## **Overview of substance assessments**

Summary of the substances assessed using the methodology for the determination of hazardous substances published in January 2017,. It enables comparison between the 1980 groundwater directive and most recent determinations. Further determinations will be made in due course. For a fuller list of substance determinations refer to the JAGDAG website since not all determinations have been or wil need to be assessed uning the 2017 methodology. You may need to request an assessment if the substance you are looking for is not listed on the JAGDAG website, contact JAGDAG\_England@environment-agency.gov.uk to request an assessment.

Substance	CAS #	1980 GWD (List1 or List 2)	JAGDAG Methodology Determination	Based on	Comments
1,1,1-trichloroethane	71-55-6	List I	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	
1,1,2-trichloroethane	79-00-5	List I	Non-hazardous	Does not meet criteria for P, B and T nor the criteria for Equivalent concern,	
1,1-dichloroethane	75-34-3	List I	pollutant Non-hazardous pollutant	ie vPvB or mutagenic/no determinable threshold Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	
1,1-dichloroethene	75-35-4	List I	Non-hazardous pollutant		1,1-dichloroethene can degrade to form vinyl chloride which has been determined as Hazardous
1,2-dichloroethane	107-06-2	List I	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	
1,2-dichloroethene	540-59-0	List I	Non-hazardous pollutant		1,2-dichloroethene can degrade to form vinyl chloride which has been determined as Hazardous
Acrylamide	79-06-1	Not assessed	Hazardous substance	Very Toxic (as Muta 1B and a threshold can not be determined)	Does not meet criteria for P, B and T however meets criteria for Very Toxic based on mutagenicity and the fact it has been reported it is not possible to determine a threshold for this substance
Anionic polyacrylamide	9003-05-8	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	Anionic polyacrylamide is not hazardous however may contain acrylamide as an impurity and this is Hazardous.
Anthracene	120-12-7	List I	Hazardous substance	Meets criteria for PBT	Has been identified as a PBT substance at an EU level and as a result has been identified as a Substance of Very High Concern (SVHC) under REACH
Antimony (V) and (III)	7440-36-0 1309-64-4	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	WHO have noted that Antimony (III) may show genotoxic effects in vivo and in vitro but limited details are given. This may need consideration in the future.
Arsenic (inorganic Arsenic (III) and Arsenic (V)		Not assessed	Hazardous substance	Noted to have not determinable threshold	Does not meet criteria for mutagenic however it has been noted to be genotoxic and that a threshold can not be identified for cancer. COT have proposed that exposure should be as low as reasonably practicable. As a result it meets the criterion relating to a non-threshold chemical
Benzene	71-43-2	List I	Hazardous substance	Very Toxic - Muta 1B	
Benzo(a)pyrene	50-32-8	List I	Hazardous substance	Very Toxic as Muta 1B. Also meets criteria for P, B and T and vPvB	The EU SVHC report for coal tar pitch (high temperature) included an assessment of benzo(a)pyrene and the assessment noted it met the criteria for PBT and vPvB
Benzo(b)fluoranthene	205-99-2	List I	Hazardous substance	Meets criteria for P, B and T	The EU SVHC report for coal tar pitch (high temperature) included an assessment of benzo(k)fluoranthene and the assessment noted it met the criteria for P and T but insufficient experimental data was available for B. However using the weight of evidence have noted it as meeting criteria for P, B and T in this assessment
Benzo(ghi)perylene	191-24-2	List I	Hazardous substance	Meets criteria for P, B and T and vPvB (Assumed Mutagencity due to lack of data - would therefore also meet Very Toxic criteria)	The EU SVHC report for coal tar pitch (high temperature) included an assessment of benzo(ghi)perylene and the assessment noted it met the criteria for PBT and vPvB
Benzo(k)fluoranthene	207-08-9	List I	Hazardous substance	Meets criteria for P, B and T and also vPvB	The EU SVHC report for coal tar pitch (high temperature) included an assessment of benzo(k)fluoranthene and the assessment noted it met the criteria for PBT and vPvB
Boron (as Boron (III)		Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	
Cadmium (as cadmium II)		List I	Non-hazardous pollutant	Does not meet the criteria for PBT or vPvB. Is noted to be mutagenic but the WHO have noted that there is limited evidence of genotoxic effects via the oral route and it is not considered to be a no determinable threshold substance for genotoxic effects.	
