where test material could have been lost.	2	1	2
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Unacceptable	The extent of air stripping was a function of the compound physical-chemical properties and a function of WWTP design and operation.	4	1	4

	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Medium	This metric met the criteria for high confidence as expected for this type of study.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Some information was not reported; however, these omissions were not likely to have had a substantial impact on the study results.	2	2	4
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	17	27
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.88	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Study evaluates removal based on air stripping. The extent of air stripping is a function of the compound p-chem properties and a function of WWTP design and operation. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	compounds 38: 2209-22 HERO ID: 35	Keefe, SH; Barber, LB; Runkel, RL; Ryan, JN. (2004). Fate of volatile organic compounds in constructed wastewater treatment wetlands. Environ Sci Technol 38: 2209-2216. http://dx.doi.org/10.1021/es034661i HERO ID: 3566693								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score				
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2				
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1				
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type.	NR	NR	NR				
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type.	NR	NR	NR				
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
	6. Testing Conditions	Not rated	The metric is not applicable to this study type.	NR	NR	NR				
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR				
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				
Test Organisms	9. Test Organism Degradation	Medium	The test organisms were reported but were not routinely used.	2	2	4				
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR				
Outcome Assessment	11. Outcome Assessment Methodology	High	This is primarily a modeling study based on field samples.	1	1	1				
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1				

Confounding/ Variable Control	13. Confounding Variables 14. Outcomes Unrelated to Exposure	High Not rated	This metric met the criteria for high confidence as expected for this type of study. The metric is not applicable to this study type.	NR	1 NR	1 NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	Medium	The study results were reasonable.	2	1	2
	18. QSAR Models	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
			Sum of scores:	14	15	18
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.2	Overall Score (Rounded):	1.2
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Brüggemann, R; Trapp, S. (1988). Release and fate modelling of highly volatile solvents in the river Main. 17: 2029-2041.							
Domain	HERO ID: 362 Metric	Qualitative Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Veighted Score		
Test Substance	1. Test Substance Identity	High	The chemical of interest was identified by name.	1	2	2		
	2. Test Substance Purity	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Test Conditions	5. Test Method Suitability	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	6. Testing Conditions	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	8. System Type and Design	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

	12. Sampling Methods	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Confounding/ Variable Control	13. Confounding Variables	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Unacceptable	The analytical method used for detection of the test substance was not reported.	4	2	8
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	Unacceptable	Unable to evaluate and verify results based on the data reported.	4	1	4
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2.5	6 Overall Score (Rounded):	1 <u>5</u> 4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹The analytical method used for detection of the test substance was not reported. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	RCRA solvent http://infoho HERO ID: 398	t waste. Sacrame ouse.p2ric.org/r 32116	port on development nto, CA: Toxic Substan ef/17/16884.pdf	nces Con	trol Prograi	n.
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Veighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Low	The test substance source and purity were not reported.	3	1	3
Test Design	3. Study Controls	Not rated	Study controls were not reported in this study.	NR	NR	NR
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Test Conditions	5. Test Method Suitability	Unacceptable	Details regarding the treatment process test method were not reported in this study.	4	1	4
	6. Testing Conditions	Unacceptable	Testing conditions were not reported in this study.	4	2	8
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	8. System Type and Design	Unacceptable	System type and design details were not reported in this study.	4	1	4
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Unacceptable	Study details were not reported to evaluate methodology.	4	1	4
	12. Sampling Methods	Unacceptable	Sampling details were not reported in this study.	4	1	4
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR

	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Unacceptable	Study and data details were not reported in this study.	4	2	8
	16. Statistical Methods and Kinetic Calculations	High	The metric is not applicable to this study type.	1	1	1
Other	17. Verification or Plausibility of Results	Unacceptable	Due to limited information, evaluation of the reasonableness of the study results was not possible.	4	1	4
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	33	13	42
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	3.23	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Due to limited information, evaluation of the reasonableness of the study results was not possible. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, seven of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	RCRA solve http://infol HERO ID: 39		, CA: Toxic Substa 17/16884.pdf	nces Cont	trol Program.	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Low	Source and purity were not reported.	3	1	3
Test Design	3. Study Controls	Not rated	Study controls were not reported in this study.	NR	NR	NR
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Test Conditions	5. Test Method Suitability	Unacceptable	Details regarding treatment process were not reported.	4	1	4
	6. Testing Conditions	Unacceptable	Testing conditions were not reported in this study.	4	2	8
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	8. System Type and Design	Unacceptable	System type and design details were not reported in this study.	4	1	4
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Unacceptable	Study details were not reported to evaluate methodology.	4	1	4
	12. Sampling Methods	Unacceptable	Sampling details were not reported in this study.	4	1	4

Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Unacceptable	Study and data details were not reported in this study.	4	2	8
	16. Statistical Methods and Kinetic Calculations	High	The metric is not applicable to this study type.	1	1	1
Other	17. Verification or Plausibility of Results	Unacceptable	Due to limited information, evaluation of the reasonableness of the study results was not possible.	4	1	4
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	33 3.23	0verall Score (Rounded):	42
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Due to limited information, evaluation of the reasonableness of the study results was not possible. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, seven of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	from wastev BL. http://ir	Blaney, BL. (1989). Applicability of steam stripping to organics removal from wastewater streams. (EPA/600/9-89/072). Cincinnati, OH: Blaney, BL. http://infohouse.p2ric.org/ref/23/22522.pdf HERO ID: 3986884							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Not rated	The test substance was identified by analytical means.	NR	NR	NR			
Test Design	3. Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4			
 	4. Test Substance Stability	Not rated	This is a field type study were stability was not considered.	NR	NR	NR			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
7.	6. Testing Conditions	Low	There were reported deviations or omissions in testing conditions, and these were likely to have a had substantial impact on the results (temperature).	3	2	6			
	7. Testing Consistency	Medium	There were omissions in the reporting across study groups, but these not likely to have had a substantial impact on the study results.	2	1	2			
	8. System Type and Design	Medium	The system designs were not described well but the omission was not likely to have had a substantial impact on the study results	2	1	2			

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Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to this			
	Degradation		study type.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment		criteria for high			
	Methodology		confidence as			
			expected for this			
			type of study.			
	12. Sampling	Low	Details regarding	3	1	3
	Methods		sampling methods of			
			the outcome(s) were			
			not fully reported,			
			and the omissions			
			were likely to have			
			had a substantial			
			impact on the study			
			results.			
Confounding/	13.	Low	Sources of variability	3	1	3
Variable	Confounding		and uncertainty in			
Control	Variables		the measurements			
			and statistical			
			techniques and			
			between study			
			groups (if			
			applicable) were not			
			considered or			
			accounted for in data			
			evaluation resulting			
			in some uncertainty.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Low	There was	3	2	6
Presentation	Reporting		insufficient evidence			
and Analysis	, ,		presented to confirm			
,			that parent			
			compound			
			disappearance was			
			not likely to have			
			been due to some			
			other process.			
			Analytical details			
			were not well			
			reported.			
	16. Statistical	Medium	Statistical analysis or	2	1	2
	Methods and		kinetic calculations	_	_	_
	Kinetic		were not conducted			
	Calculations		or were not			
			described clearly.			
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Other	17.	High	This metric met the	1	1	1
	Verification or	Ö	criteria for high			
	Plausibility of		confidence as			
	Results		expected for this type of study.			
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	24	16	33
High	Medium	Low	Overall Score =	2.06	Overall	2.1
8	110010111	20	Sum of Weighted	2.00	Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall	Medium
					Quality	
					Level:	



Study Reference:	Smith, JH; Bomberger, DC, Jr; Haynes, DL. (1980). Prediction of the volatilization rates of high-volatility chemicals from natural water bodies. Environ Sci Technol 14: 1332-1337. http://dx.doi.org/10.1021/es60171a004 HERO ID: 58132								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	Medium	Source and purity were not reported but were not likely to have had an impact on the study results.	2	1	2			
Test Design	3. Study Controls	Medium	Standard results were not reported; but were not likely to have had an impact on the study results.	2	2	4			
	4. Test Substance Stability	Medium	Not discussed, but not likely to have had an impact on the study results.	2	1	2			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	Medium	There were minor inconsistencies in test conditions across samples or study groups, but these discrepancies were not likely to have had a substantial impact on the study results.	2	1	2			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism Degradation		applicable to this study type.			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Not well reported, but not likely to have impacted the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact interpretation of study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	20 1.39	18 Overall Score (Rounded):	25 1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	organic compo Environ Res 6 HERO ID: 6586	ell, J; Melcer, H; Monteith, H; Osinga, I; Steel, P. (1993). Stripping of volatile rganic compounds at full-scale municipal wastewater treatment plants. Water nviron Res 65: 708-716. http://dx.doi.org/10.2175/WER.65.6.2 ERO ID: 658661							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1			
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	7. Testing Consistency	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	8. System Type and Design	Medium	Open system where test substance may have been lost.	2	1	2			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	The study noted that design parameters may have impacted the results.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Emission rates were estimated by multiplying the average VOC concentrations by the appropriate airflow rates.	2	1	2
Other	17. Verification or Plausibility of Results	Medium	The study results were reasonable; however, due to limited information, evaluation of the reasonableness of the study results was not possible.	2	1	2
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
High	Medium	Low	Sum of scores: Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	12 1.27	11 Overall Score (Rounded):	16 1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	2 200000		Overall Quality Level:	High

