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United States Environmental Protection Agency Office of Chemical Safety and Pollution Prevention

# Draft Risk Evaluation for Trichloroethylene

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Fate and Transport Studies

CASRN: 79-01-6



February 2020

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including dissolved oxygen, water				and documented,					
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				oxygen, water					
temperature, and				temperature. and					
pH.				pH.					

	7. Testing	High	Test conditions	1	1	1
	Consistency	8	were consistent			
	5		across study groups			
			and aquaria, and			
			exposure conditions			
			were monitored.			
	8. System	High	The test system	1	1	1
	Type and	-	(modified			
	Design		continual- flow,			
			proportional			
			dilution closed			
			system) was			
			appropriate for the			
			test substance and			
			was 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		used, details			
	Partitioning		provided, including			
			source, wet weight			
			and standard			
			length, acclimation			
			condition			
Outcome	11 Outcome	High	This metric met the	1	1	1
Assessment	Assessment	mgn	criteria for high	1	1	1
nssessmene	Methodology		confidence as			
	hethouology		expected for this			
			type of study.			
	12. Sampling	High	The study used	1	1	1
	Methods	8	widely accepted			
			methods for the			
			chemical and			
			medium being			
			analyzed; no			
			notable limitations			
			were expected to			
			have influenced			
			study results.			
Confounding/	13.	Not rated	No confounding	NR	NR	NR
Variable	Contounding		variables were			
Control	Variables	NT 1 - 1	noted.	ND	ND	ND
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			

Data Presentation and Analysis	15. Data Reporting	High	The study reported the mean chemical concentration and the calculated BCF.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	Actual concentrations measured 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.	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	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:	Umweltbundesamt. (1984). Assessments of the feasibility and evidence of test methods of levels I and II of the chemicals act on thiourea. (OTS: OTS0000551-0; 8EHQ Num: FYI-OTS-0787-0551 ; DCN: NA; TSCATS RefID: 304314; CIS: NA). HERO ID: 4215574						
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	Test substance purity was not reported or verified by analytical means.	3	1	3	
Test Design	3. Study Controls	Medium	The use of negative controls was not reported; however, an OECD guideline is cited, which requires use of a control group.	2	2	4	
	4. Test Substance Stability	Medium	Details on whether test conditions were appropriate for maintaining stable test substance were not included; however, this was unlikely to have influenced the results substantially.	2	1	2	
Test Conditions	5. Test Method Suitability	High	The test method employed was suitable for the test substance.	1	1	1	
	6. Testing Conditions	Medium	Generalized details for 10 discrete chemicals tested; some fluctuation in water temperature and pH may have occurred.	2	2	4	
	7. Testing Consistency	Medium	Limited details were reported to evaluate this metric.	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	0	Maturated	The survey of the second	ND	ND	ND
lest	9. Test	Not rated	The metric is not	NK	NK	NK
Organisms	Organism		applicable to this			
	Degradation		study type.			
	10. Test	High	Routine organism	1	2	2
	Organism	0	was used and			
	Dartitioning					
	Fartitioning		source was			
			reported; guideline			
			cited for fish body			
			weight.			
Outcome	11. Outcome	High	The outcome	1	1	1
Assessment	Assessment	-	assessment			
	Methodology		methodology			
	i iouio aorogy		reported the			
			intended outcome			
			of interest.	-		
	12. Sampling	Low	Details were not	3	1	3
	Methods		included on			
			sampling methods			
			or approaches.			
Confounding/	13	Not rated	No confounding	NR	NR	NR
Variable	Confounding	Hot fatea	variables were			
Control	Variables		variables were			
control	Variables	NT 1	mi i i i i	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	Nominal	2	2	4
Presentation	Reporting		concentrations.			
and Analysis			average			
unu murysis			concentrations in			
			water, average			
			concentrations in			
			fish, and BCFs were			
			reported; lipid			
			content was not			
			reported.			
	16. Statistical	High	The analysis of data	1	1	1
	Methods and	0	was clearly	_		_
	Kinetic		described			
	Calculations		described.			
Other		Louis	Due to limited	2	1	2
other	17.	LOW	Due to infilted	3	1	3
	Verification or		information,			
	Plausibility of		evaluation of the			
	Results		reasonableness of			
			the study results			
			was not possible.			
	18. OSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type			
			Sum of scores:	25	10	22
II:	Madi	Lerre	Julii UI SCUTES:	40	17	33
High	Mealum	LOW	Overall Score =	1./4	Overall	2.3
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low1	
<sup>1</sup> The study's overall quality rating was downgraded. Rationale: Evaluation of the reasonableness of the study results was not possible due to limited data reporting regarding sampling and controls.							

Study Reference:	Fogel, MM; Taddeo, AR; Fogel, S. (1986). Biodegradation of chlorinated ethenes by a methane-utilizing mixed culture. Appl Environ Microbiol 51: 720-724.						
Domain	HERO ID: 173 Metric	9397 Qualitative Determination	Comments	Metric Score	Metric Weighting	Weighted Score	
		[i.e., High, Medium, Low, Unacceptable, or Not rated]			Factor		
Test Substance	1. Test Substance	High	The test substance was identified by	1	2	2	
	2. Test Substance Purity	High	The test substance purity and source were reported.	1	1	1	
Test Design	3. Study	High	A sterile control	1	2	2	
	4. Test Substance Stability	High	Details regarding this metric were not reported but this did not limit the interpretation of the results.	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	High	Details regarding this metric were clearly 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	Details regarding this metric were clearly reported.	1	1	1	
	12. Sampling Methods	Medium	Limited details regarding this metric were reported.	2	1	2	

Confounding/ Variable Control	13. Confounding Variables	Not rated	The metric is not applicable to this study type (evaluating factors that inhibited biodegradation).	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	applicable to this study type.	NK	NK	NK
Data Presentation and Analysis	15. Data Reporting	High	Results were reported for radiolabeled carbon (14C).	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	The metric is not applicable to this study.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	14	18	19
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.06	Overall Score (Rounded):	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Cheng, D; Chow, WL; He, J. (2010). A Dehalococcoides-containing co-culture that dechloringtes tetrachloroothone to trans-1 2-dichloroothone. ISME L4: 88-97					
Kelerence.	http://dx.doi HERO ID: 379	i.org/10.1038/isi 9893	mej.2009.90.	or bethene.	13ME J 4. 00-	<i>.</i>
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		or Not rated				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by	-	-	-
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance	U U	purity and source			
	Purity		were reported.			
Test Design	3. Study	High	This metric met the	1	2	2
	Controls		criteria for high			
			confidence as			
			expected for this			
	4 55 - 1		type of study.			
	4. Test	High	This metric met the	1	1	1
	Substance		criteria for nigh			
	Stability		evpected for this			
			type of study			
Test	5 Test	High	The test method	1	1	1
Conditions	Method		was suitable for the	-	-	-
	Suitability		test substance.			
	6. Testing	High	The conditions	1	2	2
	Conditions	-	were suitable for			
			the test substance.			
	7. Testing	High	No inconsistencies	1	1	1
	Consistency		were reported or			
			identified.			
	8. System	High	This metric met the	1	1	1
	Type and		criteria for high			
	Design		confidence as			
			type of study			
Test	9. Test	High	This metric met the	1	2	2.
Organisms	Organism	8	criteria for high	-	_	-
	Degradation		confidence as			
	C		expected for this			
			type of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.	<u> </u>		
Outcome	11. Outcome	Low	Limited details	3	1	3
Assessment	Assessment		were reported to			
	Methodology	Madium	assess this metric.	n	1	2
	12. Sampling	Medium	Linnieu uetalis	Z	1	Z
	Methous		assess this metric			
			assess uns meure.		1	

Confounding/	13.	High	No confounding	1	1	1
Variable	Confounding	C	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	Medium	Some information	2	2	4
Presentation	Reporting		was not reported			
and Analysis			(reports			
			dechlorination			
			rates, test			
			substance			
			concentration in			
			figures); however,			
			the 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			
			study results.			
Other	17.	Low	Due to limited	3	1	3
	Verification		information,			
	or		evaluation of the			
	Plausibility of		reasonableness of			
	Results		the study results			
	10.0015		was not possible.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.		2.0	20
		Ŧ	Sum of scores:	22	20	28
High	Medium	Low	Overall Score =	1.4	Overall	2.3
			Sum of weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric weighting			
>1 and <17	>17 and	>22 and <2	ractors:		Overall	L orur1
21 anu <1.7	21.7 anu	≥2.5 anu ≤5			Overall	LOW
	<2.5				Lovol	
1The study's or	verall quality ra	ting was downgr	l aded Rationale This st	udv focused	l on dechloring	tion by 2
specific specie	s and due to lim	nited information	heing reported in the c	tudy iocuset	tion of the	tion by a
reasonablenes	s of the study r	esults was not pos	ssible.	cauy, cvaiuc		

Study	Parsons, F; Wood, PR; Demarco, J. (1984). Transformations of tetrachloroethene and						
Reference:	trichloroethe	ene in microcosm	s and groundwater. J	Am Water	Works Assoc	762: 56-	
	59. UEDO ID. 75110						
Descrite	HERO ID: 75		<b>C</b>	Martin		X47 - 1 - 1 - 1	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Factor	Score	
		I.e., figil,			ractor		
		Meurum, Low,					
		or Not rated]					
Test	1 Test	Medium	The test substance	2	2	4	
Substance	Substance	meanan	was identified by	2	2	1	
Substance	Identity		common name but				
			characterization				
			details were				
			omitted.				
	2. Test	Low	The source and	3	1	3	
	Substance		purity of the test				
	Purity		substance were not				
			reported or verified				
			by analytical means.				
Test Design	3. Study	Medium	Some concurrent	2	2	4	
	Controls		control group				
			details were not				
			included; however,				
			the lack of data was				
			not likely to have				
			had a substantial				
			impact on the study				
	4 Test	Madium	The test substance	2	1	2	
	4. Test	Medium	the test substance	Z	1	Z	
	Stability		homogeneity				
	Stability		nrenaration 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.				
Test	5. Test	High	The test method	1	1	1	
conditions	Method Switzbiliter		was suitable for the				
	Suitability	Lavy	test substance.	2	2	(	
	0. Testing	LOW	Anaeropic	3	2	Ø	
	Conunions		containions were				
			determined				
			analytically or				
			strictly set up				

			arm anim antally			
			experimentally.			
	7. Testing	High	No inconsistencies	1	1	1
	Consistency		were reported or			
			identified.			
	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	Medium	The test organism	2	2	4
Organisms	Organism	Medium	species and	-	-	-
organishis	Degradation		inoculum courco			
	Degrauation		moculum source			
			were reported, but			
			for similar stade			
			for similar study			
			types.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	Medium	Other possible	2	1	2
Assessment	Assessment		removal pathways			
	Methodology		were not			
	0.		considered.			
	12. Sampling	Low	Note from report:	3	1	3
	Methods	2011	Sampling procedure	U U	-	Ũ
	1100110000		resulted in			
			increasing			
			headspace and was			
			net used in later			
			not used in later			
Conformalized	10	T	WORK.	2	1	2
Confounding/	13.	LOW	Loss of mass	3	1	3
Variable	Confounding		balance was noted			
Control	Variables		for starting material			
			and 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	The target chemical	2	2	4
Presentation	Reporting		and transformation			
and Analysis			product(s)			
unu muy 010			concentrations			
			extraction			
			efficiency nercent			
			rocovory and mass			
			balance wore not			
			valance were not			
			teporteu; nowever,			
			unese omissions			
			were not likely to			
			have had a			
			substantial impact			

			on the study results.			
	16. Statistical	Low	Statistical analysis	3	1	3
	Methods and		or kinetic			
	Kinetic		calculations were			
	Calculations		not conducted or			
			were not described			
			clearly, and the lack			
			of information was			
			not likely to have			
			had a substantial			
			impact on the study			
0.1	4.7		results for TCE.	ND	ND	ND
Other	17. Venifi setien	Not rated	The metric is not	NK	NK	NK
	verification		applicable to this			
	0f Dlauaibility of		study.			
	Plausibility of					
		Not rated	The metric is not	ND	ND	ND
	10. QSAN Models	NotTaleu	applicable to this	INIX	INIX	INIX
	Models		study type			
			Sum of scores:	30	19	41
High	Medium	Low	Overall Score =	2.16	Overall	0
	inculum	1011	Sum of Weighted	2110	Score	0
			Scores/Sum of		(Rounded):	
			Metric Weighting		(	
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	NR <sup>1</sup>
	<2.3				Quality	
					Level:	
<sup>1</sup> Matrix not inc	cluded in the co	nceptual model fo	r TCE.			

Study	van Eekert, MHA; Schröder, TJ; van Rhee, A; Stams, AJM; Schraa, G; Field, JA. (2001).					
<b>Reference:</b>	Constitutive of	dechlorination of	chlorinated ethenes b	y a metha	nol degrading	g
	methanogeni	c consortium. Bio	resour Technol 77: 16	3-170.		
	http://dx.doi	.org/10.1016/S09	060-8524(00)00149-8	8.		
	HERO ID: 116	6576				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	Medium	The source of the	2	1	2
	Substance		test substance was			
	Purity		reported but the			
			purity was not			
			reported.			
Test Design	3. Study	High	This metric met the	1	2	2
	Controls		criteria for high			
			confidence as			
			expected for this			
			type of study.			
			Controls were			
			included.			
	4. Test	Medium	The test substance	2	1	2
	Substance		stability,			
	Stability		homogeneity,			
			preparation and			
			storage conditions			
			were not reported;			
			nowever, these			
			factors were not			
			likely to have			
			influenced the Test			
			substance of were			
			had a substantial			
			impact on the study			
			roculte			
Test	5 Test	High	The test method was	1	1	1
Conditions	Method	111211	suitable for the test	L L	T	T
Jonutions	Suitability		substance the target			
	Suitability		chemical was tested			
			at concentrations			
			below its aqueous			
			solubility.			
	6. Testing	High	Testing conditions	1	2	2
	Conditions		were monitored		-	-
	Contractions		reported, and			
			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	Low	Some TCE removal was not accounted for in this study; however, absorption to sludge was suggested.	3	1	3
Test Organisms	9. Test Organism Degradation	High	The test organism information or 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(s) of interest.	1	1	1
	12. Sampling Methods	Low	Details regarding sampling methods of the outcome(s) were not fully reported.	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 Presentation and Analysis	15. Data Reporting	Medium	The frequency of sampling, target chemical and transformation product(s) concentrations were reported in a graph	2	2	4

	16. Statistical	High	Statistical methods	1	1	1
	Methods and	-	or kinetic			
	Kinetic		calculations were			
	Calculations		clearly described			
			and address the			
			dataset.			
Other	17.	High	This metric met the	1	1	1
	Verification or	C	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:	22	20	28
High	Medium	Low	Overall Score =	1.4	Overall	1.4
_			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
					Level:	

Study Reference:	Bjerg, PL; Rügge, K; Cortsen, J; Nielsen, PH; Christensen, TH. (1999). Degradation ence: aromatic and chlorinated aliphatic hydrocarbons in the anaerobic part of the					
nerer en cer	Grindsted La	ndfill leachate plu	me: In situ microcosn	n and labo	ratory batch	
	experiments.	<b>Ground Water 37</b>	': 113-121. http://dx.o	loi.org/10	).1111/j.1745	5-
	6584.1999.tb	00964.x.				
Domain	HERO ID: 148	0371 Qualitativa	Commonto	Motria	Motria	Waightad
Domain	Metric	Determination	comments	Score	Weighting	Score
		[i.e., High.		Score	Factor	50010
		Medium, Low,			1 40001	
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance		source and purity			
	Purity		were not reported;			
			nowever, the test			
			detected by			
			analytical technique.			
Test Design	3. Study	High	This metric met the	1	2	2
	Controls	0	criteria for high			
			confidence as			
			expected for this			
			type of study.			
	4. Test	Not rated	Not applicable; this	NR	NR	NR
	Substance		study was an in-situ			
<b>T</b>	Stability	II: 1	experiment.	1	1	1
1 est Conditions	5. Test	High	I his metric met the	1	1	1
conditions	Suitability		confidence as			
	Suitability		expected for this			
			type of study.			
	6. Testing	Medium	Some testing	2	2	4
	Conditions		conditions were not			
			reported (such as			
			temperature and			
			pH); however,			
			sufficient data were			
			reported to			
			determine that the			
			likely to have had a			
			substantial impact			
			on the study results.			
	7. Testing	High	This metric met the	1	1	1
	Consistency	5	criteria for high			
			confidence as			
			expected for this			
			type of study.			

	8. System Type and Design	Medium	Some system details were omitted but these omissions were unlikely to have impacted the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Naturally occurring microorganisms in the aquifer were used. No further information was provided.	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	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	Medium	All results were provided in form of graphs as percentage of test substance disappearing over time.	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 10	NR	NR 26
	1		Juli OI SCOLES.	10	17	20

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.37	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study Reference:	Bjerg, PL; Rügge, K; Cortsen, J; Nielsen, PH; Christensen, TH. (1999). Degradation of aromatic and chlorinated aliphatic hydrocarbons in the anaerobic part of the Grindsted Landfill leachate plume: In situ microcosm and laboratory batch experiments. Ground Water 37: 113-121. http://dx.doi.org/10.1111/j.1745- 6584.1999.tb00964.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 were not reported; however, the test substance was detected by analytical technique.	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	Some system details were omitted but these omissions were unlikely to have impacted 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 Type and Design	Medium	Some system details were omitted but these omissions were unlikely to have impacted the study results.	2	1	2	

Test	9. Test	Medium	Naturally occurring	2	2	4
Organisms	Organism		microorganisms in			
8	Degradation		the aquifer were			
	8		used. No further			
			information was			
			provided.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism	notratea	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			
	riediodology		expected for this			
			type of study.			
	12 Sampling	High	This metric met the	1	1	1
	Methods	mgn	criteria for high	1	1	1
	Methous		confidence as			
			expected for this			
			type of study			
Confounding/	13	High	This metric met the	1	1	1
Variable	Confounding	man	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	notrateu	applicable to this		ivit	i i i i
	Exposure		study type			
Data	15 Data	Medium	All results were	2	2	4
Presentation	Reporting	inculum	provided in form of	-	-	
and Analysis	noporona		graphs as percentage			
jj			of test substance			
			disappearing over			
			time.			
	16. Statistical	High	This metric met the	1	1	1
	Methods and	0	criteria for high			
	Kinetic		confidence as			
	Calculations		expected for this			
			type of study.			
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:	19	20	25
High	Medium	Low	Overall Score =	1.3	Overall	1.3
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			

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

Study	Nielsen, PH; Bjerg, PL; Nielsen, P; Smith, P; Christensen, TH. (1996). In situ and						
<b>Reference:</b>	laboratory determined first-order degradation rate constants of specific organic						
	compounds in	n an aerobic aquif	er. Environ Sci Techno	ol 30: 31-3	87.		
	http://dx.doi	.org/10.1021/es9	407220.				
	HERO ID: 148	HERO ID: 1486742					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable,					
The set	1 5 1	or Not rated	m1 , , 1 ,	1	2	2	
lest	1. Test	High	The test substance	1	Z	Z	
Substance	Substance		was identified by				
	a Test	Uiah	chemical name.	1	1	1	
	Z. Test	High	The test substance	1	1	1	
	Substance		purity was reported;				
	Fully		an organics were				
Tost Dosign	2 Study	High	This motric mot the	1	2	2	
Test Design	S. Study	IIIgii	criteria for high	T	2	2	
	CONTROLS		confidence as				
			evnected for this				
			type of study				
	4 Test	Not rated	Not applicable: this	NR	NR	NR	
	Substance	notratea	study was an in-situ				
	Stability		experiment.				
Test	5. Test	High	This metric met the	1	1	1	
Conditions	Method	0	criteria for high				
	Suitability		confidence as				
	-		expected for this				
			type of study.				
	6. Testing	Low	Some testing	3	2	6	
	Conditions		conditions were not				
			reported (such as				
			temperature of the				
			microcosm and pH);				
			however, sufficient				
			data were reported				
			to determine that the				
			omissions were not				
			substantial impact				
			on the study results				
	7 Testing	High	This metric met the	1	1	1	
	Consistency		criteria for high	*	*	Ť	
	Gonsistency		confidence as				
			expected for this				
			type of study.				
	8. System	Medium	Some system details	2	1	2	
	Type and		were omitted but				
	Design		these omissions				
	_		were unlikely to				
			have impacted the				
			study results.				

Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	0	criteria for high			
- 8	Degradation		confidence as			
	0		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	LOD was not	2	1	2
Assessment	Assessment		specified, but this	_	_	
	Methodology		omission should not			
			have affected the			
			results.			
	12. Sampling	High	This metric met the	1	1	1
	Methods	0	criteria for high			
			confidence as			
			expected for this			
			type of study.			
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	This metric met the	1	2	2
Presentation	Reporting	8	criteria for high	_	_	
and Analysis	1 0		confidence as			
			expected for this			
			type of study.			
	16. Statistical	High	This metric met the	1	1	1
	Methods and	0	criteria for high			
	Kinetic		confidence as			
	Calculations		expected for this			
			type of study.			
Other	17.	High	This metric met the	1	1	1
	Verification or	0	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	18	25
High	Medium	Low	Overall Score =	1.33	Overall	1.3
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
					Level:	

Study	Nielsen, PH; Bjerg, PL; Nielsen, P; Smith, P; Christensen, TH. (1996). In situ and							
Reference:	laboratory de	laboratory determined first-order degradation rate constants of specific organic						
	compounds in an aerobic aquifer. Environ Sci Technol 30: 31-37.							
	http://dx.doi	http://dx.doi.org/10.1021/es9407220.						
	HERO ID: 148	HERO ID: 1486742						
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
Domain	Methe	Determination	comments	Score	Woighting	Score		
		Li o Ligh		Score	Easton	30016		
		I.e., nigii,			racioi			
		Mealum, Low,						
		Unacceptable,						
		or Not rated						
Test	1. Test	High	The test substance	1	2	2		
Substance	Substance		was identified by					
	Identity		chemical name.					
	2. Test	High	The test substance	1	1	1		
	Substance		purity was reported;					
	Purity		all organics were					
			analytical grade.					
Test Design	3. Study	High	Biologically	1	2	2		
U U	Controls	Ũ	deactivated controls					
			were included in this					
			study					
	4 Test	Medium	The test substance	2	1	2		
	Substance	hieulum	stability	-	1	-		
	Stability		homogeneity					
	Stability		nonogeneity,					
			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.					
Test	5. Test	High	This metric met the	1	1	1		
Conditions	Method	-	criteria for high					
	Suitability		confidence as					
			expected for this					
			type of study.					
	6. Testing	Low	Some testing	3	2	6		
	Conditions		conditions were not	-	_	-		
			reported (such as					
			temperature of the					
			microcosm and nH).					
			however sufficient					
			data were reported					
			to dotorming that the					
			to determine that the					
			offissions were not					
			likely to have had a					
			substantial impact					
		1	on the study results.					

	7 Testing	High	This metric met the	1	1	1
	Consistency		criteria for high	-	-	-
	donsistency		confidence as			
			avpacted for this			
			true of study			
	O. Crustian	Madian	Come constant dataile	2	1	2
	8. System	Mealum	Some system details	Z	1	Z
	Type and		were omitted but			
	Design		these omissions			
			were unlikely to			
			have impacted the			
			study results.			
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	Medium	LOD was not	2	1	2
Assessment	Assessment		specified, but this			
	Methodology		omission should not			
			have affected the			
			results.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high	-	-	-
	1100110000		confidence as			
			expected for this			
			type of study			
Confounding/	13	Not rated	No confounding	NR	NR	NR
Variable	15. Confounding	NotTateu	variables were	INIX	INIX	INIX
Control	Variables		noted			
control	14 Outcomos	Not rated	The metric is not	ND	ND	ND
	14. Outcomes	NotTaleu	applicable to this	INIX	INIX	INIX
	Exposure		applicable to this			
Data	15 Data	High	This matric mat the	1	2	2
Data	15. Data Poporting	mgn	critoria for high	1	2	2
and Analysia	Reporting		cificenta for high			
and Analysis			confidence as			
			expected for this			
	16 Chatiatizal	II: -l-	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			
2.1			type of study.			
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:	19	19	27

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.37	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: 171	<u>.019/10.1001/[A3</u> 7600	<u>CEJ0/33-93/2(1993)</u>	119:2(30	<u>oj</u> .	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Nat 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		criteria for high			
	Methodology		confidence as			
			type of study			
	12 Sampling	High	This metric met the	1	1	1
	12. Sampling Methods	IIIgii	criteria for high	1	1	T
	Methous		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			
Data	Exposure	Uiah	study type.	1	2	2
Dala	15. Data Reporting	підії	criteria for high	1	2	Z
and Analysis	Reporting		confidence as			
and marysis			expected for this			
			type of study.			
	16. Statistical	Medium	Some details were	2	1	2
	Methods and		omitted; however,			
	Kinetic		these omissions			
	Calculations		were not likely to			
			have had a			
			substantial impact			
Othor	17	Uigh	This matric mat the	1	1	1
other	17. Verification or	підії	criteria for high	1	1	1
	Plausibility of		confidence as			
	Results		expected for this			
	Tiebuite		type of study.			
	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 =	1.1	Overall	1.1
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Factors:			
>1 and $<1.7$	>17 and	>23 and <3	raci015.		Overall	High
21 anu <1.7	<2.3	22.5 and 25			Ouality	111511
					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: 171	<u>.019/10.1001/[A3</u> 7600	<u>CEJ0/33-93/2(1993)</u>	119:2(30	<u>uj</u> .	
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Nat 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		criteria for high			
	Methodology		confidence as			
			expected for this			
	12 Comuling	Uiah	type of study.	1	1	1
	12. Sampling Mothods	High	critoria for high	1	1	1
	Methous		confidence as			
			expected for this			
			type of study.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding	8	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	High	This metric met the	1	2	2
Presentation	Reporting		criteria for high			
and Analysis			confidence as			
			expected for this			
	16 Statistical	Madium	type of study.	2	1	2
	10. Statistical Methods and	Medium	omitted: however	2	1	Z
	Kinetic		these omissions			
	Calculations		were not likely to			
	Guiculations		have had a			
			substantial impact			
			on the study results.			
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.	45	2.0	
11. 1	M I	Ť	Sum of scores:	17	20	22
High	Medium	Low	Overall Score =	1.1	Overall	1.1
			Sum of weighted		Score	
			Motric Woighting		(Koundeu):	
			Factors			
≥1 and <1.7	≥1.7 and	≥2.3 and <3	1 4000151		Overall	High
	<2.3				Quality	0
					Level:	

Study	Long, JL; Stensel, HD; Ferguson, JF; Strand, SE; Ongerth, JE. (1993). Anaerobic and						
Reference:	aerobic treatment of chlorinated aliphatic compounds. J Environ Eng 119: 300-320.						
	HEDO ID: 171	<u>.0rg/10.1061/[A3</u> 7600	<u>CEJU/33-93/2[1993]</u>	119:2[30	<u></u>		
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
Domain	Methe	Determination	comments	Score	Weighting	Score	
		[i.e., High.		beore	Factor	beore	
		Medium, Low.			1 40001		
		Unacceptable.					
		or Not rated]					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	Medium	The test substance	2	1	2	
	Substance		source and purity				
	Purity		were not reported.				
Test Design	3. Study	High	This metric met the	1	2	2	
	Controls		criteria for high				
			confidence as				
			expected for this				
			type of study.				
	4. Test	High	This metric met the	1	1	1	
	Substance		criteria for high				
	Stability		confidence as				
			expected for this				
The set	<b>F m</b> .	11.1	type of study.	1	1	1	
lest	5. Test	High	I his metric met the	1	1	1	
conditions	Suitability		criteria for nign				
	Suitability		connuence as				
			type of study				
	6 Testing	High	This metric met the	1	2	2	
	Conditions	Ingn	criteria for high	1	2	2	
	conditions		confidence as				
			expected for this				
			type of study.				
	7. Testing	High	This metric met the	1	1	1	
	Consistency	0	criteria for high				
	5		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				
	0.5		type of study.			-	
Test	9. Test	High	This metric met the	1	2	2	
Organisms	Urganism Degradation		criteria for high				
	Degradation		confidence as				
			expected for this				
	10 Tect	Not roted	The metric is not	ND	ND	ND	
	10. Test	notrateu	applicable to this	INK	INK	INK	
	Partitioning		study type				
1	- ar ar ar an	1	study type.	1			

Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Assessment		criteria for high			
	Methodology		confidence as			
			type of study			
	12 Sampling	High	This metric met the	1	1	1
	Methods	mgn	criteria for high	1	1	1
	11001000		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			
	14 Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	Notrated	applicable to this	INIX	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	Z
	Methous and Kinetic		these omissions			
	Calculations		were not likely to			
	Guiculations		have had a			
			substantial impact			
			on the study results.			
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		type of study			
	18 OSAR	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 =	1.1	Overall	1.1
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Factors			
			raciuisi			TT- 1
$\geq 1$ and $< 1.7$	$\geq 1.7$ and	$\geq$ 2.3 and $\leq$ 3			Overall	High
	<2.3				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 HERO ID: 171	.org/10.1061/(AS	CE)0733-9372(1993)	119:2(30	0).	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting Factor	Score
		Medium. Low.			ractor	
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity	Madium	chemical name.	2	1	2
	Z. Test	Medium	source and purity	2	1	2
	Durity		were not reported			
Test Design	3 Study	High	This metric met the	1	2	2
rest Design	Controls	mgn	criteria for high	1	2	2
	001111010		confidence as			
			expected for this			
			type of study.			
	4. Test	High	This metric met the	1	1	1
	Substance		criteria for high			
	Stability		confidence as			
			expected for this			
Tost	5 Tost	High	This matric mat the	1	1	1
Conditions	Method	Ingii	criteria for high	1	1	1
conditions	Suitability		confidence as			
	buildbilley		expected for this			
			type of study.			
	6. Testing	High	This metric met the	1	2	2
	Conditions		criteria for high			
			confidence as			
			expected for this			
	7 Testing	Uiah	type of study.	1	1	1
	7. Testing	High	critoria for high	1	1	1
	consistency		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			
Test	0 Test	Uiah	type of study.	1	2	2
1 est Organisme	9. Test Organism	High	criteria for high	L	۷	۷.
Organishis	Degradation		confidence as			
	2 cgr addition		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		criteria for high			
	Methodology		confidence as			
			expected for this			
	12 Comuling	Uiah	type of study.	1	1	1
	12. Sampling Mothods	High	critoria for high	1	1	1
	Methous		confidence as			
			expected for this			
			type of study.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding	8	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	High	This metric met the	1	2	2
Presentation	Reporting		criteria for high			
and Analysis			confidence as			
			expected for this			
	16 Statistical	Madium	type of study.	2	1	2
	10. Statistical Methods and	Medium	omitted: however	2	1	Z
	Kinetic		these omissions			
	Calculations		were not likely to			
	Guiculations		have had a			
			substantial impact			
			on the study results.			
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.	45	2.2	
11. 1	M I	Ť	Sum of scores:	17	20	22
High	Medium	Low	Overall Score =	1.1	Overall	1.1
			Sum of weighted		Score (Pounded)	
			Motric Woighting		(Koundeu):	
			Factors			
≥1 and <1.7	≥1.7 and	≥2.3 and <3	1 4000151		Overall	High
	<2.3				Quality	0
					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 HERO ID: 171	i.org/10.1061/(ASC	<u>CE)0733-9372(1993)</u>	<u>119:2(300</u>	) <u>.</u>		
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		criteria for high			
	Methodology		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	High	This metric met the	1	1	1
Variable	Confounding	IIIgii	criteria for high	1	1	1
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			
Data	Exposure	Uiah	study type.	1	2	n
Presentation	15. Data Reporting	підіі	criteria for high	1	2	Z
and Analysis	Reporting		confidence as			
<b>y</b>			expected for this			
			type of study.			
	16. Statistical	Medium	Some details were	2	1	2
	Methods and		omitted; however,			
	Kinetic		these omissions			
	Calculations		have had a			
			substantial impact			
			on the study results.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high			
	Or Dlausibility of		confidence as			
	Results		type of study			
	18. OSAR	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 =	1.1	Overall	1.1
			Sum of Weighted		Score (Rounded):	
			Metric Weighting		(Koundeu).	
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
					Level:	

Study Reference:	Vogel, TM; McCarty, PL. (1985). Biotransformation of tetrachloroethylene to trichloroethylene, dichloroethylene, vinyl chloride, and carbon dioxide under					
	methanogeni HERO ID: 174	c conditions. App	Environ Microbiol 49	9: 1080-10	983.	
Domain	Metric	Qualitative Determination [i.e., High,	Comments	Metric Score	Metric Weighting Factor	Weighted Score
		Medium, Low, 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 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	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	Low	Mixture was used to	3	1	3
Assessment	Assessment		evaluate			
	Methodology		biodegradation			
			removal; difficulty in			
			interpreting removal			
			because TCE was an			
			intermediate for PCE			
			(a component of			
			mixture)			
	10.0		degradation.	-		
	12. Sampling	Medium	Some sampling	2	1	2
	Methods		details were omitted			
			but this was unlikely			
			to have impacted the			
Confounding /	13	Not rated	No confounding	NP	NP	NP
Variable	15. Confounding	NotTateu	variables were	INIX	INIX	INIX
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	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.			
Othor		U: ab	This matric mat the	1	1	1
other	17. Varification on	High	This metric met the	1	1	1
	Plausibility of		criteria ior nign			
	Results		evpected for this			
	Results		type of study			
	18. OSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
			Sum of scores:	19	19	26
High	Medium	Low	Overall Score =	1.37	Overall	2.3
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
	>17	NO 1 0	Factors:		0	T 4
$\geq 1$ and $< 1.7$	$\geq 1.7$ and	$\geq 2.3$ and $\leq 3$			Overall	LOW <sup>1</sup>
	<2.3				Quality	
1The study's o	uorall quality m	ting was downgro	dad Pationala: Pacad ar		Level:	tails and
the test substa	nce. Trichloroet	chylene, was a deg	radation product of the	test subst	ance mixture.	laiis ailu
	,	,,				

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.					
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	Control group details were not included; however, this study described a non- standard or non- 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	No information was provided on pH, dark and light conditions or duration of the test.	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	Not rated	The metric is not applicable to this	NR	NR	NR
	Partitioning		study type.			
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 time interval was not provided. The only sampling data reported was the height of the column at which the samples were taken.	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
			Sum of scores:	15	17	20
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	Kim, Y; Arp, DJ; Semprini, L. (2000). Chlorinated solvent cometabolism by butane-					
<b>Reference:</b>	grown mixed	culture. J Environ	i Eng 126: 934-942.			
	http://dx.doi	<u>.org/10.1061/(AS</u>	<u>CE)0733-9372(2000)</u>	126:10(9)	<u>34).</u>	
	HERO ID: 174	7865				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance	_	was identified by			
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance	U	source and purity			
	Purity		were reported.			
Test Design	3. Study	High	This metric met the	1	2	2
10002001811	Controls		criteria for high	-	-	_
	001101010		confidence as			
			expected for this			
			type of study			
	4 Test	High	This metric met the	1	1	1
	Substance	mgn	criteria for high	1	1	1
	Stability		confidence as			
	Stability		evpected for this			
			type of study			
Toct	5 Tost	High	This motric mot the	1	1	1
Conditions	J. Test Mothod	Ingn	critoria for high	1	1	T
conultions	Suitability		confidence as			
	Suitability		connuence as			
			expected for this			
	( Testing	Madium	type of study.	2	2	4
	6. Testing	Medium	inere were some	2	Z	4
	Conuntions		vonorting of tost			
			conditions			
	7 Testing	Uiah	This motrie mot the	1	1	1
	7. Testing	підіі	anitaria for high	1	1	T
	Consistency					
			confidence as			
			expected for this			
	0.0 1	11. 1	type of study.	1	1	1
	8. System	High	I his metric met the	1	1	1
	Type and		criteria for nign			
	Design		confidence as			
			expected for this			
Test	0	II: 1	type of study.	1	2	2
Test	9. Test	Hign	inis metric met the	1	Z	Z
Urganisms	Urganism		criteria for high			
	Degradation		confidence as			
			expected for this			
	10.7		type of study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			

				1		
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	0	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			
control	variables		evpected for this			
			type of study			
	14 Outcomes	Notrated	The metric is not	ND	ND	ND
	14. Outcomes	NotTaleu	annliaghla ta thia	INK	INK	INK
	Erm e gurre		applicable to this			
Data	Exposure	11. 1	study type.	1	2	2
Data	15. Data	High	I his metric met the	1	Z	Z
Presentation	Reporting		criteria for high			
and Analysis			confidence as			
			expected for this			
			type of study.			
	16. Statistical	Medium	Kinetic calculations	2	1	2
	Methods and		were not 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:	17	20	23
High	Medium	Low	Overall Score =	1.15	Overall	1.2
0			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting		<b>,</b>	
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	2
					Level:	

Study	Bouwer, EJ; McCarty, PL. (1983). Transformations of 1- and 2-carbon halogenated					
Reference:	aliphatic orga	nic compounds u	nder methanogenic co	onditions.	Appl Environ	Microbiol
	45: 1280-129 HERO ID: 180	4. 60				
Domain	Metric	Oualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
	1	or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Idontity		chomical name			
	2 Tost	High	The test substance	1	1	1
	Substance	IIIgii	source and purity	1	1	1
	Purity		were reported			
Test Design	3. Study	High	This metric met the	1	2	2
1 000 2 001gm	Controls		criteria for high	-	_	_
			confidence as			
			expected for this			
			type of study.			
	4. Test	High	This metric met the	1	1	1
	Substance		criteria for high			
	Stability		confidence as			
			expected for this			
Tost	5 Test	High	This metric met the	1	1	1
Conditions	J. Test Method	IIIgii	criteria for high	1	1	1
conutions	Suitability		confidence as			
			expected for this			
			type of study.			
	6. Testing	High	This metric met the	1	2	2
	Conditions		criteria for high			
			confidence as			
			expected for this			
	7 Testing	Uiah	type of study.	1	1	1
	7. Testing	підії	wore reported	1	1	1
	Consistency		across studies			
			Conditions were			
			reported.			
	8. System	High	This metric met the	1	1	1
	Type and	-	criteria for high			
	Design		confidence as			
			expected for this			
Teet	0	II: 1	type of study.	1	2	2
1 est Organisme	9. Test Organism	High	Inoculum source was	1	Z	Z
organiisiiis	Degradation		Inoculum			
			concentration was			
			reported (10 mL/L).			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			

Outcome	11 Outcome	High	This matrix mat the	1	1	1
According	Assessment	підп	anitaria far high	1	T	1
Assessment	Assessment		criteria for high			
	Methodology		confidence as			
			expected for this			
			type of study.			
	12. Sampling	High	Degradation rates	1	1	1
	Methods		were not reported			
			for this part of the			
			study, but sampling			
			methods were			
			sufficient for			
			determining the			
			ability of the bacteria			
			to degrade the			
			starting material			
Confounding	10	Madium	Starting material.	2	1	2
Veriable	15. Canfann din a	Medium		2	T	Z
variable			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	Sufficient evidence	1	2	2
Presentation	Reporting	0	was provided to			
and Analysis	1 0		confirm that			
J			sorption to the			
			column was not the			
			reason for the			
			disappearance of the			
			starting material			
	16 Statistical	Medium	Some details and	2	1	2
	10. Statistical Mothods and	Meululli	kinotic data for the	2	I	2
	Vinctic		hatch study word			
	Calculations		batch study were			
	Calculations		these amissions			
			these omissions			
			were not likely to			
			have had a			
			substantial impact			
			on the study results.			
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	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	Schmidt, KR; Tiehm, A. (2008). Natural attenuation of chloroethenes: identification of					
<b>Reference:</b>	sequential re	ductive/oxidative	biodegradation by m	icrocosm	studies. Wate	er Sci
	Technol 58: 1	137-1145. http://	/dx.doi.org/10.2166/v	wst.2008.	729.	
	HERO ID: 194	1207				
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		was identified by	-	-	-
	Identity		chemical name.			
	2. Test	Not rated	Not applicable: test	NR	NR	NR
	Substance		substance was			
	Purity		measured			
	5		analytically at a			
			polluted site.			
Test Design	3. Study	Medium	Sterile controls were	2	2	4
0	Controls		mentioned but not			
			fully described.			
	4. Test	Not rated	Not applicable for	NR	NR	NR
	Substance		this site-specific test			
	Stability		at a polluted site.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method		criteria for high			
	Suitability		confidence as			
			expected for this			
			type of study.			
	6. Testing	Low	Details of the testing	3	2	6
	Conditions		conditions were not			
			reported.			
	7. Testing	High	This metric met the	1	1	1
	Consistency		criteria for high			
			confidence as			
			expected for this			
		1	type of study.			-
	8. System	High	This metric met the	1	1	1
	Type and		criteria for high			
	Design		confidence as			
			expected for this			
<b>m</b> .	0		type of study.	1	2	2
Test	9. Test	High	This metric met the	1	Z	Z
Organisms	Organism		criteria for nign			
	Degradation		confidence as			
			tripo of study			
	10 Test	Notratad	The metric is not	ND	ND	ND
	10. Test	notrateu	applicable to this	INK	INK	INK
	Dartitioning		applicable to this			
1	1 ar trutoning	1	study type.			