Chloroalkanes (C10-13)	85535-84-8	List I	Hazardous substance	Meets criteria for PBT and vPvB	The REACH SVHC report indicates it meets the criteria for PBT and vPvB. This group of substances is still being evaluated under REACH however. SCCPs are being considered for inclusion as a POP
Chromium VI	18540-29-9	Not assessed	Hazardous substance	Very Toxic - Muta 2	UK Committee for Mutagenicity has stated that chromium (VI) is mutagenic with no determinable threshold. Based on this have noted Chromium VI is Hazardous. It is acknowledged that other studies/reports indicate may have a threshold but for the purposes of the assessment have taken the current UK position.

Cobalt (based on cobalt (II) which covers cobalt, cobalt carbonate and cobalt sulphate)		Not assessed	Non-hazardous pollutant	genotoxic effects of cobalt (II) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobalt and	Reviewed following the public consultation in May 2016, it was proposed to be a hazardous substance based on Very Toxic as Muta 2. It is now a non-hazardous pollutant following advice from the Expert Group on Vitamins and Minerals, since a threshold can be determined. Refer to assessment template for further detail.
Cyanide	74-90-8	Not assessed		Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	

DEHP	117-81-7	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	DEHP meets the criteria for T based on reproductive effects. The data for persistence indicate ready biodegradability but half lives that meet the criteria. Have noted it as not meeting criteria for persistence to be consistent with outcome of current EU assessments. In terms of bioaccumulation the BCF data for fish don't indicate it meets the criteria. It has not been designated as PBT under REACH as not considered to meet the criteria. However it is noted as a Substance of Very High Concern due to reproductive effects (Repr 1B)	
Dibutyl phthalate	84-74-2	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Dichloromethane	75-09-2	List I	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Dioxins		List I	Hazardous substance	Meets criteria for PBT and vPvB	Dioxins have been identified as a Persistent Organic Pollutant (POP)	
Ethylene glycol	107-21-1	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Flufenacet	142459-58-3	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Gluteraldehyde	111-30-8	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Hexabromocyclododecane (HBCDD)	25637-99-4	Not assessed	Hazardous substance	Meets criteria for P,B and T and vPvB	HBCDD has been designated as a POP. It has been identified as PBT under REACH by the EU	
Hexachlorobenzene	118-74-1	List I	Hazardous substance	Meets criteria for PBT and vPvB	Has not been formally noted as a PBT substance by the EU. Is designated as a POP	
Hexachlorobutadiene (HCBD)	87-68-3	List I	Hazardous substance	Meets criteria for P,B and T and vPvB. Also noted to be mutagenic with no determinable threshold and therefore meets the criteria for Very Toxic	HCBD has been designated as a POP.	
Hexachlorocyclohexane	58-89-9	List I	Hazardous substance	Meets criteria for PBT	Assessment based on gamma- hexachlorocyclohexane CAS: 58-89-9 however also relevant to othe isomers eg beta and alpha which are also designated as POPs. It meets the criteria for PBT but has not formally been designated a PBT by the EU Working Group. Is designated as a POP	
Indeno(123cd)pyrene	193-39-5	List I	Hazardous substance	Meets criteria for P, B and T and vPvB	Limited data available for this substance and have used weight of evidence and information on other PAHs to help make the assessment.	
Lead		Not assessed	Hazardous substance	WHO and EFSA have noted that there is no known level of lead exposure that is considered safe. Meets criteria for P, B and T.		
Mecoprop	7085-19-0	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Mercury (as Mercury II)		List I	Hazardous substance	Meets criteria for P, B and T		
Molybdenum (as the molybdate ion)		Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Naphthalene	91-20-3	List I	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Nickel (as nickel II)		Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern	Does not meet criteria for PBT or vPvB. Is determined as Muta 2 under CLP however it is considered to have a threshold for genotoxic effects (WHO) and therefore not considered to meet the criteria for determination as Hazardous	
Propylene glycol	57-55-6	Not assessed	Non-hazardous pollutant	Does not meet the criteria for P, B or T, vP or vB. Data provided did not indicate any evidence of genotoxic effects.		
Pentachlorobenzene	608-93-5	List I	Hazardous substance	Meets criteria for P, B and T and vPvB	Pentachlorobenzene has been designated as a POP	
PFOS	1763-23-1	Not assessed	Hazardous substance	Meets criteria for PBT	PFOS has been identified as a POP (Persistent Organic Pollutant)	
Selenium	7782-49-2	Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Tetrachloroethylene	127-18-4	List I	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold	Known breakdown products following anaerobic degradation include trichloroethylene (determined as Hazardous) and vinyl chloride (determined as Hazardous).	