Study Reference:	Stubin, AI; Brosnan, TM; Porter, KD; Jimenez, L; Lochan, H. (1996). Organic priority pollutants in New York City municipal wastewaters: 1989-1993. Water Environ Res 68: 1037-1044. http://dx.doi.org/10.2175/106143096X128108 HERO ID: 658797							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	High	The test substance was identified by analytical means.	1	1	1		
Test Design	3. Study Controls	Medium	Source and purity of analytical standard were not reported; however, a guideline analytical method was used.	2	2	4		
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2		
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1		
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment	J	criteria for high			
	Methodology		confidence as			
			expected for this			
			type of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this			
Confounding/	13.	Not rated	type of study. No confounding	NR	NR	NR
Confounding/ Variable	Confounding	Not rated	variables were	NK	NK	NK
Control	Variables		noted.			
Control	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	Not rateu	applicable to this	IVIX	IVIX	IVIX
	Exposure		study type.			
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting	****	criteria for high		_	_
and Analysis	Reporting		confidence as			
			expected for this			
			type of study.			
	16. Statistical	Not rated	The analysis of data	NR	NR	NR
	Methods and		was clearly			
	Kinetic		described.			
	Calculations					
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		expected for this			
			type of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.	4.0	1.6	10
TT: -1-	Madian	T	Sum of scores:	13	16	18
High	Medium	Low	Overall Score = Sum of Weighted	1.12	Overall Score	1.1
			Scores/Sum of		(Rounded):	
			Metric Weighting		(Kounueu):	
			Factors:			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3	i actors.		Overall	High
= 1 unu - 1.7	-117 una -215	=210 and =3			Quality	****
					Level:	

Study Reference:	Cupitt, L. T Atmospheric persistence of eight air toxics. 1987. HERO ID: 4140353							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
Test Design	3. Study Controls	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
	4. Test Substance Stability	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
Test Conditions	5. Test Method Suitability	High	Appropriate calculation method was applied.	1	1	1		
	6. Testing Conditions	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
	7. Testing Consistency	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
	8. System Type and Design	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
Test Organisms		Not rated	The metric is not applicable to this study type.	NR	NR	NR		
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR		
Outcome Assessment	11. Outcome Assessment Methodology	High	Appropriate results based on a calculation.	1	1	1		
	12. Sampling Methods	Not rated	Not applicable; this study reported a calculation.	NR	NR	NR		
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR		
Control	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR		

Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Results were based on a calculation. The Arrhenius rate constant equation was not measured or calculated in this report but was obtained from a reputable source.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	7	8	9
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.12	Overall Score (Rounded):	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Pearson, CR; Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proc Biol Sci 189: 305-332. HERO ID: 75062							
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2		
	2. Test Substance Purity	Medium	The purity and source of the test substance was not provided.	2	1	2		
Test Design	3. Study Controls	Unacceptable	Study controls were not reported.	4	2	8		
	4. Test Substance Stability	Medium	Details were omitted regarding the test substance stability and preparation; however, this was not likely to have influenced the results.	2	1	2		
Test Conditions	5. Test Method Suitability	Low	The test method was not well described.	3	1	3		
	6. Testing Conditions	Unacceptable	Testing conditions were not reported, and data provided were very general; concentration of test material was not specified. Ambient air used for experiment was not subject to any pretreatment or analysis; climate and conditions were not controlled.	4	2	8		
	7. Testing Consistency	Low	Tests were consistent, yet results would be hard to reproduce based on test method.	3	1	3		