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	C	criteria for high			
			confidence as			
			expected for this			
			type of study.			
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	Medium	Details regarding	2	2	4
Presentation	Reporting		this metric were			
and Analysis			limited; however,			
-			concentrations of			
			test substance and			
			degradation			
			products were			
			reported.			
	16. Statistical	High	The analysis of data	1	1	1
	Methods and	-	was clearly			
	Kinetic		described.			
	Calculations					
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:	15	16	24
High	Medium	Low	Overall Score =	1.5	Overall	1.5
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
					Level:	

Study	Haas, JR; Shock, EL. (1999). Halocarbons in the environment: Estimates of					
<b>Reference:</b>	thermodyna	mic properties fo	r aqueous chloroethy	lene speci	es and their s	tabilities
	in natural se	ttings. Geochim C	osmo Act 63: 3429-34	441.		
	HERO ID: 19	60428				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	Not rated	The metric is not	NR	NR	NR
	Substance		applicable to this			
	Purity		study type			
	5		(calculation).			
Test Design	3. Study	Not rated	The metric is not	NR	NR	NR
5	Controls		applicable to this			
			study type			
			(calculation).			
	4. Test	Not rated	The metric is not	NR	NR	NR
	Substance		applicable to this			
	Stability		study type			
	Stashirty		(calculation).			
Test	5. Test	Not rated	The metric is not	NR	NR	NR
Conditions	Method		applicable to this			
	Suitability		study type			
	5		(calculation).			
	6. Testing	Not rated	The metric is not	NR	NR	NR
	Conditions		applicable to this			
			study type			
			(calculation).			
	7. Testing	Not rated	The metric is not	NR	NR	NR
	Consistency		applicable to this			
			study type			
			(calculation).			
	8. System	Not rated	The metric is not	NR	NR	NR
	Type and		applicable to this			
	Design		study type			
			(calculation).			
Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to this			
	Degradation		study type			
			(calculation).			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11.	Low	Presents energetic	3	1	3
Assessment	Outcome		constraints to			
	Assessment		inform possible			
	Methodology		metabolism 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 and Analysis	15. Data Reporting	Not rated	The metric is not applicable to this study type (calculation).	NR	NR	NR
	16. Statistical Methods and Kinetic Calculations	Low	Statistical analysis or kinetic calculations 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
TT: _].	Madium	T anna	Sum of scores:	7	4	8
nign	Medium	LOW	Sum of Weighted Scores/Sum of Metric Weighting Factors:	Z	Score (Rounded):	2.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low1
<sup>1</sup> The study's ov limited details	erall quality ra for endpoints r	ting was downgrad elated to fate (ther	ded. Rationale: Study re modynamic property).	ports calc	culated estimate	es with

Study	Bielefeldt, AR; Stensel, HD; Strand, SE. (1995). Cometabolic degradation of TCE and						
<b>Reference</b> :	DCE without	intermediate toxi	city. J Environ Eng 121	l: 791-797			
	http://dx.doi	.org/10.1061/(AS	SCE)0733-9372(1995)	121:11(7	<u>91).</u>		
	HERO ID: 230	3792					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable,					
		or Not rated]					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	High	The test substance	1	1	1	
	Substance		source and purity				
	Purity		were not reported;				
			however, the test				
			substance was				
			detected by				
			analytical technique.		-	-	
Test Design	3. Study	High	This metric met the	1	2	2	
	Controls		criteria for high				
			confidence as				
			expected for this				
			type of study.				
	4. Test	Medium	The test substance	2	1	2	
	Substance		stability,				
	Stability		homogeneity,				
			preparation and				
			storage conditions				
The set	<b>– – –</b>	N/ 1:	were not reported.	2	1	2	
lest	5. Test	Medium	The test method was	Z	1	Z	
Conditions	Method		suitable for the test				
	Suitability		substance with				
	( Transfirm a	II: -l.	This we stail and the	1	2	2	
	6. Testing	Hign	I his metric met the	1	Z	Z	
	Conditions		criteria for nigh				
			connuence as				
			type of study				
	7 Testing	Uigh	Some test conditions	1	1	1	
	7. Testing	nigii	some test conditions	1	1	1	
	Consistency		atudu groups woro				
			not reported				
	9 System	Ujah	This motrie mot the	1	1	1	
	Type and	nigii	criteria for high	L	T	T	
	Design		confidence as				
	Design		ovported for this				
			type of study				
			type of study.				

Toct	0 Test	Low	The test organism	2	2	6
Organisms	9. Test	LOW	species and	5	2	0
organishis	Degradation		species, and			
	Degradation					
			were not routinely			
			used for similar			
			study types (phenol			
			feeding).			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	Medium	There were minor	2	1	2
Assessment	Assessment		differences between			
	Methodology		the assessment			
	hieurouology		methodology and the			
			intended outcome			
			assossment			
			assessment -			
			in a gulum			
	12. Compliant	II: -l.		1	1	1
	12. Sampling	High	I his metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this			
			type of study.			
Confounding/	13.	Medium	Volatilization was	2	1	2
Variable	Confounding		not discussed.			
Control	Variables					
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.			
Data	15. Data	Medium	Extraction efficiency	2	2	4
Presentation	Reporting		or recovery was not			
and Analysis			reported.			
	16. Statistical	High	This metric met the	1	1	1
	Methods and	0	criteria for high			
	Kinetic		confidence as			
	Calculations		expected for this			
			type of study.			
Other	17	High	This metric met the	1	1	1
other	Verification or		criteria for high	-	-	-
	Plausibility of		confidence as			
	Results		expected for this			
	nesults		type of study			
	18 OSAR	Not rated	The metric is not	NR	NR	NR
	Models	Notrateu	applicable to this	IVIX	MIX	INIX
	Models		applicable to this			
			Study type.	22	20	20
U: al	Madium	Laur	Sulli OI SCOFES:	1 5	20 Overall	30
nign	Medium	LOW	Sum of Woightod	1.5	Score	1.2
			Sum of weighted		Score	
			Scores/Sum of		(Roundea):	
			Metric Weighting			
	. 1		ractors:		0 "	11. 1
$\geq 1$ and $< 1.7$	$\geq$ 1.7 and	$\geq 2.3$ and $\leq 3$			Uverall	High
	<2.3				Quality	
			1		Level:	

Study Reference:	Kästner, M. (1991). Reductive dechlorination of tri- and tetrachloroethylenes depends on transition from aerobic to anaerobic conditions. Appl Environ Microbiol						
	57:2039-20	46.					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[1.e., High, Modium Louy			Factor		
		Ilnaccentable					
		or Not rated					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance	0	was identified by				
	Identity		chemical name.				
	2. Test	High	The test substance	1	1	1	
	Substance		source and purity				
	Purity		were reported.				
Test Design	3. Study	High	This metric met the	1	2	2	
	Controls		criteria for high				
			confidence as				
			expected for this				
	4 Tost	Uigh	type of study.	1	1	1	
	Substance	Ingii	criteria for high	1	1	1	
	Stability		confidence as				
	Stubility		expected for this				
			type of study.				
Test	5. Test	Unacceptable	The test method	4	1	4	
Conditions	Method		was not suitable for				
	Suitability		the test substance				
			since TCE was also a				
			degradation product				
			of another				
			tostod it is difficult				
			to				
			confirm/determine				
			TCE removal. This				
			deviation and lack				
			of information				
			resulted in serious				
			flaws that make the				
			study unusable.	2	2		
	6. Testing	Medium	Some testing	2	2	4	
	Conditions		conditions were not				
			light conditions)				
			however, sufficient				
			data were reported				
			to determine that				
			the omissions were				
			not likely to have				
			had a substantial				
			impact on the study				
			results.				

	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this	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	Non-standard test species used that may have been adapted to the test substance.	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	Degradation products and pathways were proposed based on the study results.	2	1	2
	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	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 about the statistical methods and kinetics were missing and/or only shown in figures.	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	NR	NR	NR
			study type.			
			Sum of scores:	23	20	30
High	Medium	Low	Overall Score =	1.5	Overall	4
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	Unacceptable <sup>1</sup>
	<2.3				Quality	
					Level:	
<sup>1</sup> The test meth	od was not sui	itable for the test s	ubstance since TCE wa	is also a de	egradation pro	oduct of
another comp	ound being tes	ted it is difficult to	confirm or determine	TCE remo	val. Consister	it with our
Application of	Systematic Re	view in TSCA Risk	<b>Evaluations document</b>	, if a metri	c for a data so	ource receives
a score of Una	cceptable (sco	re = 4), EPA will de	etermine the study to b	e unaccep	table. In this o	case, one of the
metrics was ra	ited as unaccep	otable. As such, the	e study is considered u	nacceptab	le and the sco	re is presented
solely to increa	ase transparen	ICV.	2	•		•

Study Reference:	Powell, CL; Goltz, MN; Agrawal, A. (2014). Degradation kinetics of chlorinated					
Kelelence.	roots. I Conta	am Hydrol 170: 6	8-75. http://dx.doi.or	g/10.101	16/j.jconhvd.	2014.10.001.
	HERO ID: 25	33464	<b>F</b> 77	8/	-,,,, ,-	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	Medium	The test substance	2	1	2
	Substance		source and purity			
	Purity		were not reported;			
			however, the			
			omissions were not			
			likely to have had a			
			substantial impact			
			on the study results.			
Test Design	3. Study	Not rated	Study details for	NR	NR	NR
	Controls		TCE were reported			
	4 55 - 1		in separate study.	ND	ND	ND
	4. Test	Not rated	Study details for TCE	NK	NR	NR
	Substance		reported in separate			
Teet	Stability	Networked	Study.	ND	ND	ND
lest	5. Test	Not rated	Study details for TCE	NK	NK	NR
Conditions	Metnod		reported in separate			
	Suitability	Notwotod	Study.	ND	ND	ND
	6. Testing	Notrated	TCE wore reported	NK	NK	NK
	Conultions		in separate study			
	7 Testing	Not rated	Study details for	NP	NR	NP
	Consistency	NotTateu	TCE were reported	INIX	INIX	INIX
	consistency		in separate study			
	8 System	Not rated	Study details for	NR	NR	NR
	Type and	notrated	TCE were reported			THE STREET
	Design		in separate study.			
Test	9. Test	Not rated	Study details for	NR	NR	NR
Organisms	Organism		TCE were reported			
0	Degradation		in separate study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11.	High	This metric met the	1	1	1
Assessment	Outcome	_	criteria for high			
	Assessment		confidence as			
	Methodology		expected for this			
			type of study.			
	12. Sampling	Not rated	Study details for	NR	NR	NR
	Methods		TCE were reported			
			in separate study.			

Confounding/	13. Confounding	Not rated	No confounding	NR	NR	NR
Control	Variables		noted.			
	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	This reference cited an earlier work for the TCE study results.	4	2	8
	16. Statistical Methods and Kinetic Calculations	Not rated	Study details for TCE were reported in separate study.	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:	8	6	13
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2.17	Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable <sup>1</sup>
<sup>1</sup> Study details Cometabolic d roots: investig	for TCE report egradation of t ation with Car	ed in separate stuc trichloroethene by ex comosa and Scin	ly (not available in HE) methane oxidizers nat rpus atrovirens. Wetlar	RO: Powel urally ass nds 31 (1)	l, C.L., Agrawa ociated with v , 45–52.) Cons	al, A., 2011. vetland plant sistent with

Cometabolic degradation of trichloroethene by methane oxidizers naturally associated with wetland plant roots: investigation with Carex comosa and Scirpus atrovirens. Wetlands 31 (1), 45-52.) 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:	Qin, K; Struckhoff, GC; Agrawal, A; Shelley, ML; Dong, H. (2014). Natural attenuation potential of tricholoroethene in wetland plant roots: Role of native ammonium-oxidizing microorganisms. Chemosphere 119C: 971-977.					
	http://dx.doi HERO ID: 253	.org/10.1016/j.ch 34473	emosphere.2014.09.0	)40.		
Domain	Metric	Qualitative Determination	Comments	Metric Score	Metric Weighting	Weighted Score
		[i.e., High,			Factor	
		Medium, Low, Unaccentable.				
		or Not rated]				
Test	1. Test	Medium	The test substance	2	2	4
Substance	Substance		was identified, but			
	Identity		details were omitted			
			that could have			
			affected			
			interpretation of the			
	2 5 .		study results.	2	1	0
	Z. Test Substance	Low	The source and	3	1	3
	Purity		substance were not			
			reported or verified			
			by analytical means.			
Test Design	3. Study	Medium	Some concurrent	2	2	4
	Controls		control group details			
			however the lack of			
			data was not likely			
			to have had a			
			substantial impact			
			on the study results.			
	4. Test	Low	The test substance	3	1	3
	Substance		stability,			
	Stability		nomogeneity,			
			storage conditions			
			were not reported,			
			and these factors			
			likely influenced the			
			test substance or			
			had a substantial			
			impact on the study			
			results.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method		criteria for high			
	Suitability		confidence as			
			expected for this			
	6. Testing	Medium	There were reported	2	2	4
	Conditions		deviations or	_	-	
	_		omissions in testing			
			conditions (pH).			

	7. Testing Consistency	High	This metric met the criteria for high confidence as	1	1	1
			type of study.			
	8.System Type and Design	Medium	There were omissions in the description of the study type and design, but this was not likely to have had a substantial impact on the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	Low	The test organism, species, and inoculum source were reported, but were not routinely used for similar study types; and the deviation may have a had 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 Assessment	11. Outcome Assessment Methodology	Medium	There were minor differences between the assessment methodology and the intended outcome assessment. Not a typical biodegradation study because chemical and media were replenished in batches.	2	1	2
	12. Sampling Methods	Low	Details regarding sampling methods of the outcome(s) were not fully reported.	3	1	3

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	Medium	The transformation	2	2	4
Presentation	Reporting		product			
and Analysis			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.			
	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.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		expected for this			
	10.0040		type of study.	ND	ND	ND
	18. QSAR	Not rated	The metric is not	NK	NK	NR
	Models		applicable to this			
			study type.	21	20	42
Ujah	Modium	Low	Sum of scores:	51 21	20 Overall	42
nign	Medium	LOW	Sum of Woightod	2.1	Secre	2.1
			Scores/Sum of		(Roundad).	
			Motric Woighting		(Noundeu):	
			Factore			
>1 and <1 7	>17 and	>23 and <3	1 actor 5.		Overall	Medium
_1 and \$1.7	<23	22.5 and 25			Quality	meannin
	-10				Level:	

Study	Haston, ZC; McCarty, PL. (1999). Chlorinated ethene half-velocity coefficients (KS)					
Kelerence:	http://dx.doi HERO ID: 277	org/10.1021/es9	805876.	23-220.		
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 not reported but were not likely to have impacted the results.	2	2	4
	4. Test Substance Stability	High	Not discussed but not likely to have impacted the 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 test organism, species, and inoculum source were not routinely used for similar study types.	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		maximum			
	Methodology		transformation rates			
			under specific			
			conditions and			
			selected test species.			
	12. Sampling	Medium	Method not reported	2	1	2
	Methods		but not likely to			
			impact 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	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	This metric met the	1	1	1
	Methods and		criteria for high			
	Kinetic		confidence as			
	Calculations		expected for this			
0.1	4.7	TT- 1	type of study.		1	4
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for nign			
	Plausibility of		confidence as			
	Results		expected for this			
	10 0540	Notrated	The metric is not	ND	ND	ND
	10. QSAK Models	NotTaleu	applicable to this	ININ	INK	INK
	Mouels		study type			
			Sum of scores:	21	20	29
High	Medium	Low	Overall Score =	1 4 5	Overall	15
	inculum	1000	Sum of Weighted	1.15	Score	1.0
			Scores/Sum of		(Rounded):	
			Metric Weighting		(	
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	5
					Level:	

Study Reference:	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	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	Medium	System Type and Design details (i.e., protection from light or use of amber bottles) were not reported.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	The test organism was an inoculum that was pre- adapted with (multiple generation studies) to the test substance.	2	2	4

	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	Low	Deficiencies in the	3	1	3
Assessment	Assessment	2011	outcome assessment	Ũ	-	0
	Methodology		methodology of the			
	riediouology		assessment or			
			reporting were likely			
			to have had a			
			substantial impact			
			on the results. This			
			non-standard			
			biodegradation test			
			indicated the			
			potential for			
			biodegradation and			
			biodegradation			
			product information			
			but did not give			
			biodegradation			
			rates.			
	12. Sampling	High	This metric met the	1	1	1
	Methods	0	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		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			
		TT: 1	type of study.	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			
Othor	17	Uiah	This metric met the	1	1	1
ouler	17. Varification on	пign	ritoria for high	L	T	1
	Plaugibility of		confidence as			
	PlauSibility Of		connuence as			
	ivesuits		type of study			
	18 0540	Not rated	The metric is not	ND	ND	ND
	Models	notrateu	annlicable to this	INIX	INIX	1111
	mouels		study type			
			Sum of scores	10	20	25
1	1	1	Julli of Scoles.	17	20	20

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.25	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study	Henry, SM; Grbić-Galić, D. (1991). Influence of endogenous and exogenous electron						
Reference:	donors and ti	richloroethylene o	xidation toxicity on t	richloroet	hylene oxida	tion by	
	methanotrop	hic cultures from	a groundwater aquife	er. Appl En	viron Microb	iol 57:	
	236-244.						
	HFRO ID: 2802580						
Domain	Metric	Qualitativo	Comments	Motric	Motric	Weighted	
Domain	Methe	Dotormination	comments	Scoro	Woighting	Scoro	
		Lio Ligh		Score	Factor	Score	
		I.e., filgii, Modium Loui			Factor		
		Meuluill, LOW,					
		Unacceptable,					
		or Not rated				-	
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	High	The test substance	1	1	1	
	Substance		source and purity				
	Purity		were reported.				
Test Design	3. Study	Low	Some concurrent	3	2	6	
0	Controls		control groups				
			(blanks) were not				
			included and may				
			have had a				
			substantial impact				
			on the study results				
	4 Test	Madium	The test substance	2	1	2	
	4. Test	Mealum	The test substance	2	1	Z	
	Substance		stability,				
	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				
Test	5 Test	High	This metric met the	1	1	1	
Conditions	Mothod	IIIgii	critoria for high		T	Ŧ	
conunions	Suitability						
	Suitability		confidence as				
			expected for this				
			type of study.				
	6. Testing	Medium	There were	2	2	4	
	Conditions		omissions in the				
			reporting for Testing				
			conditions; however,				
			these were not likely				
			to have a substantial				
			impact on study				
			results.				
r			1	1	1		
--------------	--------------	-----------	-----------------------	------	------	------	
	7. Testing	High	This metric met the	1	1	1	
	Consistency		criteria for high				
	-		confidence as				
			expected for this				
			type of study.				
	8. System	Medium	There were	2	1	2	
	Type and		omissions in the	_	-	_	
	Design		reporting for System				
	Design		Type and Design				
			however these were				
			not likely to have				
			had a substantial				
			impact on the study				
			results				
Test	9 Test	Medium	The test organism	2	2	4	
Organisms	Organism	Medium	species and	2	2	т	
organishis	Degradation		inoculum source				
	Degradation		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				
	10 Test	Not rated	The metric is not	NR	NR	NR	
	Organism	NotTateu	applicable to this	INIX	INIX	INIX	
	Partitioning		study type				
Outcome	11 Outcome	Low	Biodegradation	3	1	3	
Assessment	Assessment	LOW	study provided	5	1	5	
nssessment	Methodology		reaction rate				
	Methodology		information under				
			specific conditions				
			with methane				
			starvation				
	12 Sampling	Medium	There were	2	1	2	
	Methods	Medium	omissions in the	-	-	-	
	1100110000		reporting for				
			sampling method:				
			however the				
			omissions were not				
			likely to have had a				
			substantial impact				
			on the study results.				
Confounding/	13.	High	This metric met the	1	1	1	
Variable	Confounding	8	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	morratea	applicable to this				
	Exposure		study type				
				l			

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:	24	20	33
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.65	Overall Score (Rounded):	1.7
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium

Study Reference:	Kim, JY; Park, JK; Emmons, B; Armstrong, DE. (1995). Survey of volatile organic compounds at a municipal solid waste cocomposting facility. Water Environ Res 67: 1044-1051. http://dx.doi.org/10.2175/106143095X133284. HERO ID: 2802998						
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	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2	
	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	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	Inoculum source was reported.	1	2	2	

	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
Outcome	11.	High	This metric met the	1	1	1
Assessment	Outcome		criteria for high	-	-	-
	Assessment		confidence as			
	Methodology		expected for this			
			type of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			type of study			
Confounding/	13	High	This metric met the	1	1	1
Variable	Confounding	mgn	criteria for high	1	1	I
Control	Variables		confidence as			
			expected for this			
			type of study.			
	14.	Not rated	The metric is not	NR	NR	NR
	Outcomes		applicable to this			
	Unrelated		study type.			
<b>D</b> :	to Exposure				2	0
Data	15. Data	Unacceptable	Results reported for	4	Z	8
and Analysis	Reporting		sufficient to			
and Analysis			evaluate removal			
			pathways (>0 %			
			removal efficiency			
			for volatilization,			
			biodegradation and			
			residuals).			
	16.	High	This metric met the	1	1	1
	Statistical Matheda and		criteria for high			
	Methods and Kinotic		confidence as			
	Calculations		type of study			
Other	17.	High	This metric met the	1	1	1
	Verification	0	criteria for high			
	or		confidence as			
	Plausibility		expected for this			
	of Results		type of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			Sum of scores	17	19	25
High	Medium	Low	Overall Score =	1.32	Overall	4
0-*			Sum of Weighted		Score	-
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	$\geq$ 2.3 and $\leq$ 3			Overall	Unacceptable <sup>1</sup>
	<2.3				Quality	
					Level:	

<sup>1</sup>Based on insufficient data reported for TCE. Removal efficiency for volatilization, biodegradation and residuals for TCE of >0% were not sufficient to evaluate study results. 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:	Tobajas, M; Verdugo, V; Polo, AM; Rodriguez, JJ; Mohedano, AF. (2016). Assessment of toxicity and biodegradability on activated sludge of priority and emerging pollutants					
Kererenee.	Environ Tech HERO ID: 307	nol 37: 713-721. l 70754	http://dx.doi.org/10.1	080/095	93330.2015.1	1079264.
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		fi.e., High,			Factor	
		Medium Low			1 40001	
		Unaccentable				
		on Not not of				
<b>T</b>	1			1	2	2
Test	1. Test	High	The test substance	1	Z	Z
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance		source and purity			
	Purity		were reported.			
Test Design	3. Study	Medium	The use of blank	2	2	4
0	Controls		controls was not			
			reported in this			
			study: however they			
			were a requirement			
			of the method cited			
			OFCD Test Cuideline			
			OECD Test Guideline			
			302B.			
	4. Test	High	This metric met the	1	1	1
	Substance		criteria for high			
	Stability		confidence as			
			expected for this			
			type of study.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method	_	criteria for high			
	Suitability		confidence as			
			expected for this			
			type of study.			
	6 Testing	High	This metric met the	1	2	2
	Conditions	mgn	criteria for high	1	-	-
	Conditions		confidence as			
			ovported for this			
			type of study			
	7 Testing	Lliah	This motio mot the	1	1	1
	7. Testing	High	This metric met the	1	1	1
	Consistency		criteria for high			
			confidence as			
			expected for this			
			type of study.			
	8. System	Medium	There were	2	1	2
	Type and		omissions in the			
	Design		description of the			
			study type and			
			design, but this was			
			not likely to have			
			had a substantial			
			impact on the study			
			results.			

Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	0	criteria for high			
5	Degradation		confidence as			
	0		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	0	criteria for high			
	Methodology		confidence as			
	0,		expected for this			
			type of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods	0	criteria for high			
			confidence as			
			expected for this			
			type of study.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding	0	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	Medium	Percent recovery	2	2	4
Presentation	Reporting		was not reported but			
and Analysis			was unlikely to have			
			impacted 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.	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.	10		
11.1		T	Sum of scores:	18	20	25
High	Medium	Low	Overall Score =	1.25	Overall	1.3
			Sum of Weighted		Score	
			Scores/Sum of		(Kounded):	
			Metric weighting			
>1 and 17	>17 and	>22 and 22	ractors:		Overall	Himb
≥1 anu <1./	≥1.7 anu	≥2.5 allu ≤3			Overall	підп
	<2.3				Lovel	
				1	Level:	

Study	Phelps, TJ; Niedzielski, JJ; Malachowsky, KJ; Schram, RM; Herbes, SE; White, DC.					
<b>Reference:</b>	(1991). Biodegradation of mixed-organic wastes by microbial consortia in					
	continuous-r	ecycle expanded-	bed bioreactors. Envi	ron Sci Te	chnol 25: 146	61-1465.
	<b>HERO ID: 354</b>	3307				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance	0	was identified by			
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance		source and purity	-	-	-
	Purity		were reported			
Test Design	3 Study	High	This metric met the	1	2	2
rest Design	Controls	mgn	criteria for high	-	-	-
	Gonerois		confidence as			
			expected for this			
			type of study			
	4 Test	High	This metric met the	1	1	1
	Substance	mgn	criteria for high	-	1	1
	Stability		confidence as			
	Stability		evnected for this			
			type of study			
Test	5 Test	High	This metric met the	1	1	1
Conditions	Method	mgn	criteria for high	-	1	1
contactions	Suitability		confidence as			
	Sultubility		expected for this			
			type of study.			
	6. Testing	High	This metric met the	1	2	2
	Conditions	0	criteria for high			
			confidence as			
			expected for this			
			type of study.			
	7. Testing	High	This metric met the	1	1	1
	Consistency		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	Medium	The test inoculum	2	2	4
Organisms	Organism		source was reported			
	Degradation		to be enriched; 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	Low	This study evaluated	3	1	3
Assessment	Assessment		a bioremediation	-	_	-
	Methodology		technique: this			
	i iouiouoiogy		outcome assessment			
			is not likely to be			
			relevant to			
			environmental			
			hiodegradation			
	12 Sampling	Medium	Some details	2	1	2
	Methods	Medium	regarding the	2	1	2
	Methous		sampling were			
			omitted such as the			
			result of readily and			
			noorly			
			biodogradablo			
			roforonco			
			substances			
			however this was			
			not likely to have			
			influenced the			
			interpretation of the			
			study regults			
Confounding	10	Uiah	This metric met the	1	1	1
Voriable	15. Confounding	підіі	mits metric met the	1	1	1
Variable	Variables		criteria for nigh			
Control	variables		connuence as			
			expected for this			
	14 Outcomes	Notworkd	The metric is not	ND	ND	ND
	14. Outcomes	Not rated	The metric is not	NK	NK	NK
	Unrelated to		applicable to this			
Data		TT: 1		1	2	2
Data	15. Data	High	I his metric met the	1	Z	Z
Presentation	Reporting		criteria for nign			
and Analysis			confidence as			
			expected for this			
	16 Chattattan	II: _l.	This west is west the	1	1	1
	10. Statistical	High	This metric met the	1	1	1
	Methods and					
	Colculations		confidence as			
	Calculations		expected for this			
Other	17	UI: ~k	This metric west the	1	1	1
other	1/. Vorifiantian com	High	i nis metric met the		1	T
	verification or		criteria for nign			
	Plausibility of		connuence as			
	Kesuits		expected for this			
	10.0040	Not 1	type of study.	ND	ND	ND
	18. QSAK	Not rated	i ne metric is not	NK	NK	NK
	Models		applicable to this			
			study type.	10	22	2-
			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):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study	Lee, W; Park, SH; Kim, J; Jung, JY. (2015). Occurrence and removal of hazardous							
<b>Reference</b> :	chemicals an	d toxic metals in 2	7 industrial wastewa	ter treatm	ent plants in	Korea.		
	Desalination	Water Treat 54: 1	141-1149.		-			
	http://dx.doi	.org/10.1080/194	443994.2014.935810.					
	<b>HERO ID: 358</b>	HERO ID: 3580141						
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High,			Factor			
		Medium, Low,						
		Unacceptable,						
		or Not rated]						
Test	1. Test	High	The test substance	1	2	2		
Substance	Substance	-	was identified by					
	Identity		chemical name.					
	2. Test	High	The source and	1	1	1		
	Substance	Ū	purity of the test					
	Purity		substance were not					
	5		reported; however,					
			the test substance					
			was identified by					
			analytical means.					
Test Design	3. Study	Medium	The use of controls	2	2	4		
5	Controls		was not reported but					
			likely did not impact					
			the study results.					
	4. Test	Medium	Sample storage	2	1	2		
	Substance		conditions were not					
	Stability		reported but were					
	L L		unlikely to have					
			influenced the study					
			results.					
Test	5. Test	High	This metric met the	1	1	1		
Conditions	Method	-	criteria for high					
	Suitability		confidence as					
			expected for this					
			type of study.					
	6. Testing	Medium	As this was a	2	2	4		
	Conditions		screening study					
			looking at several					
			WWTPs, specific					
			conditions were not					
			reported but were					
			not critical to the					
			study results.					
	7. Testing	High	This metric met the	1	1	1		
	Consistency	Ŭ	criteria for high					
	-		confidence as					
			expected for this					
			type of study.					

	8. System Type and Design	Medium	Some system details were omitted but these omissions were unlikely to have impacted the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Details regarding the test organisms at each WWTP were not given but their omission did not likely impact 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 but this was unlikely to impact 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	Medium	Transformation products were not reported, and volatilization was likely a large factor in the lower effluent concentrations since the removal rates were proportional to air to water ratios.	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:	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	Parsons, F; Lage, GB; Rice, R. (1985). Biotransformation of chlorinated organic					
<b>Reference:</b>	solvents in st	atic microcosms. I	Environ Toxicol Chem	<b>4: 739-7</b> 4	2.	
	http://dx.doi	.org/10.1002/etc	.5620040604.			
	HERO ID: 379	7820	ſ	1		
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance		purity was reported			
	Purity		(ultrapure).			
Test Design	3. Study	High	Solvent blank on	1	2	2
0	Controls	0	non-viable			
			microcosm controls			
			was used.			
	4. Test	High	This metric met the	1	1	1
	Substance	0	criteria for high			
	Stability		confidence as			
	5		expected for this			
			type of study.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method	0	criteria for high			
	Suitability		confidence as			
	,		expected for this			
			type of study.			
	6. Testing	High	This metric met the	1	2	2
	Conditions	0	criteria for high			
			confidence as			
			expected for this			
			type of study.			
	7. Testing	Medium	The authors noted	2	1	2
	Consistency		subtle			
	5		inconsistencies			
			between the			
			microcosms that			
			may have caused			
			extended lag			
			periods.			
	8. System	High	This metric met the	1	1	1
	Type and	0	criteria for high			
	Design		confidence as			
	0		expected for this			
			type of study.			
Test	9. Test	High	This metric met the	1	2	2
Organisms	Organism	0	criteria for high			
	Degradation		confidence as			
	- ogradation		expected for this			
			type of study.			

	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
<b>Q</b>	Partitioning		study type.			
Outcome Assessment	11. Outcome Assessment Methodology	Medium	Biodegradation products were measured throughout the study although rate information was not reported	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	There was high uncertainty in the concentrations of the TCE degradation products.	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	Select degradation products were monitored; however, quantitative degradation results were not presented for TCE.	3	2	6
·	16. Statistical Methods and Kinetic Calculations	Medium	This metric met the criteria for high confidence as expected for this type of study.	2	1	2
Other	17. Verification or Plausibility of Results	Low	Loss due to abiotic processes and/or adsorption were not controlled.	3	1	3
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	23	20	30
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.5	Overall Score (Rounded):	2.3
≥1 and <1.7	$\geq 1.7$ and	≥2.3 and ≤3			Overall Quality	Low <sup>1</sup>

Study	Wakeham, SG; Davis, AC; Karas, JA. (1983). Mesocosm experiments to determine the						
<b>Reference</b> :	fate and pers	istence of volatile	organic compounds i	n coastal s	eawater. Env	riron Sci	
	Technol 17: 6	511-617. http://dx	k.doi.org/10.1021/es0	0116a00	9.		
	<b>HERO ID: 379</b>	7829					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable,					
		or Not rated]					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	High	The source and	1	1	1	
	Substance		purity of the test				
	Purity		substance were not				
			reported; however,				
			the test substance				
			was identified by				
			analytical means.				
Test Design	3. Study	Medium	Sterile control used;	2	2	4	
	Controls		however, use of a				
			reference substance				
			was not reported.				
	4. Test	High	This metric met the	1	1	1	
	Substance		criteria for high				
	Stability		confidence as				
			expected for this				
			type of study.				
Test	5. Test	Medium	Limited detail was	2	1	2	
Conditions	Method		reported on the test				
	Suitability		method.				
	6. Testing	Medium	There were	2	2	4	
	Conditions		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.	-	-		
	7. Testing	Medium	The control	2	1	2	
	Consistency		experiment was run				
			on different dates,				
			not correlating with				
			other systems.				

	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 Organisms	9. Test Organism Degradation	Medium	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.	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 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	Medium	Details regarding this metric were limited; some of the data were inferred from figures.	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 be 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 of Weighted Scores/Sum of Metric Weighting Factors:	1.78	Overall Score (Rounded):	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium

Study	Wakeham, SG; Davis, AC; Karas, JA. (1983). Mesocosm experiments to determine the						
<b>Reference</b> :	fate and pers	istence of volatile	organic compounds i	n coastal s	seawater. Env	viron Sci	
	Technol 17: 6	511-617. http://dx	k.doi.org/10.1021/es0	0116a00	9.		
	<b>HERO ID: 379</b>	07829					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable,					
		or Not rated]					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	High	The source and	1	1	1	
	Substance		purity of the test				
	Purity		substance were not				
			reported; however,				
			the test substance				
			was identified by				
			analytical means.				
Test Design	3. Study	Medium	Sterile control used;	2	2	4	
	Controls		however, use of a				
			reference substance				
			was not reported.				
	4. Test	High	This metric met the	1	1	1	
	Substance		criteria for high				
	Stability		confidence as				
			expected for this				
			type of study.				
Test	5. Test	Medium	Limited detail was	2	1	2	
Conditions	Method		reported on the test				
	Suitability		method.		-		
	6. Testing	Medium	There were	2	2	4	
	Conditions		omissions in testing				
			conditions; however,				
			sufficient data were				
			reported to				
			determine that the				
			omissions were not				
			likely to have had a				
			substantial impact				
	<b>7 m</b>		on the study results.	2	4	2	
	7. Testing	Medium	i ne control	2	1	Z	
	Consistency		experiment was run				
			on different dates,				
			not correlating with				
	1	1	other systems.				

	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 Organisms	9. Test Organism Degradation	Medium	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.	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 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	Medium	Details regarding this metric were limited; some of the data were inferred from figures.	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 be 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 of Weighted Scores/Sum of Metric Weighting Factors:	1.78	Overall Score (Rounded):	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium

Study Reference:	Gossett, JM. (1985). Anaerobic degradation of C1 and C2 chlorinated hydrocarbons. (ESL-TR-85-38). Tyndal AFB, FL: Air Force Engineering & Services Center.						
Domain	Metric	Qualitative Determination [i.e., High, Medium, Low, Unacceptable,	Comments	Metric Score	Metric Weighting Factor	Weighted Score	
		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	Low	The test substance source and purity were not reported.	3	1	3	
Test Design	3. Study Controls	Medium	Limited detail was provided on control 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	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	

Tost	9 Test	High	This metric met the	1	2	2
Organisms	Organism	111611	criteria for high	1	2	2
organishis	Degradation		confidence as			
	Degradation		evpected for this			
			type of study			
	10 Test	Not noted	The metric is not	ND	ND	ND
	10. Test	Not fateu	The metric is not	INK	NK	INK
	Dertitioning		applicable to this			
Outcome	1 1	Uiah	This metric met the	1	1	1
Outcome	11. Outcome	High	I his metric met the	1	1	1
Assessment	Outcome		criteria for high			
	Assessment		confidence as			
	Methodology		expected for this			
	42.0 1:		type of study.	2	1	2
	12. Sampling	Medium	Sampling details	Z	1	2
	Methods		were not fully			
			reported; alternate			
			sampling of			
			duplicate tests run			
			side by side.			
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.	Not rated	The metric is not	NR	NR	NR
	Outcomes		applicable to this			
	Unrelated		study type.			
	to Exposure					
Data	15. Data	Unacceptable	Extraction	4	2	8
Presentation	Reporting		efficiency, percent			
and Analysis			recovery, and mass			
			balance were not			
			reported. In			
			addition, analytical			
			methods were not			
			reported and there			
			was an			
			unaccounted-for			
			loss of test material.			
	16.	Medium	Calculations	2	1	2
	Statistical		summarized and			
	Methods and		experimental values			
	Kinetic		were not reported.			
	Calculations					
Other	17.	Low	Due to limited	3	1	3
	Verification		information,			
	or		evaluation of the			
	Plausibility		reasonableness of			
	of Results		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:	26	20	35

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Eactors:	1.75	Overall Score (Rounded):	4		
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall Quality	Unacceptable <sup>1</sup>		
	×2.5				Level:			
<sup>1</sup> Extraction eff reported, and	iciency, percer loss of test ma	nt recovery, and ma terial was not acco	ass balance were not re unted for which limits	eported; a the evalu	nalytical methation of the st	nods were not udy. 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								
one of the met presented sole	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:	Alvarez-Cohen, L; McCarty, PL. (1991). Effects of toxicity, aeration and reductant supply on trichloroethylene transformation by a mixed methanotrophic culture. Appl Environ Microbiol 57: 228-235. HERO ID: 4140406					
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	Medium	Variable degradation rates were observed and some test conditions across samples were not reported, 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	0	11: 1	Minnel	4	2	2
lest	9. Test	High	Mixed	1	Z	Z
Organisms	Organism		methanotrophic			
	Degradation		culture.			
	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	0	criteria for high			
	Methodology		confidence as			
			expected for this			
			type of study			
	12 Sampling	Medium	Some sampling	2	1	2
	12. Samping Mothodo	Meuluii	dotails wore omitted	2	1	2
	Methous		but this was unlikely			
			but this was unikely			
			to have impacted the			
	10		study results.		4	
Confounding/	13.	Low	Variation in	3	1	3
Variable	Confounding		transformation rates			
Control	Variables		indicated that loss			
			was affected by			
			factors other than			
			strictly biotic			
			processes.			
	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	0	criteria for high			
and Analysis	1 0		confidence as			
			expected for this			
			type of study			
	16 Statistical	High	The analysis of data	1	1	1
	Methods and	111,611	was clearly	1	1	1
	Kinetic		described			
	Calculations		ucscribeu.			
Othor	17	Low	Variation in	2	1	2
other	17. Varification on	LOW	variation vator	3	1	3
	Dlaugibility of		indicated that loss			
	Plausibility of		indicated that loss			
	Results		was affected by			
			factors other than			
			strictly biotic			
			processes.			
	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 =	1.3	Overall	2.3
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	Low <sup>1</sup>
	<2.3				Quality	
					Level:	

<sup>1</sup>The study's overall quality rating was downgraded. Rationale: Variation in transformation rates indicated that loss was affected by factors other than strictly biotic processes.