Thallium (as Thallium (I))		Not assessed	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Tributyltin (as TBT ion)	56-35-9 36643-28-4	List I	Hazardous substance	Meets the criteria for PBT	Has been identified as a PBT substance at an EU level under REACH	
Trichlorobenzenes	12002-48-1	List I	Non-hazardous pollutant	Does not meet criteria for P, B and T nor the criteria for Equivalent concern, ie vPvB or mutagenic/no determinable threshold		
Trichloroethylene	79-01-6	List I	Hazardous substance	Very Toxic as Muta 2	Available information indicates it can degrade in groundwater to form vinyl chloride (determined as Hazardous).	
Vinyl chloride	75-01-4	List I	Hazardous substance	Very Toxic as 'no determinable threshold'	WHO drinking water guideline report noted that although a drinking water guideline has been proposed due to its carcinogenic effects exposure levels should be kept as low as practically possible.	

			1,1, DI	CHLOROETHENE (1, 1 DCE) (CAS: 75-35-4)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no ?			
Persistence Passes ready biodegradation test	No data			
Passes inherent biodegradation test If answer to either guestion is YES, substance is not persistent	No data			
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	No Data			
Half life fresh or estuarine water ≥ 40 days	Yes	28-180days	Environment Canada (2013)	The main route of removal from the water environment is volatilisation with half lives in the order of hours to a few days. This is not a relevant fate process for groundwater. Modeled half lives in water reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 -
Half life marine sediment ≥ 180 days	No	150days	Environment Canada	132days and other results reported in the range 5- 6 months.
Half life fresh or estuarine sediment ≥ 120 days	No Data		(2013)	
Half life in soil ≥ 120 days	Yes	28-180 days	Environment Canada (2013)	The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days.
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
				Limited data available. Volatilisation is a key removal process but not directly relevant in groundwater.
Is substance persistent?	Yes			Using the upper modelled degradation rates indicates meets the criteria for persistence.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	4 - <13	WHO 2003	Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No data			
	No	4.00	WUO 2000	Value of 2.1 noted in Environment Conside (2012) which superstants for the fort is descent and the
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	No	1.32	WHO 2003	Value of 2.1 noted in Environment Canada (2013) which supports the fact it does not meet the
Does the weight of evidence from the following criteria indicate bioaccumulation	Not assessed as			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	data available above			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm	abore			
Molecular size ≥ 4.5im Molecular weight ≥ 1100g/mol Octanol solubility \$ 0.002mmol/i				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	No	3.9 mg/l	WHO 2003	Alga Chlamydomonas reinhardtii 72 hr EC10 (broadly used as a surrogate for NOEC); Substance difficult to test due to volatility
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	EU harmonised C&L classification available for 1,1-dichloroethene and indicates it does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	Classified Carc.2 (EU harmonised C&L classification)
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Doesn't meet criteria for B or T
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
				The main route of removal from the water environment is volatilisation with half lives in the order of
Half life in marine, fresh or estuarine water ≥ 60 days	Yes	28-180	Environment Canada (2013)	hours to a few days. This is not a relevant fate process for groundwater. Modelled half lives in water reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 120den end above service the reported in the reported in the context of the reported in the r
			(2013) Environment Canada	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months.
Half life in marine, fresh or estuarine sediment ≿ 180 days	No	150	(2013) Environment Canada (2013) Environment Canada	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the
			(2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	No Yes	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000	No	150	(2013) Environment Canada (2013) Environment Canada	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	No Yes No	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative?	No Yes	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very parsistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	No Yes No	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≿ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≿ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater?	No Yes No	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days         Half life in soil ≥ 180 days         If answer to any question is YES, substance is very persistent         Is bioconcentration factor ≥ 5000         If answer is yes, substance is very bioaccumulative         Is substance very persistent and very bioaccumulative         Is substance pose a specific risk to groundwater?         Does substance pose a specific risk to groundwater?         Doe 5 % of groundwater samples show levels of the substance greater than the LOQ?         Do ≥ 15% of sites have at least one sample where the substance is detected	No Yes No No Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does aroundwater monitorind data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?	No Yes No No Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days         Half life in soil ≥ 180 days         If answer to any question is YES, substance is very persistent         Is bioconcentration factor ≥ 5000         If answer is yes, substance is very bioaccumulative         Is substance very persistent and very bioaccumulative         Is substance pose a specific risk to groundwater?         Does substance pose a specific risk to groundwater?         Does of groundwater monitoring data show half life in groundwater ≥ 1 vear         Do ≥ 15% of sites have at least one sample where the substance is detected         above the LOQ?         If answer to any question is YES, substance is persistent in groundwater         Is substance posesitent in groundwater?	No Yes No No Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Doe 5% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance is persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is heardous	No Yes No No Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does usostance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 vear Do ≥ 15% of groundwater samples show levels of the substance greater than the LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance is persistent in groundwater? If substance is hearardous Does substance pose a specific risk to groundwater?	