	8. System Type and Design	Medium	Details were omitted regarding the test system and design; however, this was not likely to have	2	1	2
Test Organisms	9. Test	Not rated	influenced the results. The metric is not	NR	NR	NR
Test Organisms	Organism Degradation	Not rated	applicable to this study type.	NK	INK	INK
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Low	The assessment methodology did not address or report the outcome of interest; analytical	3	1	3
	12.6		methods were not reported.	4		
	12. Sampling Methods	Unacceptable	Sampling methods were not reported.	4	1	4
Confounding/ Variable Control	13. Confounding Variables	Medium	Author noted that reproducibility was very low due to climate variations.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely due to some other process.	3	2	6
	16. Statistical Methods and Kinetic Calculations	Not rated	Statistical analysis or kinetic calculations were not reported.	NR	NR	NR
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	33	16	45

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2.81	Overall Score (Rounded):	4
1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable ¹

¹Testing conditions were not reported, and data provided were very general; concentration of test material not specified. Ambient air used for experiment was not subject to any pretreatment or analysis; climate and conditions were not controlled. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, three of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

Study Reference:	Shirayama, H; Tohezo, Y; Taguchi, S. (2001). Photodegradation of chlorinated hydrocarbons in the presence and absence of dissolved oxygen in water. Water Res 35: 1941-1950. http://dx.doi.org/10.1016/S0043-1354(00)00480-2 HERO ID: 3544747								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance source was reported.	1	1	1			
Test Design	3. Study Controls	Low	The study did not include or report control groups; however, the lack of data was not likely to have had a substantial impact on the study results.	3	2	6			
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	16	17	22
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.29	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Doong, RA; Wu, SC. (1992). Reductive dechlorination of chlorinated hydrocarbons in aqueous solutions containing ferrous and sulfide ions. Chemosphere 24: 1063-1075. http://dx.doi.org/10.1016/0045-6535(92)90197-Y HERO ID: 3561878								
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score			
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2			
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1			
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2			
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this did not limit the interpretation of the results.	2	1	2			
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	6. Testing Conditions	Medium	There were omissions in the test condition reporting (light source not specified).	2	2	4			
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR			
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1			

	12. Sampling Methods	Medium	Limited details regarding this metric were reported; however, the omissions were unlikely to have hindered the interpretation of results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	17	17	22
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.29	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:		tile organic subst 142.	ra, JK; St. Pierre, CC; Zytn tances in aqueous enviro		Water Pollu	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance source and purity were reported.	1	1	1
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Medium	Details regarding this metric were limited; all data points were not reported; however, this did not hinder the interpretation of the study results.	2	1	2

	12. Sampling Methods	Medium	Sampling methods were not reported.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	15	17	19
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.12	Overall Score (Rounded):	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	methylene ch tetrachloroet	lloride, chlorofor thylene, and othe echnol 9: 833-83	nllos, GJ. (1975). Evapora m, 1,1,1-trichloroethane r chlorinated compound 8. http://dx.doi.org/10.3	, trichlo s in dilu	roethylene, te aqueous s	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comments	Metric Score	Metric Weighting Factor	Weighted Score
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance purity and source were not reported; however, MS analysis was	1	1	1
			performed at start of study. The detection method was specifically at the m/z of the desired compound, so the purity was not likely to have affected the results.			
Test Design	3. Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have had a substantial impact on the study results.	2	2	4
	4. Test Substance Stability	High	Mass spectra analysis was performed at start of study.	1	1	1
Test Conditions		High	Methanol was used as a co-solvent.	1	1	1
	6. Testing Conditions	High	Water was purged with air 15 min prior to initiation of study; the authors appear to be assuming that hydrolysis is followed by oxidation; thus, by having an abundance of oxygen, they ensure that the rate- determining step is hydrolysis.		2	2
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome of interest and its basis were reported.	1	1	1
	12. Sampling Methods	Medium	Sampling methods were omitted. Sampling timing was suitable.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Transformation products were not identified.	2	2	4
-	16. Statistical Methods and Kinetic Calculations	Medium	Statistical methods or kinetic calculations were not reported.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	18	25
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.33	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality	High ¹