Study	Dow Chem Co. (1977). The Inhibition of Anaerobic Sludge Gas Production By 1,1,1-					
Reference:	trichloroethane. Methylene Chloride. Trichloroethylene and Perchloroethylene. Part					
	2. (OTS: OTS)	)517178: 8EHO Nu	m: NA: DCN: 86- 8700	02089: TS	CATS RefID:	309930:
	(O I O I O I O I O I O I O I O I O I O I			02007,12		
	HFRO ID: 421	13887				
Domain	Motria	Qualitativa	Commonto	Motria	Matria	Wataktad
Domain	Methc	Qualitative	comments	Metric	Metric	weighteu
		Determination		Score	weighting	Score
		[1.e., Hign,			Factor	
		Medium, Low,				
		Unacceptable, or				
		Not rated				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	Low	The source and	3	1	3
	Substance		purity of the test			
	Purity		substance were not			
	5		reported or verified			
			by analytical means.			
Test Design	3 Study	High	This metric met the	1	2	2
1000200.8	Controls		criteria for high	-	-	_
	001101015		confidence as			
			evpected for this			
			type of study			
	4 Test	Uiah	This motrie mot the	1	1	1
	4. Test	nigii	mitorio for high	1	1	1
	Substance		criteria for nign			
	Stability		confidence as			
			expected for this			
_		1	type of study.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method		criteria for high			
	Suitability		confidence as			
			expected for this			
			type of study.			
	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	This metric met the	1	1	1
	Consistency		criteria for high			
			confidence as			
			expected for this			
			type of study.			
	8. System	High	This metric met the	1	1	1
	Type and	U U	criteria for high			
	Design		confidence as			
	8		expected for this			
			type of study			
Test	9 Test	High	This metric met the	1	2	2
Organisme	Organism	111g11	criteria for high		2	4
Jiganisins	Degradation		confidence as			
	Degrauation		overage of the state			
			expected for this			
1			type of study.	1		

	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			
Outcome	11. Outcome	Unacceptable	Study describes	4	1	4
Assessment	Assessment		inhibition of gas			
	Methodology		production not			
			biodegradation.			
	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			
<b>D</b> .	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			
	16 0 1 1	11.1	type of study.	1	1	1
	16. Statistical	High	I his metric met the	1	1	1
	Methods and		criteria for high			
	Kinetic		confidence as			
	Calculations		expected for this			
Othor	17	Madium	type of study.	2	1	2
Other	17. Venification	Medium	The extraction	Z	1	Z
	verification		recovery was 50%.			
	01 Dlaugibility of					
	PlauSibility Of					
		Not rated	The metric is not	ND	ND	ND
	10. QSAN Models	NotTaleu	applicable to this	INIX	INIX	INIX
	Models		applicable to this			
			Sum of scores:	21	20	26
High	Modium	Low	Overall Score -	12	Overall	20
mgn	Meuluii	LOW	Sum of Weighted	1.5	Score	2.3
			Scores/Sum of		(Rounded)	
			Metric Weighting		(Roundeu).	
			Factors			
>1 and $<1.7$	>17 and	>23 and <3	1 40013	<u> </u>	Overall	LOW1
_1 unu \$1.7	<23	-2.5 and 25			Quality	10 10
	-2.0				Level:	
<sup>1</sup> The study's o	verall quality ra	ting was downgrad	led Rationale Study de	L scrihes int	ibition of gas r	roduction
not biodegrad	ation rates or tr	ansformation nath	ways Consistent with o	ur Annlica	tion of Systema	atic

not biodegradation rates or transformation pathways. 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:	Kao, CM; Prosser, J. (1999). Intrinsic bioremediation of trichloroethylene and chlorobenzene: field and laboratory studies. J Hazard Mater 69: 67-79. HERO ID: 660136					nd
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 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	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, preparation and storage conditions were not reported; 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	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 limited; however, this did not limit the interpretation of the 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 details limited; however, this did not limit the interpretation of the 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	Low	This study evaluated co-metabolism; the use of different substrates was likely to have had a substantial impact on results.	3	1	3
	12. Sampling Methods	Low	Information regarding this metric was not reported.	3	1	3
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	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	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 for this site-specific study, 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:	25	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:	Kao, CM; Prosser, J. (1999). Intrinsic bioremediation of trichloroethylene and chlorobenzene: field and laboratory studies. J Hazard Mater 69: 67-79.					
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 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	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, preparation and storage conditions were not reported; 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	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 condition details were not reported; however, these factors were not likely to have had a substantial impact on the study results.	2	2	4

	7. Testing Consistency	Medium	Some test conditions across samples or study groups were	2	1	2
			not reported, but these discrepancies were not likely to			
			have had a substantial impact			
			on the study results			
	8. System Type and Design	High	Testing conditions were monitored, reported, and appropriate for the method.	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	Low	This study evaluated intrinsic bioremediation; this outcome assessment not likely to be relevant to environmental biodegradation.	3	1	3
	12. Sampling Methods	Low	Information regarding this metric was not reported.	3	1	3
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, however, 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	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	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 for this site-specific study, 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:	25	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	Freitag, D; Ballhorn, L; Gever, H; Korte, F. (1985). Environmental hazard profile of							
Reference:	organic chemicals: an experimental method for the assessment of the behaviour of							
	organic chemicals in the ecosphere by means of simple laboratory tests with 14C							
	labelled che	micals. Chemospl	here 14: 1589-1616.	F	,, <b>,</b>			
	HERO ID: 85251							
Domain	Metric	Oualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High.		50010	Factor			
		Medium, Low.			1 40001			
		Unaccentable						
		or Not rated]						
Test	1 Test	Unaccentable	No information was	4	2	8		
Substance	Substance	onacceptable	novided about the	1	2	0		
Substance	Identity		test substance other					
	luentity		than a general					
			statement that some					
			statement that some					
			users hought and					
			were bought, and					
			some were					
			synthesized in the					
	2 5 4		lab.	4	1			
	2. Test	Unacceptable	No information was	4	1	4		
	Substance		provided about the					
	Purity		test substance other					
			than a general					
			statement that some					
			test substances					
			were bought, and					
			some were					
			synthesized in the					
			lab.					
Test Design	3. Study	Not rated	No information was	NR	NR	NR		
	Controls		provided.					
	4. Test	Unacceptable	No information was	4	1	4		
	Substance		provided about the					
	Stability		test substance.					
Test	5. Test	Unacceptable	No details about the	4	1	4		
Conditions	Method		test method were					
	Suitability		provided.					
	6. Testing	Unacceptable	No information	4	2	8		
	Conditions		regarding the					
			testing conditions					
			were provided.					
	7. Testing	Unacceptable	Critical exposure	4	1	4		
--------------	-------------------------	--------------	------------------------	------	------	------		
	Consistency		details across	_	_	-		
			samples were not					
			reported and these					
			omissions resulted					
			in serious flaws that					
			had a substantial					
			impact on the					
			overall confidence					
			consequently					
			making the study					
			unusable					
	8 System	Not rated	No information was	NP	NP	NP		
	Type and	Notrateu	no moridad	INIX	INIX	INIX		
	Type and Design		provideu.					
Teet	0 Test	Low	The inequilym was	2	n	6		
Organisms	9. Test	LOW	identified as	3	Z	0		
Organishis	Degradation		adapted activated					
	Degradation		auapteu activateu					
			information					
			inior mation					
			regarding the					
			source of the sludge					
	10	Natural	Was provided.	ND	ND	ND		
	10. Test	Not rated	I ne metric is not	NK	NK	NK		
	Deutitioning		applicable to this					
Outcome		Notratad	No information was	ND	ND	ND		
According	11. Outcomo	Notrated	NO IIIIOI IIIation was	INK	NK	INK		
Assessment	Assessment		provided.					
	Assessment							
	Methodology	Naturated	No information was	ND	ND	ND		
	12. Sampling Mothodo	Notrated	no information was	INK	NK	INK		
Confounding/	12	Not rated	No confounding	ND	ND	ND		
Variable	15. Confounding	NotTaleu	No contounding	INIX	INIX	INIX		
Control	Variables		variables were					
Control	14	Notratad	No information was	ND	ND	ND		
	14. Outcomos	NotTaleu	no information was	INIX	INIX	INIX		
	Unrolated		provided.					
	to Exposure							
Data	15 Data	Low	A single data point	3	2	6		
Presentation	Reporting	10 10	3 4% degradation	5	2	U		
and Analysis	nopoi ung		was provided					
ana mary 315	16	Not rated	No information was	NR	NR	NR		
	Statistical	Not fated	provided		1110			
	Methods and		Provident					
	Kinetic							
	Calculations							
Other	17.	Not rated	Due to limited	NR	NR	NR		
	Verification	mornatea	information.					
	or		evaluation of the					
	Plausibility		reasonableness of					
	of Results		the study results					
	ST REDUILD		was not possible.					

	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR	
			Sum of scores:	30	12	44	
High	Medium	Low	Overall Score =	3.67	Overall	4	
			Sum of Weighted		Score		
			Scores/Sum of		(Rounded):		
			Metric Weighting				
			Factors:				
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	Unacceptable <sup>1</sup>	
	<2.3				Quality		
					Level:		
<sup>1</sup> No information was provided about the test substance other that a statement saying some test substances were bought, some were synthesized in the lab. 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, six of the metrics were rated as unacceptable.							
As such, the st	uay is conside	red unacceptable a	ind the score is present	ea solely	to increase tra	ansparency.	

Study	Bouwer, EJ; Rittmann, BE; McCarty, PL. (1981). Anaerobic degradation of halogenated					
<b>Reference:</b>	1- and 2-carb	on organic compo	unds. Environ Sci Tech	nol 15: 59	96-599.	
	http://dx.doi	.org/10.1021/es0	0087a012.			
	HERO ID: 981	8	-	-	_	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by			
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance		source and purity			
	Purity		were reported.			
Test Design	3. Study	High	This metric met the	1	2	2
	Controls		criteria for high			
			confidence as			
			expected for this type			
			of study.			
	4. Test	High	This metric met the	1	1	1
	Substance		criteria for high			
	Stability		confidence as			
			expected for this type			
			of study.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method		criteria for high			
	Suitability		confidence as			
			expected for this type			
	( <b>T</b>		of study.			
	6. Testing	High	This metric met the	1	2	2
	Conditions		criteria for high			
			confidence as			
			expected for this type			
	7 Testing	Uiah	OI SLUGY.	1	1	1
	7. Testing	High	mit a metric met the	1	1	1
	consistency		confidence ac			
			ovported for this type			
			of study			
	8 System	High	This metric met the	1	1	1
	Type and		criteria for high	-	Ĩ	Ť
	Design		confidence as			
			expected for this type			
			of study.			
Test	9. Test	Medium	Nonstandard	2	2	4
Organisms	Organism		organism from	_	-	-
	Degradation		laboratory scale			
			digester was used in			
			this 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 Methodology		criteria for high			
	110010000085		expected for this type			
			of study.			
	12. Sampling	Medium	Sampling frequency	2	1	2
	Methous		method was not			
			documented.			
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	Variables		confidence as			
			of study.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
Data	Exposure	11. 1	study type.	1	2	2
Data	15. Data Reporting	High	I his metric met the	1	Z	Z
and Analysis	Reporting		confidence as			
······ ·······························			expected for this type			
			of study.			
	16. Statistical	High	This metric met the	1	1	1
	Methods and		criteria for high			
	Calculations		expected for this type			
	Galculations		of study.			
Other	17.	High	This metric met the	1	1	1
	Verification or		criteria for high			
	Plausibility of		confidence as			
	Results		of study			
	18. OSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.			
TT+ 1		T	Sum of scores:	17	20	23
High	Medium	LOW	of Weighted	1.15	Overall	1.2
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:		(	
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
					Level:	

Study	Bouwer, EJ; Rittmann, BE; McCarty, PL. (1981). Anaerobic degradation of halogenated					
<b>Reference:</b>	1- and 2-carb	on organic compo	ounds. Environ Sci Tec	hnol 15: 5	596-599.	-
	http://dx.doi	.org/10.1021/es0	0087a012.			
	HERO ID: 981	.8	<u> </u>			X47 * 1 . 1
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[I.e., Hign,			Factor	
		Medium, Low,				
		or Not rated]				
Test	1 Test	High	The test substance	1	2	2
Substance	Substance		was identified by	-	-	_
	Identity		chemical name.			
	2. Test	High	The test substance	1	1	1
	Substance	U	source and purity			
	Purity		were reported.			
Test Design	3. Study	High	This metric met the	1	2	2
	Controls	-	criteria for high			
			confidence as			
			expected for this			
			type of study.			
	4. Test	High	This metric met the	1	1	1
	Substance		criteria for high			
	Stability		confidence as			
			expected for this			
<b>m</b> .	<b>- - -</b>	TT: 1	type of study.			
Test	5. Test	High	This metric met the	1	1	1
Conditions	Method		criteria for nign			
	Suitability		connuence as			
			type of study			
	6 Testing	High	This metric met the	1	2	2
	Conditions	mgn	criteria for high	-	-	-
	Contractions		confidence as			
			expected for this			
			type of study.			
	7. Testing	High	This metric met the	1	1	1
	Consistency	-	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			
Tost	0 Test	Madium	type of study.	2	2	Λ
Organisms	7. Test	Medium	organism from	2	۷.	4
organisiiis	Degradation		laboratory scale			
			digester was used in			
			this study.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this			
	Partitioning		study type.			

Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as	1	1	1
			type of study.			
	12. Sampling Methods	Medium	Sampling frequency was reported but method was not documented.	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 <sup>1</sup>
<sup>1</sup> The study's ov remaining rela	verall quality ra tive to the cont	ting was downgra rols after 25 week	ded. Rationale: Greater 1 s.	han 100%	of test substar	nce was

Study	Jensen, S; Rosenberg, R. (1975). Degradability of some chlorinated aliphatic							
Reference:	hydrocarbo HERO ID: 98	ns in sea water an 41	d sterilized water. W	ater Res	9:659-661.			
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 analytical technique.	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 were 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		

	8. System Type and Design	Medium	The test system was reported for 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.	2	1	2
Test Organisms	9. Test Organism Degradation	Low	Inoculum source was not routinely used and was not validated for microbial action.	3	2	6
	10. Test Organism Partitioning	Not rated	applicable to this study type.	NK	NK	NK
Outcome Assessment	11. Outcome Assessment Methodology	Low	This study used a continuous-flow methanogenic fixed- film laboratory- scale column.	3	1	3
	12. Sampling Methods	Unacceptable	Serious 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.	4	1	4
Confounding/ Variable Control	13. Confounding Variables	Low	Leaks were noted; loss in open systems attributed to possible volatilization; not controlled or quantified.	3	1	3
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Data	15 Data	Low	There was	3	2	6
Presentation	Reporting	LOW	insufficient evidence	5	-	0
and Analysis	Reporting		nrocontod to			
anu Anarysis			presented to			
			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.			
	16.	High	The analysis of data	1	1	1
	Statistical		was clearly			
	Methods and		described.			
	Kinetic					
	Calculations					
Other	17.	Not rated	Due to limited	NR	NR	NR
	Verification		information,			
	or		evaluation of the			
	Plausibility		reasonableness of			
	of Results		the study results			
	or neo uno		was not possible			
			(i.e. reference			
			substance not used			
			loss was not			
			confined to one			
			nrocess			
	19 0540	Not rated	The metric is not	ND	ND	ND
	10. QSAK Madala	NotTaleu	applicable to this	INK	INK	INK
	Models		applicable to this			
			study type.	22	10	4.4
Ul: -l.	Madisses	T	Sum of scores:	32	19	44
High	Medium	LOW	Overall Score =	2.32	Overall	4
			Sum of weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	$\geq$ 2.3 and $\leq$ 3			Overall	Unacceptable <sup>1</sup>
	<2.3				Quality	
					Level:	
<sup>1</sup> Serious uncer	tainties or lim	itations were iden	tified in sampling meth	ods of the	e outcome of in	nterest. In
addition, loss f	from leaks in v	alves and open tes	t systems were likely to	o have a s	ubstantial imp	oact on the
results. These	serious flaws r	nake the study un	usable. Consistent with	our Appli	ication of Syst	ematic Review
in TSCA Risk E	valuations doo	ument, if a metric	for a data source receiv	ves a scor	e of Unaccepta	able (score =

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	Tabak, HH; Quave, SA; Mashni, CI; Barth, EF. (1981). Biodegradability studies with					
<b>Reference:</b>	organic prior	ity pollutant com	pounds. J Water Pollu	t Control I	Fed 53: 1503-	1518.
	HERO ID: 986	01				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
Teet	1 T+	or Not rated		1	2	2
l est	1. Test	High	The test substance	1	Z	Z
Substance	Substance		was identified by			
		N/ 1:	chemical name.	2	1	2
	Z. Test	Medium	The test substance	Z	1	Z
	Substance		source and purity			
To at De al an	Purity	II: -l.	were not reported.	1	2	2
l est Design	3. Study	High	I his metric met the	1	Z	Z
	Controls		criteria for nign			
			connuence as			
			type of study			
	4 Test	Uigh	This matric mat the	1	1	1
	4. Test	Ingn	criteria for high	1	T	1
	Stability		confidence as			
	Stability		expected for this			
			type of study			
Test	5 Test	High	This metric met the	1	1	1
Conditions	Method	mgn	criteria for high	-	*	1
conditions	Suitability		confidence as			
	bullubility		expected for this			
			type of study.			
	6. Testing	High	This metric met the	1	2	2
	Conditions	0	criteria for high			
			confidence as			
			expected for this			
			type of study.			
	7. Testing	High	This metric met the	1	1	1
	Consistency	-	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			
		1	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			
	10	Nata 1	type of study.	ND	ND	ND
	10. Test	Not rated	i ne metric is not	NK	NK	NK
	Organism		applicable to this			
	Fartutioning		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			
Confounding	10	Uiah	This matric mat the	1	1	1
Variable	13. Confounding	High	aritaria for high	1	1	1
Control	Variables		confidence as			
CONTINU	variables		evpected for this			
			type of study			
	14 Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to	notratea	applicable to this	i i i i	i iii	1111
	Exposure		study type.			
Data	15. Data	Medium	Some quantitative	2	2	4
Presentation	Reporting		details were			
and Analysis			omitted; however,			
_			overall results were			
			clearly reported.			
	16. Statistical	Medium	Some details were	2	1	2
	Methods and		omitted; however,			
	Kinetic		these omissions			
	Calculations		were not likely to			
			have had a			
			substantial impact			
Othor	17	Uigh	This matric mat the	1	1	1
other	Verification or	nigii	criteria for high	1	1	1
	Plausibility of		confidence as			
	Results		expected for this			
	neouno		type of study.			
	18. OSAR	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 =	1.2	Overall	1.2
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	$\geq 1.7$ and	$\geq$ 2.3 and $\leq$ 3			Overall	High
	<2.3				Quality	
			1	1	Level:	

Study	Wood, PR; Parsons, FZ; DeMarco, J; Harween, HJ; Lang, RF; Payan, IL; Ruiz, MC. (19							
<b>Reference:</b>	ce: Introductory study of the biodegradation of the chlorinated methane, ethane and							
	ethene comp	ene compounds. Paper presented at American Water Works Association Annual						
	Conference a	nd Exposition, Jun	ne 7-11, 1981, St. Louis	s, MO.				
	<b>HERO ID: 988</b>	81						
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
20111111		Determination		Score	Weighting	Score		
		lie High		beore	Factor	50010		
		Medium Low			Tuctor			
		Unaccontable						
		or Not rated]						
Toct	1 Tost	Uigh	The test substance	1	2	2		
Substance	1. Test	Ingn	the test substance	1	2	2		
Substance	Substance		was identified by					
	Identity		chemical name.			2		
	2. Test	Medium	The test substance	2	1	2		
	Substance		source and purity					
	Purity		were not reported;					
			however, the test					
			substance was					
			detected by GC-MS					
			analytical technique.					
Test Design	3. Study	High	This metric met the	1	2	2		
	Controls		criteria for high					
			confidence as					
			expected for this					
			type of study.					
	4. Test	Not rated	Trichloroethylene	NR	NR	NR		
	Substance		was a					
	Stability		transformation					
	otability		product from carbon					
			tetrachloride in this					
			study					
Test	5 Test	High	This metric met the	1	1	1		
Conditions	Method	ingn	criteria for high	1	-	1		
conditions	Suitability		confidence as					
	Sultability		evnected for this					
			type of study					
	6 Testing	Low	Thoro woro como	2	2	6		
	Conditions	LOW	amiggiong in the	5	2	0		
	Conultions		vonorting of tost					
			reporting of test					
			conditions. pri,					
			specific temperature					
			and light control					
	<b>7 m</b>	TT: 1	were not reported.	4	4	1		
	7. Testing	High	I his metric met the	1	1	1		
	Consistency		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	High	This metric met the	1	2	2
Organisms	Organism	0	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		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	Absorption was	1	1	1
Variable	Confounding		discussed.			
Control	Variables					
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
_	Exposure		study type.			
Data	15. Data	Medium	Specific chemical	2	2	4
Presentation	Reporting		concentrations were			
and Analysis			not reported.	-		
	16. Statistical	Medium	Half-life calculation	2	1	2
	Methods and		was not described.			
	Kinetic					
Others		II: -l-		1	1	1
Other	1/. Varification or	High	I his metric met the	L	1	1
	Plaugibility of		criteria for nigh			
	PlauSibility Of		connuence as			
	Results		type of study			
	18 OSAR	Not rated	The metric is not	NR	NR	NR
	Models	Notrated	annlicable to this	THE THE		i i i i i i i i i i i i i i i i i i i
	inoucis		study type			
			Sum of scores:	19	19	27
High	Medium	Low	Overall Score =	1 4 2	Overall	17
gii	neurum	2011	Sum of Weighted	1.14	Score	±17
			Scores/Sum of		(Rounded):	
			Metric Weighting		()	
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	Medium <sup>1</sup>
	<2.3				Quality	
					Level:	
<sup>1</sup> The study's o	verall quality ra	ting was downgra	ded. Rationale: Trichlor	oethylene	is a transforma	ation
product in this	s study.					