No Yes No No Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is VES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5 % of sproundwater smaples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance is persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance nutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No Yes No No Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5 - 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5% of groundwater samples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance is persistent in groundwater, bioaccumulative AND toxic, substance is hearadous Does substance pose a specific risk to groundwater? Is substance nutlagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5-6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is VES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5 % of sproundwater smaples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance is persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance nutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance yes a specific risk to groundwater? Dees substance pose a specific risk to groundwater ≥ 1 ver Do ≥ 5% of groundwater samples show half life in groundwater ≥ 1 ver Do ≥ 15% of sites have at least one sample where the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater If substance persistent in groundwater? If substance is persistent in groundwater? If substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Does substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic)	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5% of groundwater samples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater If substance is persistent in groundwater, bioaccumulative AND toxic, substance is nearatous Does substance pose a specific risk to groundwater? Is substance protection (Muta 1A, 1B2,) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5-6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 vear Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater If answer to any question is YES, substance is persistent in groundwater substance is persistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is substance very toxic? Is substance very toxic is VES, substance is very toxic and hazardous Is substance is on human health If answer to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is	No Yes No No Not Assessed Not Assessed	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1,1-dichloroethene NB. Dichloroethene can result in the formation of vinyl chloride (determined as Hazardous)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative Is substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 ver Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater If answer to any question is YES, substance is persistent in groundwater If answer to any question is YES, substance is persistent in groundwater? If substance persistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance nutagentic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis	No Yes No No Not Assessed Not Assessed	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1,1-dichloroethene NB. Dichloroethene can result in the formation of vinyl chloride (determined as Hazardous) during degradation in groundwater.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 ver Doe 2 5% of groundwater samples show healf life in groundwater ≥ 1 ver Do 2 5% of symondwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater If substance persistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater? If substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance nutagenic (Muta 1A, 1B, 2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis	No Yes No Not Assessed Not Asse	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003 ECHA C&L database ECHA C&L database	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5-6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for v8 EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1.1-dichloroethene NB. Dichloroethene can result in the formation of vinyt chloride (determined as Hazardous) during degradation in groundwater. Is a known breakdown product
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer as yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Is 25% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance is persistent in groundwater? Is substance is on human heath If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous to groundwater? Is substance hazardous to groundwater? Is substance hazerdous, if so, state on what basis Does substance have breakdown products of concern? REFERENCES	No Yes No No Not Assessed Not A	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003 ECHA C&L database ECHA C&L database	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1.1-dichloroethene NB. Dichloroethene can result in the formation of vinyl chloride (determined as Hazardous) during degradation in groundwater. Is a known breakdown product

				1,1-dichloroethane (CAS: 75-34-3)
	Yes / No / nsufficent data / Borderline / assume yes or	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence				
Passes ready biodegradation test Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days				A key removal process for 1,1-dichloroethane is volatilisation with half lives reported in a few hours/days. However as groundwater is being considered this is not thought to be relevant for this particular assessment. Few studies on biodegradation found and it is noted
Half life fresh or estuarine water ≥ 40 days	Yes			that biodegradation is not a key removal process. A study on degradation in groundwater reported half lives in the order of 8 to 16 weeks in a sample of aerobic groundwater (Ref. ATSDR). Another study on water from a landfill indicated a half life of 115days (Ref. ATSDR). Due to the limited data for 1.1.dichloredhane have also considered the data for 1.2.dichloredhane which also suggested low rates of biodegradation (SIDS, 2002). Based on the available data have therefore assumed that 1,1-dichloredhane meets the criteria for persistence.
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days				
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes			See comments noted above
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No No data	5	HSDB	An estimated BCF value calculated from the log Kow. No experimental data located No specific data on biomagnification but not expected to biomagnify based on the BCF and log Kow data
If no BCF data, is log Kow ≥ 4.5?	No	1.79	HSDB	
If answer is YES, substance is bioaccumulative	Not considered			
Dees the weight of exidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size 2 4 Jam Molecular weight 2 1100g/mol	due to above information			
Octanol solubility 50.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative? Toxicity	No			
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	11mg/l	SIDS (2002)	No chronic data located for 1,1-dichloroethane. Data for 1,2-dichloroethane has therefore been used (chronic NOEC for Daphnia magna of 11mg/l)
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic	No		ECHA C&L database ECHA C&L	Harmonised C&L classification available for 1,1-dichloroethane. The classification indciates it does not meet the criteria
If answer to all questions is NO, substance is not toxic	No		database	Harmonised C&L classification available for 1,1-dichloroethane. The classification indiciates it does not meet the oriteria
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Very little data available for this substance. Information for 1.2-dichloroethane has also been considered as part of the assessment where necessary. The data located indicate it does not meet criteria for B or T.
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				A key removal process for 1,1-dichloroethane is volatilisation with half lives reported in a few hours/days. However as groundwater is
Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes			A key relinivar process on 1, rouchat clearle's violatisation with hai rives reported in a few hours days. Indiverse as gould water is being considered this is not thought to be relevant for this particular assessment. Few studies on biodegradation found and it is noted that biodegradation is not a key removal process. A study on degradation in groundwater reported half lives in the order of 8 to 16 weeks in a sample of aerobic groundwater (Ref. ATSDR). Another study on water from a landfil indicated a half live of the days (Ref. ATSDR). Due to the limited data for 1,1-dichloroethane have also considered the data for 1,2-dichloroethane meets the criteria for persistence.
Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	5	HSDB	An estimated BCF value calculated from the log Kow. No experimental data located
If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for vB. Very little data available for persistence - have assumed vP based on the limited data
	NO			available.
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not assessed Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater	Not assessed			
Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health if answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification available for 1,1-dichloroethane. The classification indciates it does not meet the criteria
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	No			
Is substance very toxic?	in V			
Is substance hazardous, if so, state on what basis	No			Does not meet criteria for PBT as not B or T. Does not meet vPvB as not bloaccumulative. Does not meet criteria for Very Toxic does not meet the criteria for mutagenicity.
Does substance have breakdown products of concern?	No			
REFERENCES HSDB h	ttp://toynot.clm.cl		in/eie/coor-b0//0	?/temp/~yhCYkS:1
ECHA C&L database ht SIDS (2002) (Assessment on 1,2-dichloroethane) ht	ttp://echa.europa.e	eu/informat org/docum	tion-on-chemical ents/sids/sids/D	is/cl-inventory-database JICHLOROETH.pdf

				1,2-dichloroethane (CAS: 107-06-2)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	1,2-dichioroemane (CAS: 107-06-2) Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test				
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent				
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	Yes (see comment)		SIDS(2002)	No specific half life data was available for this substance. The DECD SIDS review indicated that available studies showed it was not biodegraded when non-adapted, non-acclimated microbial populations were used however biodegradation did occur when adapted microbes were used. No half lives were provided. It was noted that under environmental conditions biodegradation is not likely to occur. 1,2-dichloreethane is rapidly volatilised from surface water with half lives in the order of hours but this has not been considered here as groundwater is the main medium of interest rather than surface water. Have assumed that it meets the criteria for persistence based on the available data.
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 davs Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes (See comment above)		SIDS(2002)	
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			Used data for situations with non-adapted, non-accumulated conditions which indicate slow degradation.
Is substance persistent?	Yes			No specific half lives available and have assumed it meets the criteria for persistence.
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	2	SIDS (2002)	Measured value from a study on a fish species (Blueqill sunfish)
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	No	1.45	SIDS (2002)	Measured value
	Net concerned due			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to the information provided above			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers),				
BCF data should be obtained Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
	No			
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	11mg/l	SIDS (2002)	A range of toxicity data was collated for the SIDS report. The lowest chronic value was 11mg/l for an invertebrate
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No			(Daphnia magna - 28day NOEC) Harmonised C&L classification for 1,2-dichloroethane indicates it does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes	Coro 1P		
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	Tes	Carcino	ECHA C&L dalabase	Harmonised C&L classification for 1,2-dichloroethane indicates it does not meet the criteria
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Based on the fact it has been assigned Carc 1B under CLP
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet the criteria for bioaccumulation
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				No specific half life data was available for this substance. The OECD SIDS review indicated that available studies
Half life in marine, fresh or estuarine water ≥ 60 days	Yes		SIDS(2002)	No specific that the data was available tool this studiation. The OECoIDS terver historicated that available studies showed it was not biodegraded when non-adapted, non-acclimated microbial pollutions were used however biodegradation did occur when adapted microbes were used. No half lives were provided. It was noted that under environmental conditions biodegradation is not likely to occur. 1.2. Acichhoreethane is rapidly outbilised from studies water with half lives in the order of hours but this has not been considered here as groundwater is the main medium of interest rather than surface water. Have assumed that it meets the criteria for persistence based on the available data.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	2	SIDS (2002)	Measured value from a study on the Bluegill sunfish
If answer is ves, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			No specific data available on degradation half lives however does not meet vB criteria therefore not vPvB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
$Do \ge 5\%$ of groundwater monitoring data show har me in groundwater $\ge 1$ year $Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
$Do \ge 15\%$ of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous	Not assessed			
Does substance pose a specific risk to groundwater? Is substance very toxic?	1101 03353860			
Is substance wutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification for 1,2-dichloroethane indicates it does not meet the criteria
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic? Is substance hazardous to groundwater?	No			
Is substance hazardous, if so, state on what basis	No			Does not meet the criteria for P, B and T, nor vPvB or Very Toxic
Does substance have breakdown products of concern? REFERENCES	No			
SIDS (2002) Initial Assessment report on 1,2-dichloroethane ECHA C&L database			ments/sids/sids/DICHL0 nation-on-chemicals/cl-ir	

			1,1, DI	CHLOROETHENE (1, 1 DCE) (CAS: 75-35-4)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no ?			