Study	Dilling, WL; Tefertiller, NB; Kallos, GJ. (1975). Evaporation rates and reactivities of					
Reference:	methylene ch	loride, chloroform	, 1,1,1-trichloroethar	ie, trichlo	roethylene,	
	tetrachloroe	thylene, and other	chlorinated compoun	ds in dilu	te aqueous s	olutions.
	Environ Sci 1	echnol 9: 833-838	http://dx.doi.org/10	.1021/es	60107a008.	
Domoin	HERU ID: 580	J54 Ovelitetive	Commonto	Motria	Motria	Waightad
Domain	Metric	Qualitative	Comments	Metric	Metric	weighted
				score	Factor	Score
		Medium Low			Factor	
		Ilnaccentable or				
		Not rated]				
Test	1. Test	High	The test substance	1	2	2
Substance	Substance		was identified by	-	_	-
	Identity		chemical name.			
	2. Test	Medium	Purity not reported:	2	1	2
	Substance		however. MS			
	Purity		analysis performed			
			at start of study,			
			m/z corresponds to			
			trichloroethylene.			
Test Design	3. Study	Not rated	Not reported for the	NR	NR	NR
	Controls		hydrolysis study.			
	4. Test	High	MS analysis	1	1	1
	Substance		performed at start			
	Stability		of study.			
Test	5. Test	High	Methanol was used	1	1	1
Conditions	Method		as a co-solvent.			
	Suitability					
	6. Testing	High	Water was purged	1	2	2
	Conditions		with air 15 min			
			prior to initiation of			
			study; the authors			
			appeared to be			
			assuming that			
			hydrolysis was			
			Iollowed by			
			baying an			
			abundance of			
			oxygen they			
			ensured that the			
			rate-determining			
			step was hydrolysis.			
	7. Testing	High	This metric met the	1	1	1
	Consistency	C C	criteria for high			
	5		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			
U	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	Sampling methods	2	1	2
	Methods		were omitted.			
			Sampling timing			
			was suitable.			
Confounding/	13.	Medium	Dichloroacetic acid	2	1	2
Variable	Confounding		and hydrogen			
Control	Variables		chloride were			
			assumed to be the			
			degradation			
			products; however,			
			they were never			
			determined			
			experimentally.			
	14. Outcomes	Not rated	The metric is not	NR	NR	NR
	Unrelated to		applicable to this			
	Exposure		study type.		2	
Data	15. Data	Medium	Transformation	2	2	4
Presentation	Reporting		products not			
and Analysis	16 00 11 1		identified.	2	1	2
	16. Statistical	Medium	Statistical methods	Z	1	Z
	Methods and					
	Calculationa		calculations were			
Othor		High	This motric mot the	1	1	1
other	Verification	Ingii	criteria for high	I	1	1
	or		confidence as			
	Plausibility		expected for this			
	of Results		type of study.			
	18. OSAR	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 =	1.38	Overall	1.4
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	-
					Level:	

Study Reference:	Jeffers, PM; Ward, LM; Woytowitch, LM; Wolfe, NL. (1989). Homogeneous Hydrolysis Rate Constants for Selected Chlorinated Methanes Ethanes Ethenes and Propanes.						
	Environ Sci T HERO ID: 661	'echnol 23: 965-9( 1098	69. http://dx.doi.org/	10.1021/	es00066a006	5.	
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 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	Details regarding this metric were not reported but this did not limit the interpretation of 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	Details regarding the analytical procedure were very general; this may limit meaningful/precise interpretation of the results.	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
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:	22	18	30

High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.67	Overall Score (Rounded):	1.7
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Medium

Study	Rodriguez, C; Linge, K; Blair, P; Busetti, F; Devine, B; Van Buynder, P; Weinstein, P;						
<b>Reference:</b>	Cook, A. (201	2). Recycled water:	potential health risks	s from vo	latile organio	2	
	compounds a	and use of 1,4-dichlo	robenzene as treatm	ent perfo	rmance indi	cator.	
	Water Res 46	6: 93-106. http://dx.	doi.org/10.1016/j.wa	atres.201	1.10.032.		
	HERO ID: 1008978						
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		<b>[i.e., High</b> ,			Factor		
		Medium, Low,					
		Unacceptable, or					
		Not rated]					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance	0	was identified by				
	Identity		chemical name and				
			CASRN.				
	2 Test	High	The test substance	1	1	1	
	Substance		was identified by	-	-	-	
	Purity		analytical means				
Test Design	3 Study	Medium	Not applicable to	2	2	4	
rest Design	Controls	Medium	the	-	-	1	
	001101015		field/monitoring				
			studies Source and				
			nurity of analytical				
			standard were not				
			roported				
	4 Test	Uigh	This matric mat the	1	1	1	
	4. Test	mgn	critoria for high	1	1	1	
	Substance		confidence as				
	Stability		ovpocted for this				
			type of study				
Test	E Tost	Uiah	This motrie mot the	1	1	1	
Conditions	5. Test Mothod	nigii	critoria for high	1	1	1	
conultions	Suitability		confidence as				
	Suitability		ovported for this				
			type of study				
	6 Testing	Uiah	This motrie mot the	1	2	2	
	6. Testing	підії	anitorio for high	1	2	Z	
	Conditions		criteria for nigh				
			connuence as				
			expected for this				
	7 Testing	Uiah	type of study.	1	1	1	
	7. Testing	підіі	aritaria far high	1	1	1	
	Consistency		criteria for nign				
			confidence as				
			expected for this				
	O. Creations	II: -1-	type of study.	1	1	1	
	o. System	High	mitorio for high	1	1	T	
	Type and		criteria for high				
	Design		confidence as				
			expected for this				
	0.5	NT	type of study.	115			
Test	9. Test	Not rated	The metric is not	NR	NR	NR	
Urganisms	Urganism		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	Madium	MAATD monitoring	2	1	2
Outcome	11. Outcome	Mealum	wwiP monitoring	2	1	Z
Assessment	Assessment		study; could be			
	Methodology		considered site-			
			specific data.			
	12. Sampling	Medium	Minor limitations	2	1	2
	Methods		were identified in	-	-	-
	Methous		were lucifilited in			
			sampling methods;			
			however, the			
			limitations were			
			not likely to have			
			had a substantial			
			impact on results.			
Confounding/	12	Not rated	No confounding	NR	NP	NP
Voriable	15. Confounding	Not fateu	wariahlag wara	INIX	INIX	INIX
	Variables		valiables were			
Control	variables		noted.			
	14.	Not rated	The metric is not	NR	NR	NR
	Outcomes		applicable to this			
	Unrelated to		study type.			
	Exposure					
Data	15. Data	Medium	Some target	2	2	4
Presentation	Reporting		chemical	_	-	-
and Analysis	Reporting		concontrations			
allu Allalysis						
			were reported only			
			in a figure;			
			however, these			
			omissions were not			
			likely to have had a			
			substantial impact			
			on the study			
			results			
	16	Uigh	This matric mat the	1	1	1
	10. Chatiatian	nigii	mit ania fara high	1	1	1
	Statistical		criteria for high			
	Methods and		confidence as			
	Kinetic		expected for this			
	Calculations		type of study.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high			
	or		confidence as			
	Plausibility		expected for this			
	of Posults		type of study			
		Notrated	The metric is not	ND	ND	ND
	18. QSAR	Not rated	The metric is not	NK	NK	NK
	Models		applicable to this			
			study type.			
			Sum of scores:	17	17	23
High	Medium	Low	Overall Score =	1.35	Overall	1.4
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			

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

Study Reference:	Tancrede, M; Yanagisawa, Y; Wilson, R. (1992). Volatilization of volatile organic compounds from showers: I. Analytical method and quantitative assessment (pp.					
	1103-1111) HERO ID: 102	. (BIOSIS/92/15798) 23248	).  .			- urr
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 was identified by analytical means.	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	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	Low	Study investigated	3	1	3
Assessment	Assessment		volatilization from			
	Methodology		shower water; this			
			is an uncommon			
			study type for a fate			
			endpoint.			
	12. Sampling	High	This metric met the	1	1	1
	Methods		criteria for high			
			confidence as			
			expected for this			
	10	11. 1	type of study.	1	1	1
Confounding/	13.	High	Sources of	1	1	1
Variable	Confounding		variability were			
Control	variables		addressed in the			
	14	Notratad	The metric is not	ND	ND	ND
	14. Outcomes	NotTaleu	applicable to this	INIK	INK	INK
	Unrelated to		study type			
	Exposure		study type.			
Data	15 Data	Medium	Data were mainly	2	2	4
Presentation	Reporting	Ficultum	reported in figures.	-	-	1
and Analysis	16.	High	This metric met the	1	1	1
<b>y</b>	Statistical	8	criteria for high		_	
	Methods and		confidence as			
	Kinetic		expected for this			
	Calculations		type of study.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high			
	or		confidence as			
	Plausibility		expected for this			
	of Results		type of study.			
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this			
			study type.	10	10	
		Ŧ	Sum of scores:	18	18	23
High	Medium	Low	Overall Score =	1.28	Overall	2.3
			Sum of weighted		Score	
			Scores/Sull Of Motric Woighting		(Rounded):	
			Factors:			
>1 and <1 7	>1 7 and	>2 3 and <3	Tactors.		Overall	Low1
21 and \$1.7	<23	22.5 and 25			Quality	LOW
	1210				Level:	
<sup>1</sup> This study's o	verall quality r	ating was downgrad	ed. Rationale: Study invo	estigated	volatilization f	rom
shower water.	Study results n	nav not be relevant t	o a specific/designated	Fate endp	oint.	

Study Reference:	Chiou, CT; Freed, VH; Peters, LJ; Kohnert, RL. (1980). Evaporation of solutes from water. Environ Int 3: 231-236. http://dx.doi.org/10.1016/0160-4120(80)90123-3. HERO ID: 18077							
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	Low	Study controls not reported.	3	2	6		
	4. Test Substance Stability	Medium	Test substance stability was 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	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	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	13. Confounding	High	This metric met the	1	1	1
Control	Variables		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	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	23
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.41	Overall Score (Rounded):	1.4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study	Dilling, WL. (1977). Interphase transfer processes. II. Evaporation rates of chloro							
<b>Reference:</b>	methanes, et	hanes, ethylenes, pr	opanes, and propyler	nes from	dilute aqueo	us		
	solutions. Co	mparisons with the	oretical predictions. I	Environ S	ci Technol 11	l: 405-		
	409. http://dx.doi.org/10.1021/es60127a009.							
	HERO ID: 18370							
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High,			Factor			
		Medium, Low,						
		Unacceptable, or						
		Not rated]						
Test	1. Test	High	The test substance	1	2	2		
Substance	Substance		was identified by	-	-	-		
Substance	Identity		chemical name					
	2 Test	Low	There were possible	3	1	3		
	2. Itst	LOW	mixturo concorne	5	1	5		
	Durity		since two to five					
	runty		since two to nve					
			compounds were					
Test Design	2 Churcher	Madium	run together.	2	2	4		
l est Design	3. Study	Mealum	A series of	Z	Z	4		
	Controls		compounds were					
			run, but no mention					
			of controls.					
	4. Test	Medium	Not discussed but	2	1	2		
	Substance		were not likely to					
	Stability		have influenced the					
			test results.					
Test	5. Test	High	This metric met the	1	1	1		
Conditions	Method		criteria for high					
	Suitability		confidence as					
			expected for this					
			type of study.					
	6. Testing	High	This metric met the	1	2	2		
	Conditions	C	criteria for high					
			confidence as					
			expected for this					
			type of study.					
	7. Testing	High	This metric met the	1	1	1		
	Consistency		criteria for high	-	-	-		
	Gonoieveney		confidence as					
			expected for this					
			type of study					
	8 System	High	This metric met the	1	1	1		
	Type and	mgn	criteria for high	1	1	1		
	Design		confidence as					
	Design		ovported for this					
			type of study					
Tost	0 Test	Not roted	The metric is not	ND	ND	ND		
Organiama	9. Test	notrated	applicable to this	INK	INK	INK		
organisms	Degradation		applicable to this					
	Degradation	NT 4 - 3	study type.	ND	ND	ND		
	10. Test	Not rated	I ne metric is not	NK	NK	NK		
	Organism		applicable to this					
	Partitioning		study type.					

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

Study	Dunovant, VS; Clark, CS; Que Hee, SS; Hertzberg, VS; Trapp, JH. (1986). Volatile							
<b>Reference:</b>	Organics in t	he Wastewater and A	Airspaces of Three W	astewate	r Treatment	Plants		
	(pp. 886-895	5 <b>). (NIOSH/0016592</b> 2	1). Dunovant, VS; Clai	rk, CS; Qu	e Hee, SS; He	rtzberg,		
	VS; Trapp, JH	VS; Trapp, JH.						
	HERO ID: 199	93670	Γ					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High,			Factor			
		Medium, Low,						
		Unacceptable, or						
		Not rated]						
Test	1. Test	High	The test substance	1	2	2		
Substance	Substance		was identified by					
	Identity		chemical name.					
	2. Test	High	The test substance	1	1	1		
	Substance		was identified by					
	Purity		analytical means.					
Test Design	3. Study	High	Control was used to	1	2	2		
_	Controls		determine					
			detection limit					
	4. Test	Not rated	This is a field type	NR	NR	NR		
	Substance		study were stability					
	Stability		was not considered.					
Test	5. Test	High	This metric met the	1	1	1		
Conditions	Method	0	criteria for high					
	Suitability		confidence as					
	5		expected for this					
			type of study.					
	6. Testing	High	This metric met the	1	2	2		
	Conditions	0	criteria for high					
			confidence as					
			expected for this					
			type of study.					
	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	Medium	Equilibrium was	2	1	2		
	Type and		not established or					
	Design		reported. This was					
	5		an open system.					
Test	9. Test	Not rated	The metric is not	NR	NR	NR		
Organisms	Organism		applicable to this					
6	Degradation		study type.					
	10. Test	Not rated	The metric is not	NR	NR	NR		
	Organism		applicable to this					
	Partitioning		study type.					
Outcome	11. Outcome	Low	Study may have	3	1	3		
Assessment	Assessment	2011	reported site-	5	÷	5		
	Methodology		specific results.					

	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	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.	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	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 <sup>1</sup>
<sup>1</sup> The study's ov systems.	verall quality ra	ting was downgrade	d. Rationale: The volati	lity is rep	orted for 3 site	s in open

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: 28-27. http://dx.doi.org/10.1016/j.org/pol.2012.02.008							
	177: 28-37. r HERO ID: 21	1/7: 20-37. http://ux.uoi.org/10.1010/j.envpoi.2013.02.008. HFRO ID: 2128010						
Domain	Metric	Qualitative Determination [i.e., High,	Comments	Metric Score	Metric Weighting Factor	Weighted Score		
		Medium, Low,						
		Unacceptable, or						
<b>m</b> .	4 55 - 1	Not rated	<b>m</b> 1	1	2	2		
Test	1. Test	High	The test substance	1	Z	Z		
Substance	Substance		was identified by					
	Identity 2 Test	Uiah	Chemical name.	1	1	1		
	Z. Test	High	The test substance	1	1	1		
	Substance		was identified by					
Test Design	Pullty 2 Study	Notratod	The metric is not	ND	ND	ND		
Test Design	3. Study Controls	Not rated	applicable to this study type.	NK	NK	NK		
	4. Test Substance	Not rated	The metric is not applicable to this	NR	NR	NR		
Teet		I	study type.	2	1	2		
Test	5. Test Mothod	LOW	Many possible	3	1	3		
conditions	Suitability		the study results in					
	Suitability		the study results in					
	6 Testing	Not rated	The metric is not	NR	NR	NR		
	Conditions	Not Tateu	applicable to this	INIX	INIX	INIX		
	Conditions		study type					
	7 Testing	Not rated	The metric is not	NR	NR	NR		
	Consistency	Not fatea	applicable to this		THE STREET	1111		
	donisistency		study type.					
	8.Svstem	Not rated	The metric is not	NR	NR	NR		
	Type and		applicable to this					
	Design		study type.					
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	Low	Flux from a field	3	1	3		
Assessment	Assessment		study was not					
	Methodology		specifically a fate					
			outcome of interest.					
	12. Sampling	High	This metric met the	1	1	1		
	Methods		criteria for high					
			confidence as					
			expected for this					
			type of study.					

Confounding/ Variable Control	<ul> <li>13.</li> <li>Confounding</li> <li>Variables</li> <li>14.</li> <li>Outcomes</li> <li>Unrelated to</li> <li>Exposure</li> </ul>	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.	1 NR	1 NR	1 NR
Data Procentation	15. Data	Medium	Some data were	2	2	4
and Analysis	Reporting		figures.			
	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	U.S. EPA (U.S. Environmental Protection Agency). (2012). Estimation Programs						
Reference:	Interface Suite <sup>™</sup> for Microsoft® Windows, v 4.11 [Computer Program]. Washington,						
	DC. Retrieve	d from https://www	.epa.gov/tsca-screen	ning-tools	/epi-suitetm	-	
	estimation-program- interface.						
	HERO ID: 2347246						
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
Domain	Methe	Determination	comments	Score	Woighting	Score	
		fie High		50016	Factor	50016	
		Modium Low			Factor		
		Meuluill, LOW,					
		Unacceptable, or					
<b>m</b> .	4 55 1	Not rated	m1 · · · 1 ·	1	2	2	
lest	1. Test	High	The test substance	1	Z	Z	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	Not rated	The metric is not	NR	NR	NR	
	Substance		applicable to this				
	Purity		study type (SAR).				
Test Design	3. Study	Not rated	The metric is not	NR	NR	NR	
	Controls		applicable to this				
			study type (SAR).				
	4. Test	Not rated	The metric is not	NR	NR	NR	
	Substance		applicable to this				
	Stability		study type (SAR).				
Test	5. Test	Not rated	The metric is not	NR	NR	NR	
Conditions	Method		applicable to this				
	Suitability		study type (SAR).				
	6 Testing	Not rated	The metric is not	NR	NR	NR	
	Conditions	Not fatea	applicable to this			1111	
	Conditions		study type (SAR)				
	7 Testing	Not rated	The metric is not	NR	NP	NP	
	7. Testing	Notrateu	applicable to this	INIX	INIX	INIX	
	consistency		study type (SAP)				
	0 Swatam	Notrated	The metric is not	ND	ND	ND	
	8. System	Not rated	The metric is not	NK	INK	NK	
	Type and		applicable to this				
<b>T</b>	Design	NT 4 1	study type (SAR).	ND	ND	ND	
Test	9. Test	Not rated	The metric is not	NK	NK	NK	
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	Not rated	The metric is not	NR	NR	NR	
Assessment	Assessment		applicable to this				
	Methodology		study type (SAR).				
	12. Sampling	Not rated	The metric is not	NR	NR	NR	
	Methods		applicable to this				
			study type (SAR).				
Confounding/	13.	Not rated	The metric is not	NR	NR	NR	
Variable	Confounding		applicable to this				
Control	Variables		study type (SAR).				
	14.	Not rated	The metric is not	NR	NR	NR	
	Outcomes		applicable to this				
	Unrelated to		study type.				
	Exposure						

Data Presentation and Analysis	15. Data Reporting	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	16. Statistical Methods and Kinetic Calculations	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
Other	17. Verification or Plausibility of Results	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR

	10.0015					
	18. QSAR	High	The models in EPI	1	1	1
	Models		Suite <sup>™</sup> have			
			defined endpoints.			
			Chemical Domain			
			and porformanco			
			statistics for each			
			model are known,			
			and unambiguous			
			algorithms are			
			available in the EPI			
			Suite <sup>TM</sup>			
			documentation			
			and (or sited			
			references to			
			establish their			
			scientific validity.			
			Many EPI Suite <sup>™</sup>			
			models have			
			correlation			
			coefficients >0.7,			
			cross-validated			
			correlation			
			coefficients $>0.5$			
			and standard arror			
			values < 0.3;			
			however,			
			correlation			
			coefficients (r2, q2)			
			for the regressions			
			of some			
			environmental fate			
			models (i e			
			BIOWIN) are lower			
			as ovposted			
			as expected,			
			regressions which			
			have specific			
			experimental			
			values such as			
			water solubility or			
			log Kow (octanol-			
			water partition			
			coefficient).			
			Sum of scores:	2	3	1
High	Medium	Low	Overall Score =	1	Overall	1
0.			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting		(	
			Factors			
>1 and <1 7	>17 and	>2.3 and <3	1 400151		Overall	High
	<23	-210 and 20			Quality	
	-210				Level	
			1		Leven	

Study Reference:	Soltanali, S; Hagani, ZS. (2008). Modeling of air stripping from volatile organic ceen compounds in biological treatment processes. Int J Environ Sci Tech 5: 353-360 HERO ID: 2529433						
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.	NR	NR	NR	
Test Design	3. Study Controls	Medium	Study control not reported but not likely to have had a substantial impact on the study results.	2	2	4	
	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	The test method measured influent, effluent and VOCs.	1	1	1	
	6. Testing Conditions	Low	Some test conditions were reported but not all (i.e. unnamed facilities).	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	Medium	Retention time and temperature were not reported.	2	1	2	
Test Organisms	9. Test Organism Degradation	Low	Not clear of test organism source (domestic or industrial sewage).	3	2	6	
	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	May have given site- /WWTP- specific results.	3	1	3	
	12. Sampling Methods	Low	Sample timing was not well described.	3	1	3	
Confounding/ Variable	13. Confounding	High	This metric met the criteria for high	1	1	1	

Control	Variables		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	Low	Sampling results were not clearly reported.	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			
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:	25	18	38			
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	2.06	Overall Score (Rounded):	2.3			
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Low <sup>1</sup>			
<sup>1</sup> The study's ov related experim	<sup>1</sup> The study's overall quality rating was downgraded. Rationale: Modeling study that did not report the related experimental details well.								
Study	Chen, WH; Yang, WB; Yuan, CS; Yang, JC; Zhao, QL. (2014). Fates of chlorinated volatile								
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<b>Reference:</b>	organic com	pounds in aerobic bi	ological treatment p	rocesses:	the effects of	faeration			
	and sludge a	ddition. Chemosphe	re 103: 92-98.						
	http://dx.do	http://dx.doi.org/10.1016/j.chemosphere.2013.11.039.							
	HERO ID: 2799543								
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted			
		Determination		Score	Weighting	Score			
		[i.e., High,			Factor				
		Medium, Low,							
		Unacceptable, or							
		Not rated]							
Test	1. Test	High	The test substance	1	2	2			
Substance	Substance		was identified by						
	Identity		chemical name.						
	2. Test	High	The test substance	1	1	1			
	Substance		was identified by						
	Purity		analytical means.						
Test Design	3. Study	Medium	Analytical blanks	2	2	4			
	Controls		were included;						
			biodegradation						
			controls were not						
			included. Source						
			and purity of						
			analytical standard						
		1	were not included.		-				
	4. Test	High	This metric met the	1	1	1			
	Substance		criteria for high						
	Stability		confidence as						
			expected for this						
<b>m</b> .		TT: 1	type of study.	1		1			
Test	5. Test	High	This metric met the	1	1	1			
Conditions	Method		criteria for high						
	Suitability		confidence as						
			expected for this						
	( Trating	Madium	type of study.	2	2	4			
	6. Testing	Medium	Some details were	Z	Z	4			
	Conditions		omitted; nowever,						
			sufficient data were						
			dotorming that the						
			omissions were not						
			likely to have had a						
			substantial impact						
			on the study						
			results.						
	7. Testing	High	This metric met the	1	1	1			
	Consistency		criteria for high		*				
	2220101010		confidence as						
			expected for this						
			type of study.						