Persistence Passes ready biodegradation test	No data			
Passes inherent biodegradation test If answer to either guestion is YES, substance is not persistent	No data			
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	No Data			
Half life fresh or estuarine water ≥ 40 days	Yes	28-180days	Environment Canada (2013)	The main route of removal from the water environment is volatilisation with half lives in the order of hours to a few days. This is not a relevant fate process for groundwater. Modeled half lives in water reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 -
Half life marine sediment ≥ 180 days	No	150days	Environment Canada	132days and other results reported in the range 5- 6 months.
Half life fresh or estuarine sediment ≥ 120 days	No Data		(2013)	
Half life in soil ≥ 120 days	Yes	28-180 days	Environment Canada (2013)	The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days.
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
				Limited data available. Volatilisation is a key removal process but not directly relevant in groundwater.
Is substance persistent?	Yes			Using the upper modelled degradation rates indicates meets the criteria for persistence.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	4 - <13	WHO 2003	Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No data			
	No	4.00	WUO 2000	Value of 2.1 noted in Environment Conside (2012) which supercise the first is descent as a site
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	No	1.32	WHO 2003	Value of 2.1 noted in Environment Canada (2013) which supports the fact it does not meet the
Does the weight of evidence from the following criteria indicate bioaccumulation	Not assessed as			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	data available above			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm	abore			
Molecular size ≥ 4.5im Molecular weight ≥ 1100g/mol Octanol solubility \$ 0.002mmol/i				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	No	3.9 mg/l	WHO 2003	Alga Chlamydomonas reinhardtii 72 hr EC10 (broadly used as a surrogate for NOEC); Substance difficult to test due to volatility
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	EU harmonised C&L classification available for 1,1-dichloroethene and indicates it does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	Classified Carc.2 (EU harmonised C&L classification)
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Doesn't meet criteria for B or T
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
				The main route of removal from the water environment is volatilisation with half lives in the order of
Half life in marine, fresh or estuarine water ≥ 60 days	Yes	28-180	Environment Canada (2013)	hours to a few days. This is not a relevant fate process for groundwater. Modelled half lives in water reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 120den end alters service the reported in the reported in the context of the reported in the
			(2013) Environment Canada	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months.
Half life in marine, fresh or estuarine sediment ≿ 180 days	No	150	(2013) Environment Canada (2013) Environment Canada	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the
			(2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	No Yes	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000	No	150	(2013) Environment Canada (2013) Environment Canada	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	No Yes No	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative?	No Yes	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very parsistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	No Yes No	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater?	No Yes No	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days         Half life in soil ≥ 180 days         If answer to any question is YES, substance is very persistent         Is bioconcentration factor ≥ 5000         If answer is yes, substance is very bioaccumulative         Is substance very persistent and very bioaccumulative         Is substance pose a specific risk to groundwater?         Does substance pose a specific risk to groundwater?         Doe 5 % of groundwater samples show levels of the substance greater than the LOQ?         Do ≥ 15% of sites have at least one sample where the substance is detected	No Yes No No Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does aroundwater monitorind data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?	No Yes No No Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
Half life in marine, fresh or estuarine sediment ≥ 180 days         Half life in soil ≥ 180 days         If answer to any question is YES, substance is very persistent         Is bioconcentration factor ≥ 5000         If answer is yes, substance is very bioaccumulative         Is substance very persistent and very bioaccumulative         Is substance pose a specific risk to groundwater?         Does substance pose a specific risk to groundwater?         Does of groundwater monitoring data show half life in groundwater ≥ 1 vear         Do ≥ 15% of sites have at least one sample where the substance is detected         above the LOQ?         If answer to any question is YES, substance is persistent in groundwater         Is substance posesitent in groundwater?	No Yes No No Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013)
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Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is VES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5 % of sproundwater smaples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance is persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance nutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No Yes No No Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013)	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5 - 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB
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Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is VES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5 % of sproundwater smaples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance is persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance nutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance yes a specific risk to groundwater? Dees substance pose a specific risk to groundwater ≥ 1 ver Do ≥ 5% of groundwater samples show half life in groundwater ≥ 1 ver Do ≥ 15% of sites have at least one sample where the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater If substance persistent in groundwater? If substance is persistent in groundwater? If substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Does substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic)	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 5% of groundwater samples show levels of the substance greater than the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater If substance is persistent in groundwater, bioaccumulative AND toxic, substance is nearatous Does substance pose a specific risk to groundwater? Is substance protection (Muta 1A, 1B2,) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	No Yes No Not Assessed Not Assessed Not Assessed Not Assessed Not Assessed	150 28-180	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5-6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Doe 2 5% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater If answer to any question is YES, substance is persistent in groundwater Substance is persistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater? Is substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic? Is substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic? Is substance hazardous to groundwater?	No Yes No No Not Assessed Not Assessed	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1,1-dichloroethene NB. Dichloroethene can result in the formation of vinyl chloride (determined as Hazardous)
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative Is substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 ver Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater If answer to any question is YES, substance is persistent in groundwater If answer to any question is YES, substance is persistent in groundwater? If substance presistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance prover toxic? Is substance nutagentic (Muta 1A, 1B, 2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis	No Yes No No Not Assessed Not Assessed	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1,1-dichloroethene NB. Dichloroethene can result in the formation of vinyl chloride (determined as Hazardous) during degradation in groundwater.
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance very persistent and very bioaccumulative Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 ver Doe 2 5% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater ample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance pose a specific risk to groundwater? If substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance nutagenic (Muta 1A, 1B, 2) or have no determinable threshold for adverse effects on human heath If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis	No Yes No Not Assessed Not Asse	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003 ECHA C&L database ECHA C&L database	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5-6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for v8 EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1.1-dichloroethene NB. Dichloroethene can result in the formation of vinyt chloride (determined as Hazardous) during degradation in groundwater. Is a known breakdown product