	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	Medium	There was incomplete reporting of measured concentrations in the media analyzed.	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	High	None identified.	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 of the target chemical 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	Medium	There was incomplete reporting of measured concentrations in the media analyzed; mass distributions were reported, no serious study deficiencies were identified, and the value was plausible.	2	1	2
	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 =	1.4	Overall	1.4
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
					Level:	

Study	Parker, WJ; Thompson, DJ; Bell, JP; Melcer, H. (1993). Fate of volatile organic							
<b>Reference:</b>	compounds	in municipal activa	ted sludge plants. W	ater Env	riron Res 65:	58-65.		
	HERO ID: 28	03053	ſ	1				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High,			Factor			
		Medium, Low,						
		Unacceptable, or						
The set	1 5 1	Not rated	m1 , , 1 ,	1	2	2		
lest	1. Test	High	I he test substance	1	Z	Z		
Substance	Substance		was identified by					
	Dentity	II: -l.	The test substance.	1	1	1		
	Z. Test	High	I ne test substance	1	1	1		
	Substance		was identified by					
To at Do al an	Purity	Madiana	Chamieral means.	2	2	4		
l est Design	3. Study	Medium	chemical name(s)	2	Z	4		
	Controis		of external					
			control(s) not					
	4 Test	Notrated	This is a field type	ND	ND	ND		
	4. Test	NotTaleu	study whore	INK	INK	INK		
	Stability		study where					
	Stability		considered					
Test	5 Test	High	This metric met	1	1	1		
Conditions	Method	Ingn	the criteria for		1	1		
contactions	Suitability		high confidence as					
	Survasinty		expected for this					
			type of study.					
	6. Testing	Unacceptable	Testing conditions	4	2	8		
	Conditions	1	were not well					
			reported (pH,					
			temperature,					
			sludge					
			concentrations).					
	7. Testing	Not rated	The metric is not	NR	NR	NR		
	Consistency		applicable to this					
			study type.					
	8. System	Medium	Likely an open	2	1	2		
	Type and		system where test					
	Design		material could					
<b>m</b> .	0		have been lost.		2			
Test	9. Test	High	I his metric met		2	2		
Organisms	Organism		the criteria for					
	Degradation		nign confidence as					
			expected for this					
	10 Test	Notratad	The metric is not	ND	ND	ND		
	10. Test	notrated	applicable to this	INK	NК	NK		
	Dartitioning		applicable to this					
1	LI aI UUUIIIIIg	1	study type.	1				

Outcome	11	Unaccentable	The extent of air	4	1	4
Assessment	Outcome	onacceptuble	strinning is a		1	1
Assessment	Accossmont		function of the			
	Mothodology		compound			
	Methodology		representation of the second second			
			physical-chemical			
			properties and a			
			design and			
	40.0 1		operation.	4	1	1
	12. Sampling	High	This metric met	1	1	1
	Methods		the criteria for			
			high confidence as			
			expected for this			
	10		type of study.			-
Confounding/	13.	Medium	This metric met	2	1	2
Variable	Confounding		the criteria for			
Control	Variables		high confidence as			
			expected for this			
			type of study.			
	14.	Not rated	The metric is not	NR	NR	NR
	Outcomes		applicable to this			
	Unrelated		study type.			
	to Exposure					
Data	15. Data	Medium	Some information	2	2	4
Presentation	Reporting		was not reported;			
and Analysis			however, these			
			omissions were			
			not likely to have			
			had a substantial			
			impact on the			
			study results.			
	16.	High	This metric met	1	1	1
	Statistical		the criteria for			
	Methods and		high confidence as			
	Kinetic		expected for this			
	Calculations		type of study.			
Other	17.	Not rated	Due to limited	NR	NR	NR
	Verification		information,			
	or		evaluation of the			
	Plausibility		reasonableness of			
	of Results		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:	22	17	27
High	Medium	Low	Overall Score =	1.88	Overall	4
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	$\geq$ 1.7 and	$\geq$ 2.3 and $\leq$ 3			Overall	Unacceptable <sup>1</sup>
	<2.3				Quality	
					Level:	

<sup>1</sup>Study evaluates removal based on air stripping. The extent of air stripping is a function of the compound physical-chemical 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	Pant, P; Allen, M; Cai, Y; Jayachandran, K; Chen, Y, in. (2007). Influence of physical							
<b>Reference:</b>	factors on trichloroethylene evaporation from surface water. Water Air Soil Pollut							
	183: 153- 16	183: 153- 163. http://dx.doi.org/10.1007/s11270-007-9365-5.						
	HERO ID: 354	43365	-					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High,			Factor			
		Medium, Low,						
		Unacceptable, or						
		Not rated]						
Test	1 Test	High	The test substance	1	2	2		
Substance	Substance		was identified by	-	-	-		
Substance	Identity		chemical name					
	2 Test	High	The test substance	1	1	1		
	2. Test	IIIgii	source and purity	1	1	1		
	Dursitar		source and purity					
The Dealers		TT: 1	were reported.	1	2	2		
l est Design	3. Study	High	I his metric met the	1	Z	Z		
	Controls		criteria for high					
			confidence as					
			expected for this					
		1	type of study.					
	4. Test	High	This metric met the	1	1	1		
	Substance		criteria for high					
	Stability		confidence as					
			expected for this					
			type of study.					
Test	5. Test	High	This metric met the	1	1	1		
Conditions	Method		criteria for high					
	Suitability		confidence as					
			expected for this					
			type of study.					
	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	This metric met the	1	1	1		
	Consistency	0	criteria for high					
	consistency		confidence as					
			expected for this					
			type of study					
	8 System	High	This metric met the	1	1	1		
	Type and	man	criteria for high	-	1	1		
	Design		confidence as					
	Design		connucted for this					
			type of study					
Test	0 Test	Notrated	The metric is not	ND	ND	ND		
1 est	9. Test	not rated	The metric is not	NK	INK	INK		
organisms	Drganism		applicable to this					
	Degradation	N	study type.	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 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	0	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.	Not rated	The metric is not	NR	NR	NR
	Outcomes		applicable to this			
	Unrelated to		study type.			
	Exposure					
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.	High	This metric met the	1	1	1
	Statistical		criteria for high			
	Methods and		confidence as			
	Kinetic		expected for this			
	Calculations		type of study.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high			
	or		confidence as			
	Plausibility		expected for this			
	of Results		type of study.	ND	ND	ND
	18. QSAR	Not rated	I ne metric is not	NK	NK	NR
	Models		applicable to this			
			Study type.	14	10	10
Lich	Modium	Low	Ovorall Score -	14		10
nign	Medium	LOW	Sum of Woighted	1	Score	1
			Scores/Sum of		(Roundad).	
			Motric Woighting		(Noundeu):	
			Factors			
>1 and <1 7	>17 and	>2.3 and <3	1 400131		Overall	High
_1 unu \$1.7	<2.3	-2.0 unu -30			Ouality	
	_10				Level:	

Study	Keefe, SH; Barber, LB; Runkel, RL; Ryan, JN. (2004). Fate of volatile organic						
<b>Reference:</b>	compounds in constructed wastewater treatment wetlands. Environ Sci Technol 38:						
	2209-2216. ł	nttp://dx.doi.org/10	.1021/es034661i.				
	HERO ID: 35	66693	1	n			
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable, or					
		Not rated]					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.				
	2. Test	High	The test substance	1	1	1	
	Substance		was identified by				
	Purity		analytical means.				
Test Design	3. Study	Not rated	The metric is not	NR	NR	NR	
	Controls		applicable to this				
			study type.				
	4. Test	Not rated	The metric is not	NR	NR	NR	
	Substance		applicable to this				
	Stability		study type.				
Test	5. Test	High	This metric met the	1	1	1	
Conditions	Method		criteria for high				
	Suitability		confidence as				
			expected for this				
			type of study.				
	6. Testing	Not rated	The metric is not	NR	NR	NR	
	Conditions		applicable to this				
			study type.				
	7. Testing	Not rated	The metric is not	NR	NR	NR	
	Consistency		applicable to this				
			study type.				
	8. System	High	This metric met the	1	1	1	
	Type and		criteria for high				
	Design		confidence as				
			expected for this				
<b>m</b> .	0 5 1		type of study.	2	2		
lest	9. Test	Medium	The test organisms	Z	Z	4	
Organisms	Organism		were reported but				
	Degradation		were not routinely				
	10 Teat	Notwated	USEG.	ND	ND	ND	
	10. Test	Not rated	The metric is not	NK	INK	NK	
	Dartitioning		applicable to this				
Outcome	11 Outcome	Uiah	This is primorily o	1	1	1	
According	11. Outcome	nigii	modeling study	1	1	1	
Assessment	Assessment		hoged on field				
	Methodology		camples				
	12 Sampling	Ujah	Sallipies.	1	1	1	
	12. Sampling	nigli	critoria for bigh	1	1		
	Methous		confidence ac				
			ovported for this				
			expected for this				
	1		type of study.	1		1	

Confounding/ Variable Control	<ul> <li>13.</li> <li>Confounding</li> <li>Variables</li> <li>14.</li> <li>Outcomes</li> <li>Unrelated to</li> <li>Exposure</li> </ul>	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.	1 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	Brüggemann, R; Trapp, S. (1988). Release and fate modelling of highly volatile						
Reference:	HERO ID: 362	ie river Main. 17: 202 29597	9-2041.				
Domain	Metric	Qualitative Determination [i.e., High, Medium,	Comments	Metric Score	Metric Weighting Factor	Weighted Score	
		Unacceptable, or Not rated]					
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	Only estimated data were reported; no analytical method nor measured data for detection of the test substance was 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:	<u>10</u> 2.5	6 Overall Score (Rounded):	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	Unacceptable <sup>1</sup>
<sup>1</sup> This is a site-s	specific modelir	ng study reporting esti	imated data. Consi	stent wit	h our Applicat	ion of

<sup>1</sup>This is a site-specific modeling study reporting estimated data. 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	Culver, TB; Shoemaker, CA; Lion, LW. (1991). Impact of vapor sorption on the						
<b>Reference:</b>	subsurface to	ransport of volatile o	organic compounds: A	A numerio	cal model and	d analysis.	
	Water Resou	r Res 27: 2259-2270	). http://dx.doi.org/1	0.1029/9	1WR00223.		
	HERO ID: 38	09323	<b>a</b>				
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable, or					
		Not rated					
Test	1. Test	High	The test substance	1	2	2	
Substance	Substance		was identified by				
	Identity		chemical name.	ND	ND	ND	
	2. Test	Not rated	The metric is not	NR	NR	NR	
	Substance		applicable to this				
	Purity		study type.	ND	ND	ND	
Test Design	3. Study	Not rated	The metric is not	NR	NR	NR	
	Controls		applicable to this				
			study type.				
	4. Test	Not rated	The metric is not	NR	NR	NR	
	Substance		applicable to this				
	Stability	1	study type.		-		
Test	5. Test	High	This metric met the	1	1	1	
Conditions	Method		criteria for high				
	Suitability		confidence as				
			expected for this				
	( Testine	II: -l-	type of study.	1	2	2	
	6. Testing	High	I his metric met the	1	Z	Z	
	Conditions		criteria for nign				
			connuence as				
			type of study				
	7 Testing	Not rated	The metric is not	ND	ND	ND	
	7. Testing	NotTaleu	applicable to this	INK	INK	INK	
	Consistency		study type				
	8 System	High	This metric met the	1	1	1	
	Type and	Ingn	criteria for high	1	1	1	
	Design		confidence as				
	Design		evnected for this				
			type of study				
Test	9. Test	Not rated	The metric is not	NR	NR	NR	
Organisms	Organism	notratea	applicable to this				
8	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	0**	criteria for high	-	-	-	
	Methodology		confidence as				
			expected for this				
			type of study.				

Confounding/ Variable Control	12. Sampling Methods 13. Confounding Variables 14. Outcomes	High Not rated Not rated	This metric met the criteria for high confidence as expected for this type of study. No confounding variables were noted. The metric is not applicable to this	1 NR NR	1 NR NR	1 NR NR
	Unrelated to Exposure		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:	9	12	12
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1	Overall Score (Rounded):	1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study	Matienzo, LV. (1989). Staff report on development of treatment standards for non-						
Reference:	RCRA solven	t waste. Sacrament	o, CA: Toxic Substan	ces Cont	rol Program.		
	http://infoh	ouse.p2ric.org/ref/	17/16884.pdf.				
Desiste	HERO ID: 39	82116	<b>6</b>	Martin		X47 - <sup>1</sup> - 1 - 4 - 3	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	weighting	Score	
		[1.e., Hign,			Factor		
		Mealum, Low,					
		Unacceptable, or					
Teet	1		The test substance	1	2	2	
lest	1. Test	High	I ne test substance	1	Z	Z	
Substance	Substance		was identified by				
	a Track	I	chemical name.	2	1	2	
	Z. Test	LOW	The test substance	3	1	3	
	Substance		source and purity				
	Purity		were not reported				
			or verified by				
Test Design	2 Chudre	Naturated	Study controls	ND	ND	ND	
l est Design	3. Study	Not rated	Study controls	NK	NK	NK	
	CONTROLS		in this study				
	4 Test	Naturated	The metric is not	ND	ND	ND	
	4. Test	Not rated	The metric is not	NK	NK	NK	
	Substance		applicable to this				
Test	5 Teat	Unaggantabla	Study type.	4	1	4	
Test	5. Test Mothod	Unacceptable	the treatment	4	1	4	
conultions	Suitability		ne de la content				
	Suitability		process test				
			reported in this				
			study				
	6 Testing	Unaccentable	Testing conditions	1.	2	Q	
	Conditions	onacceptable	were not reported	т	2	0	
	Conditions		in this study				
	7 Testing	Not rated	The metric is not	NR	NR	NR	
	Consistency	Not latea	applicable to this	III	i i i i i	nn i	
	donsistency		study type				
	8. System	Unacceptable	System Type and	4	1	4	
	Type and	ondoooptable	Design details	-	-	-	
	Design		were not reported				
	0		in this study.				
Test	9. Test	Not rated	The metric is not	NR	NR	NR	
Organisms	Organism		applicable to this				
0	Degradation		study type.				
	10. Test	Not rated	The metric is not	NR	NR	NR	
	Organism		applicable to this				
	Partitioning		study type.				
Outcome	11.	Unacceptable	Study details were	4	1	4	
Assessment	Outcome	-	not reported to				
	Assessment		evaluate				
	Methodology		methodology.				
	12. Sampling	Unacceptable	Sampling details	4	1	4	
	Methods	*	were not reported				
			in this study.				

Confounding/	13.	Not rated	No confounding	NR	NR	NR
Control	Variables		noted.			
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data	15. Data	Unacceptable	Study and data	4	2	8
Presentation and Analysis	Reporting		details were not reported in this study.			
	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 <sup>1</sup>
<sup>1</sup> Due to limited	d information.	evaluation of the rea	isonableness of the st	udv resul	ts was not not	ssihle

<sup>1</sup>Due 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, five of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency. 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. 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	Matienzo, LV. (1989). Staff report on development of treatment standards for non-						
Reference:	RCRA solven	t waste. Sacrament	o, CA: Toxic Substan	ces Cont	rol Program.		
	http://infoh	ouse.p2ric.org/ref/	17/16884.pdf.				
Desiste	HERO ID: 39	82116	<b>6</b>	Martin		X47 - <sup>1</sup> - 1 - 4 - 3	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	weighting	Score	
		[1.e., Hign,			Factor		
		Mealum, Low,					
		Unacceptable, or					
Teet	1		The test substance	1	2	2	
lest	1. Test	High	I ne test substance	1	Z	Z	
Substance	Substance		was identified by				
	a Track	I	chemical name.	2	1	2	
	Z. Test	LOW	The test substance	3	1	3	
	Substance		source and purity				
	Purity		were not reported				
			or verified by				
Test Design	2 Chudre	Naturated	Study controls	ND	ND	ND	
l est Design	3. Study	Not rated	Study controls	NK	NK	NK	
	CONTROLS		in this study				
	4 Test	Naturated	The metric is not	ND	ND	ND	
	4. Test	Not rated	The metric is not	NK	NK	NK	
	Substance		applicable to this				
Test	5 Teat	Unaggantabla	Study type.	4	1	4	
Test	5. Test Mothod	Unacceptable	the treatment	4	1	4	
conultions	Suitability		ne de la content				
	Suitability		process test				
			reported in this				
			study				
	6 Testing	Unaccentable	Testing conditions	1.	2	Q	
	Conditions	onacceptable	were not reported	т	2	0	
	Conditions		in this study				
	7 Testing	Not rated	The metric is not	NR	NR	NR	
	Consistency	Not latea	applicable to this	III	i i i i i	nn i	
	donsistency		study type				
	8. System	Unacceptable	System Type and	4	1	4	
	Type and	ondoooptable	Design details	-	-	-	
	Design		were not reported				
	0		in this study.				
Test	9. Test	Not rated	The metric is not	NR	NR	NR	
Organisms	Organism		applicable to this				
0	Degradation		study type.				
	10. Test	Not rated	The metric is not	NR	NR	NR	
	Organism		applicable to this				
	Partitioning		study type.				
Outcome	11.	Unacceptable	Study details were	4	1	4	
Assessment	Outcome	-	not reported to				
	Assessment		evaluate				
	Methodology		methodology.				
	12. Sampling	Unacceptable	Sampling details	4	1	4	
	Methods	*	were not reported				
			in this study.				

Confounding/ Variable	13. Confounding	Not rated	No confounding variables were	NR	NR	NR		
Control	Variables		noted.					
	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 <sup>1</sup>		
<sup>1</sup> Due to limited Consistent wit data source re	<sup>1</sup> Due 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:	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	High	The test substance was identified by analytical means.	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	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	Low	There were reported deviations or omissions in testing conditions, and these were likely to have had a 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	

Test Organisms	8. System Type and Design 9. Test Organism	Medium Not rated	The system designs were not described well but the omission was not likely to have had a substantial impact on the study results. The metric is not applicable to this	2 NR	1 NR	2 NR
	Degradation 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	Low	Details regarding 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.	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 (if applicable) were not considered or accounted for in data evaluation resulting in some uncertainty.	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	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely to have been due to some other process. Analytical details were not well reported.	3	2	6
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical analysis or kinetic calculations were not conducted or were not described clearly.	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:	25	17	34
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	Smith, JH; Bomberger, DC, Jr; Haynes, DL. (1980). Prediction of the volatilization rates						
Reference:	of high-volat	ility chemicals from	natural water bodies	s. Environ	Sci Technol	14: 1332-	
	1337. http://	/dx.doi.org/10.1021	/es60171a004.				
	HERO ID: 58	132		24 . 1		*** * * . *	
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Mealum, Low,					
		Unacceptable, or					
Toot	1 Test	Not Fateuj	The test substance	1	2	2	
Substance	1. Test	nigii	was identified by	1	2	2	
Substance	Idontity		chomical name				
	2 Tost	Modium	Source and purity	2	1	2	
	Substance	Medium	were not reported	2	1	2	
	Durity		but were not likely				
	I unity		to have impacted				
			the study results				
Test Design	3 Study	Medium	Standard results	2	2	4	
rest besign	Controls	incurum	were not reported	-	-		
			but were not likely				
			to have impacted				
			the study results.				
	4. Test	Medium	Not discussed, but	2	1	2	
	Substance		not likely to have				
	Stability		impacted the study				
			results.				
Test	5. Test	High	This metric met the	1	1	1	
Conditions	Method		criteria for high				
	Suitability		confidence as				
			expected for this				
			type of study.				
	6. Testing	High	This metric met the	1	2	2	
	Conditions		criteria for high				
			confidence as				
			expected for this				
	7 Testing	Madium	There were minor	2	1	2	
	7. Testing	Medium	inconsistoncios in	2	1	2	
	consistency		test conditions				
			across samples or				
			study groups but				
			these discrepancies				
			were not likely to				
			have had a				
			substantial impact				
			on the study				
			results.				
	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			
_	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	Medium	Not well reported;	2	1	2
	Methods		but not likely to			
			have impacted the			
	10		study results.		1	- 1
Confounding/	13.	High	This metric met the	1	1	1
Variable	Confounding		criteria for high			
Control	variables		confidence as			
			type of study			
	14	Not rated	The metric is not	NR	NR	NR
	Outcomes	Not lated	annlicable to this	INIX	ivix	TUIX
	Unrelated to		study type.			
	Exposure		study type:			
Data	15. Data	High	This metric met the	1	2	2
Presentation	Reporting	0	criteria for high			
and Analysis			confidence as			
			expected for this			
			type of study.			
	16.	Medium	Not well reported,	2	1	2
	Statistical		but not likely to			
	Methods and		have impacted the			
	Kinetic		study results.			
	Calculations	11. 1	m1 · · · · · · · · · · · · · · · · · · ·	1	1	1
Other	1/. Varification	High	I his metric met the	1	1	1
	or		confidence as			
	Dlausibility		expected for this			
	of Results		type of study			
	18 OSAR	Not rated	The metric is not	NR	NR	NR
	Models	notratea	applicable to this			
	110000		study type.			
			Sum of scores:	20	18	25
High	Medium	Low	Overall Score =	1.39	Overall	1.4
			Sum of Weighted		Score	
			Scores/Sum of		(Rounded):	
			Metric Weighting			
			Factors:			
≥1 and <1.7	≥1.7 and	$\geq$ 2.3 and $\leq$ 3			Overall	High
	<2.3				Quality	
			1		Level:	

Study Reference:	Bell, J; Melcer, H; Monteith, H; Osinga, I; Steel, P. (1993). Stripping of volatile organic compounds at full-scale municipal wastewater treatment plants. Water Environ Res						
	65: 708-716. HERO ID: 65	http://dx.doi.org/1 8661	0.2175/WER.65.6.2.	Ĩ			
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 14. Outcomes	Not rated Not rated	The study noted that design parameters may have impacted the results. The metric is not applicable to this	NR NR	NR NR	NR
	Unrelated to Exposure		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	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
			Sum of scores:	12	11	14
High	Medium	Low	Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:	1.27	Overall Score (Rounded):	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			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: 65	8797				
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		was identified by chemical name.		-	-
	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	Not rated	The metric is not applicable to this	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	Not rated	The analysis of data was clearly described.	NR	NR	NR
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:	13	16	18
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	Gay, BW, Jr; Hanst, PL; Bufalini, JJ; Noonan, RC. (1976). Atmospheric oxidation of						
<b>Reference:</b>	ce: chlorinated ethylenes. Environ Sci Technol 10: 58-67.						
	http://dx.do	i.org/10.1021/es	60112a005.				
	HERO ID: 593	310					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable,					
		or Not rated]					
Test	1. Test	High	The test substance was	1	2	2	
Substance	Substance		identified by chemical				
	Identity		name.				
	2. Test	High	The test substance	1	1	1	
	Substance		purity was reported as				
	Purity		research grade. The				
			test substance source				
			was not reported.				
Test Design	3. Study	Low	Blanks controls were	3	2	6	
	Controls		not reported for the				
			test system.				
	4. Test	Medium	Details were omitted	2	1	2	
	Substance		regarding the test				
	Stability		substance stability and				
			preparation; however,				
			this was not likely to				
			have influenced the				
			results.				
Test	5. Test	High	This metric met the	1	1	1	
Conditions	Method		criteria for high				
	Suitability		confidence as expected				
			for this type of study.				
	6. Testing	Medium	Some details were	2	2	4	
	Conditions		omitted regarding				
			testing conditions;				
			however, this was not				
			likely to have				
			influenced the results.				
	7. Testing	Not rated	The metric is not	NR	NR	NR	
	Consistency		applicable to this				
			study; multiple				
	0.0		samples were not run.	1		1	
	8. System	High	Details were omitted	1	1	1	
	Type and		regarding the test				
	Design		system and design;				
			however, this was not				
			influenced the recults				
Tost	0 Test	Notratad	The metric is not	ND	ND	ND	
Organisme	9. Test	notrated	applicable to this stude	INK	INK	INK	
organisiiis	Dogradation		applicable to this study				
	10 Test	Notratad	type. The metric is not	ND	ND	ND	
	10. Test	notrated	applicable to this study	INK	INK	INK	
	Digamism		applicable to this study				
	Farudoning	1	type.				

Outcome	11. Outcome	High	This metric met the	1	1	1
Assessment	Methodology		confidence as expected			
	Methodology		for this type of study.			
	12. Sampling	High	This metric met the	1	1	1
	Methods	C	criteria for high			
			confidence as expected			
			for this type of study.			
Confounding/	13.	Not rated	No confounding	NR	NR	NR
Variable	Confounding		variables were noted.			
Control	Variables		m1 , · · ·	ND	ND	ND
	14. Outcomos	Not rated	I ne metric is not	NK	NK	NK
	Unrelated to		type			
	Exposure		type.			
Data	15. Data	Medium	Some information was	2	2	4
Presentation	Reporting		not reported (or			
and Analysis			reported in a figure);			
			however, these			
			omissions were not			
			likely to have had a			
			substantial impact on			
	16 Statistical	Not rated	Statistical analysis or	NR	NR	NR
	Methods and	NotTaleu	kinetic calculations	INIX	INIX	INIX
	Kinetic		were not reported.			
	Calculations		·····			
Other	17.	High	The study results were	1	1	1
	Verification	_	reasonable. This metric			
	or		met the criteria for			
	Plausibility		high confidence as			
	of Results		expected for this type			
	10.0040	Notwotod	Of study.	ND	ND	ND
	18. QSAR Models	Not rated	I ne metric is not	NK	NK	NK
	Models		type			
			Sum of scores:	16	15	24
High	Medium	Low	Overall Score = Sum	1.6	Overall	1.6
0			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	High
	<2.3				Quality	
				1	Level:	

Study Reference:	Park, J; Choi, E; Cho, H; Kim, YG. (2003). Solar light induced degradation of trichloroethylene (TCE) using TiO2: effects of solar light intensity and seasonal variations. J Environ Sci Health A Tox Hazard Subst Environ Eng 38: 1915-1926. http://dx.doi.org/10.1081/ESE-120022889. HERO ID: 1497906							
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		identified by name.					
	Identity							
	2. Test	High	The test substance	1	1	1		
	Substance		source and purity were					
The Dealers	Purity	N I	reported.	2	2	4		
Test Design	3. Study Controls	Medium	Negative controls were not included; however, this omission was not likely to have hindered the interpretation of the results.	2	2	4		
	4. Test Substance Stability	Medium	Details regarding this metric were omitted; however, this was 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.	1	1	1		
	6. Testing Conditions	Medium	Some details were limited; temperature was not reported	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	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	Medium	Details regarding this	2	1	2
	Methods		metric were limited;			
			however, this was not			
			likely to have hindered			
			the interpretation of			
			the 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.	Not rated	The metric is not	NR	NR	NR
	Outcomes		applicable to this study			
	Unrelated to		type.			
	Exposure					
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	This metric met the	1	1	1
	Methods and		criteria for high			
	Kinetic		confidence as expected			
	Calculations		for this type of study.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high			
	or		confidence as expected			
	Plausibility		for this type of study.			
	of Results					
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this study			
			type.			
		-	Sum of scores:	18	18	24
High	Medium	Low	Overall Score = Sum	1.33	Overall	1.3
			of Weighted		Score	
			Scores/Sum of Metric		(Rounded):	
			Weighting Factors:			
$\geq 1$ and $< 1.7$	$\geq 1.7$ and	$\geq 2.3$ and $\leq 3$			Overall	High
	<2.3				Quality	
				1	Level:	

Study	Park, J; Choi, E; Cho, IH; Kim, YG. (2003). Solar light induced degradation of						
<b>Reference:</b>	trichloroethy	lene (TCE) using	TiO2: effects of solar lig	ht inten	sity and seas	onal	
	variations. J	Environ Sci Healt	h A Tox Hazard Subst En	viron En	ng 38: 1915-1	926.	
	http://dx.doi	i.org/10.1081/ES	E-120022889.				
	HERO ID: 1497906						
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted	
		Determination		Score	Weighting	Score	
		[i.e., High,			Factor		
		Medium, Low,					
		Unacceptable,					
		or Not rated]					
<b>Test Substance</b>	1. Test	High	The test substance	1	2	2	
	Substance		identified by chemical				
	Identity		name.				
	2. Test	High	The test substance	1	1	1	
	Substance		source and purity were				
	Purity		reported.				
Test Design	3. Study	Medium	Negative controls were	2	2	4	
	Controls		not included; however,				
			this omission was not				
			likely to have hindered				
			the interpretation of				
			the results.				
	4. Test	Medium	Details regarding this	2	1	2	
	Substance		metric were omitted;				
	Stability		however, this was not				
			likely to have hindered				
			the interpretation of				
			the results.				
Test	5. Test	High	This metric met the	1	1	1	
Conditions	Method		criteria for high				
	Suitability		confidence as expected				
			for this type of study.				
	6. Testing	Medium	Some details were	2	2	4	
	Conditions		limited; temperature				
			was not reported.				
	7. Testing	High	This metric met the	1	1	1	
	Consistency		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 study				
	Degradation		type.				
	10. Test	Not rated	The metric is not	NR	NR	NR	
	Organism		applicable to this study				
	Partitioning		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	Minor limitations	2	1	2
	Methods		involving loss of test			
			sampling: however this			
			was minimal and not			
			likely to have had			
			substantial influence on			
			the 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 study			
	Exposure		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	This metric met the	1	1	1
	Methods and		criteria for high			
	Kinetic		confidence as expected			
	Calculations		for this type of study.			
Other	17.	High	This metric met the	1	1	1
	Verification		criteria for high			
	or		confidence as expected			
	Plausibility		for this type of study.			
	of Results					
	18. QSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this study			
			type.			
771-3		<b>T</b>	Sum of scores:	18	18	24
High	Medium	Low	Overall Score = Sum of	1.33	Overall	1.3
			Weighted Scores/Sum		Score	
			of Metric Weighting		(Kounded):	
>1 and 117	>17 and	> 2 2 and 2 2	Factors:		Orromall	U: ah
≥1 and <1./	21.7 and	$22.3$ and $\leq 3$			Overall	nign
	<2.3				Quality	
					Level:	

Study	Dobaradara	n, S; Nabizadeh, R	; Mahvi, AH; Noroozi, A; `	Yunesia	n, M; Rastkaı	ri, N;		
Reference:	Nazmara, S; Zarei, S. (2012). Kinetic and degradation efficiency of trichloroethylene (TCE) via photochemical process from contaminated water. Afr I Biotechnol 11							
	(TCE) via photochemical process from contaminated water. Afr J Biotechnol 11: 2006-2012							
	2006-2012.							
	HERO ID: 2128765							
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted		
		Determination		Score	Weighting	Score		
		[i.e., High,			Factor			
		Medium, Low,						
		Unacceptable,						
		or Not rated]						
Test Substance	1. Test	High	The test substance was	1	2	2		
	Substance	0	identified by chemical					
	Identity		name					
	2 Test	High	The test substance	1	1	1		
	Substance	mgn	source was reported	-	-	-		
	Purity		source was reported.					
Test Design	3 Study	Low	No details about a dark	3	2	6		
i est Design	Controls	LOW	control were provided:	5	2	0		
	Controls		bydrolysis was not					
			considered					
	4 Test	Madium	The test substance	2	1	2		
	4. Test	Meuluiii	stability homogonoity	2	T	2		
	Substance		stability, nonogeneity,					
	Stability		preparation of storage					
			conditions were not					
			reported; nowever,					
			these factors were not					
			likely to have					
			influenced the test					
			substance or were to					
			have had a substantial					
			impact on the study					
			results.					
Test	5. Test	High	This metric met the	1	1	1		
Conditions	Method		criteria for high					
	Suitability		confidence as expected					
			for this type of study.					
	6. Testing	Medium	There were omissions	2	2	4		
	Conditions		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.					
	7. Testing	High	This metric met the	1	1	1		
	Consistency	Ŭ	criteria for high					
			confidence as expected					
			for this type of study.					

	8. System Type and Design	Medium	There were omissions in system details; however, sufficient data were reported to determine that the omissions were not likely to have had a substantial impact on the study results.	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	Medium	Sources of variability and uncertainty in the measurements and statistical techniques and between study groups (if applicable) were reported in the study and minor deviations or omissions 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	Low	Data for well water samples were only presented in figures.	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
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:	22	18	31
High	Medium	Low	<b>Overall Score = Sum of</b>	1.72	Overall	1.7
-			Weighted Scores/Sum		Score	
			of Metric Weighting		(Rounded):	
			Factors:			
≥1 and <1.7	≥1.7 and	≥2.3 and ≤3			Overall	Medium
	<2.3				Quality	
					Level:	
Study	Shirayama, H; Tohezo, Y; Taguchi, S. (2001). Photodegradation of chlorinated					
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Reference:	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	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[1.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
The Charles	1 5 1	or Not rated		1	2	2
Test Substance	1. Test	Hign	The test substance was	1	Z	Z
	Substance		Identified by chemical			
	Identity	II: -l.	name.	1	1	1
	2. Test	High	The test substance	1	1	1
	Substance		source was reported.			
The st Date is a	Purity	T		2	2	
l est Design	3. Study	LOW	The control substance	3	Z	6
	Controls		was not reported;			
			nowever, the lack of this			
			influence the study			
			nonlta			
	4 Test	Uiah	This matric mat the	1	1	1
	4. Test	nigii	critoria for high	1	1	1
	Substance		confidence as expected			
	Stability		for this type of study			
Tost	5 Test	High	This metric met the	1	1	1
Conditions	Method	IIIgii	criteria for high	1	1	1
conditions	Suitability		confidence as expected			
	bullability		for this type of study			
	6. Testing	High	This metric met the	1	2	2
	Conditions	8	criteria for high	_	_	_
			confidence as expected			
			for this type of study.			
	7. Testing	High	This metric met the	1	1	1
	Consistency	U	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 study			
	Degradation		type.			
	10. Test	Not rated	The metric is not	NR	NR	NR
	Organism		applicable to this study			
	Partitioning		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.			

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	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	This metric met the criteria for high confidence as expected for this type of 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	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):	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			Overall Quality Level:	High

Study	Dilling, WL; Tefertiller, NB; Kallos, GJ. (1975). Evaporation rates and reactivities of					
<b>Reference:</b>	methylene chloride, chloroform, 1,1,1-trichloroethane, trichloroethylene,					
	tetrachloroethylene, and other chlorinated compounds in dilute aqueous solutions.					
	Environ Sci Technol 9: 833-838. http://dx.doi.org/10.1021/es60107a008.					
	HERO ID: 58054					
Domain	Metric	Qualitative	Comments	Metric	Metric	Weighted
		Determination		Score	Weighting	Score
		[i.e., High,			Factor	
		Medium, Low,				
		Unacceptable,				
		or Not rated				
Test Substance	1. Test	High	The test substance was	1	2	2
	Substance	0	identified by chemical			
	Identity		name			
	2 Test	High	The test substance	1	1	1
	L. ICSC	Ingn	nurity and course were	1	1	T
	Durity		pullty and source were			
	Fully		MC analysis was			
			NIJ dildiysis Was			
			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	Medium	Some concurrent	2	2	4
	Controls		control group details			
			were not included;			
			however, the lack of			
			data was not likely to			
			have had a substantial			
			impact on the study			
			results.			
	4. Test	High	Mass spectra analysis	1	1	1
	Substance	-	was performed at start			
	Stability		of study.			
Test	5. Test	High	Methanol was used as a	1	1	1
Conditions	Method	Č	co-solvent.			
	Suitability					
	6. Testing	High	Water was purged with	1	2	2
	Conditions	-	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			
			dotormining stop is			
			uetermining step is			
		1	nyuroiysis.			

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	7. Testing	High	No inconsistencies	1	1	1
	Consistency		were reported or			
			identified.			
	8.System	High	This metric met the	1	1	1
	Type and	C	criteria for high			
	Design		confidence as expected			
	0		for this type of study.			
Test	9. Test	Not rated	The metric is not	NR	NR	NR
Organisms	Organism		applicable to this study			
0.8	Degradation		type			
	10 Test	Not rated	The metric is not	NR	NR	NR
	Organism	Not fatea	applicable to this study			i i i i i i i i i i i i i i i i i i i
	Dartitioning		type			
Outcome	11 Outcome	Uiah	The outcome of interest	1	1	1
Accordent	According	nigii	and its basis work	1	1	1
Assessment	Assessment		and its basis were			
	Methodology	Madiana	Compliance and the de	2	1	2
	12. Sampling	Medium	Sampling methods	Z	1	Z
	Methods		were omitted. Sampling			
	10		timing was suitable.			
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 study			
	Exposure		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.	High	This metric met the	1	1	1
	Verification	0	criteria for high			
	or		confidence as expected			
	Plausibility of		for this type of study.			
	Results					
	18 OSAR	Not rated	The metric is not	NR	NR	NR
	Models		applicable to this study			
	110000		type			
			Sum of scores:	18	18	24
High	Medium	Low	Overall Score = Sum of	1 22	Overall	1 3
mgn	Meanum	LOW	Weighted Scores/Sum	1.55	Score	1.5
			of Matric Weighting		(Rounded):	
			Factors:		(Noundeu).	
>1 and <1.7	>17 and	>22 and <2	1 actors.		Overall	High1
≥1 anu <1./	≥1.7 aliu	≥2.5 dIIu ≥5			Overall	rugu.
	<2.5				Quality	
1Deleted UEDO	ID. 2070702 FC	IIA Dhotatuan-f-	mation in water Tates -11	ono cthe-l	Level:	
<sup>+</sup> Related HERU ID: 3970783, ECHA. Phototransformation in water: Tetrachloroethylene. 2017.						

behaviour of					
organic chemicals: an experimental method for the assessment of the behaviour of					
organic chemicals in the ecosphere by means of simple laboratory tests with 14C					
labelled chemicals. Chemosphere 14: 1589-1616.					
HERO ID: 85251					
Weighted					
Score					
50010					
6					
0					
3					
8					
_					
NR					
NP					
INIX					
0					
8					
NR					
NR					
NR					
NR					

Outcome	11.	Not rated	Little to no	NR	NR	NR	
Assessment	Outcome		information was				
	Assessment		provided but may be				
	Methodology		available in				
	12 Sampling	Not rated	Little to no	NR	NR	NR	
	Methods	NotTated	information was	IVIX	IVIX	IVIX	
			provided but may be				
			available in				
			referenced sources.				
Confounding/	13.	Not rated	No confounding	NR	NR	NR	
Variable	Confounding		variables were noted.				
Control	14	Not rated	The metric is not	NR	NR	NR	
	Outcomes	NotTated	applicable to this	IVIX	IVIX	IVIX	
	Unrelated		study type.				
	to Exposure						
Data	15. Data	Medium	A single data point	2	2	4	
Presentation	Reporting		(36% degradation)				
and Analysis			was provided. More				
			available in the study				
			report; however, it is				
			illegible.				
	16.	Not rated	Little to no	NR	NR	NR	
	Statistical		information was				
	Methods and		provided.				
	Calculations						
Other	17.	Not rated	Little to no	NR	NR	NR	
	Verification		information was				
	or		provided; therefore, it				
	Plausibility		is difficult to interpret				
	of Results	Notwotod	the results.	ND	ND	ND	
	18. QSAR Models	Not rated	applicable to this	NK	INK	INK	
	Models		study type.				
			Sum of scores:	16	9	29	
High	Medium	Low	Overall Score = Sum	3.22	Overall	4	
			of Weighted		Score		
			Scores/Sum of Metric		(Rounded):		
>1 and <1.7	>17 and	>23 and <2	weighting Factors:		Overall	Unaccentable <sup>1</sup>	
21 allu <1.7	<2.3	22.5 and 55			Ouality	onacceptable	
	10				Level:		
<sup>1</sup> A single data point (36% degradation) was provided. More info may be available in the report; however,							
the document is illegible. Consistent with our Application of Systematic Review in TSCA Risk Evaluations							

the document is illegible. 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.