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer as yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Is 25% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance is persistent in groundwater? Is substance is on human heath If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous to groundwater? Is substance hazardous to groundwater? Is substance hazerdous, if so, state on what basis Does substance have breakdown products of concern? REFERENCES	No Yes No No Not Assessed Not A	150 28-180 4 - <13	(2013) Environment Canada (2013) Environment Canada (2013) WHO 2003 ECHA C&L database ECHA C&L database	reported in the range of 28 - 180days. Modelled half lives in groundwater reported in the order of 56 - 132days and other results reported in the range 5- 6 months. The main route of removal from the soil environment is volatilisation with half lives reported in the order of hours to a few days. Modelled half lives in soil reported in the order of 28 - 180 days. Two studies in fish. Substance noted to be difficult to test due to volatility. BCF values of 4 and 6.9 also noted in Environment Canada (2013) Doesn't meet criteria for vB EU harmonised C&L classification indicates it does not meet the criteria for mutagenicity. WHO (2005) noted that it was not relevant to determine a drinking water threshold for 1.1-dichloroethene NB. Dichloroethene can result in the formation of vinyl chloride (determined as Hazardous) during degradation in groundwater. Is a known breakdown product

Yes / No / Bodderline, assume yes or no?       Yalue       Reference       Comments         Parsise the comments       Stabstance persistent, bioaccumulative and toxic?       Stabstance persistent, bioaccumulative and toxic?       Stabstance persistent, bioaccumulative and toxic?         Parsises incert Passes incert If answer to either question is STES, substance is not persistent If answer to both questions is NO, additional date on half life is required       No       StDS (2009)       OECD 301C 0% degradation after 14days         Half life marine water > 60 days       Yes       0.5-1 year       StDS (2009)       Very limited data was available on half lives of 1,1,1-trichloroethan information found generally indicated slow degradation. It is required         Half life marine water > 60 days       Yes       0.5-1 year       StDS (2009)       Very limited data was available on half lives of 1,1,1-trichloroethane information found generally indicated slow degradation. It is reguired this instruct considered relearnt for groundwater. The StDS review of 1year for 1,1,1-inchloroethane in water         Half life marine sediment > 180 days       Yes       >485days       HSDB         Half life fresh or estuarine existent is not persistent       Yes       HSDB       HSDB         If answer to all questions is NO. Substance is persistent       Yes       >485days       HSDB         If answer to all questions is NO. Substance is not persistent       Yes       >485days       HSDB         If answer to all q	dly volatilised however
Persistence       No       SIDS (2009)       OECD 301C 0% degradation after 14days         Passes interent biodegradation test       If answer to ider question is YES, substance is not persistent       If answer to both questions is NO, additional data on hall life is required         Hall life marine water ≥ 60 days       Yes       0.5-1 year       SIDS (2009)       Very limited data was available on hall lives of 1,1,1-trichloroethan information found generally indicated slow degradation. It is rapid the insoln 2 to days         Hall life fresh or estuarine sediment ≥ 180 days       Yes       0.5-1 year       SIDS (2009)         Hall life fresh or estuarine sediment ≥ 120 days       Yes       >485days       HSDB         Hall life in soli ≥ 120 days       Yes, substance is not persistent       If answer to all questions is NO, substance is not persistent         If answer to all questions is NO, substance is not persistent       Yes       >485days       HSDB	dly volatilised however
Passes inherent biolegradation test       No       SIDS (2009)       OECD 301C 0% degradation after 14days         Passes inherent biolegradation test       If answer to either question is YES, substance is not persistent       If answer to both questions is NO, additional data on half life is required       Very limited data was available on half lives of 1,1,1-trichloroethan         Half life marine water ≥ 60 days       Yes       0.5-1 year       SIDS (2009)       Very limited data was available on half lives of 1,1,1-trichloroethan         Half life fresh or estuarine water ≥ 40 days       Yes       0.5-1 year       SIDS (2009)       Very limited data was available on half lives of 1,1,1-trichloroethan         Half life fresh or estuarine sediment ≥ 180 days       Yes       0.5-1 year       SIDS (2009)       Very limited data was available on half lives of 1,1,1-trichloroethane         Half life fresh or estuarine sediment ≥ 120 days       Yes       >485days       HSDB       Very limited data was available on half lives of 1,1,1-trichloroethane in water         Half life in soil = 120 days       Yes       >485days       HSDB       Very limited data was available on half lives of 1,1,1-trichloroethane in water         Half life in soil = 120 days       Yes       >485days       HSDB       Very limited data was available on half lives of 1,1,1-trichloroethane in water         If answer to all questions is NO. substance is not persistent       If answer to all questions is NO. substance is not persiste	dly volatilised however
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life fresh or estuarine water ≥ 40 days Half life fresh or estuarine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life fresh or estuarine sediment ≥ 120 days Half life fresh or estuarine sediment ≥ 120 days Half life fresh or estuarine sediment ≥ 120 days Half life fresh or estuarine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life fresh oreester days Half life fresh oreester days Half l	dly volatilised however
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life fresh or estu	dly volatilised however
Half life fresh or estuarine water ≥ 40 days       Yes       0.5-1 year       SIDS (2009)       Very limited data was available on half lives of 1,1,1+trichloroethane. It is rapic information found generally indicated slow degradation. It is rapic this isn't considered relevant for groundwater. The SIDS review in the SIDS review in the SID state of the single considered relevant for groundwater. The SIDS review in the SID state of 1,1,1-trichloroethane in water         Half life fresh or estuarine sediment ≥ 120 days       Yes       >485davs       HSDB         Half life fresh or estuarine sediment ≥ 120 days       Yes       >485davs       HSDB         Half life fresh or any question is YES, substance is not persistent       Yes       >485davs       HSDB	dly volatilised however
Half life marine sediment ≥ 180 days Half life marine sediment ≥ 180 days Half life in soit ≥ 120 days Half life in soit ≥ 120 days If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent If answer to all questions is NO, substance is not persistent	
Half life in soil ≥ 120 days Yes >485days HSDB If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent	
If answer to all questions is NO, substance is not persistent	
Is sufficient data available? (if not assume substance is persistent) Yes	
Limited data was available on half lives for 1.1.1-trichloroethane h	ut overall the available
Is substance persistent? Yes data indicated slow degradation	
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 No 9 SIDS (2009) BCF value reported for fish of 9	
Does field data show evidence for biomagnification? No data If answer to either guestion is YES, substance is bioaccumulative	
If no BCF data, is log Kow ≥ 4.5? No 2.47 SIDS (2009) This is a measured value	
If answer is YES, substance is bioaccumulative	
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Not assessed due to the above information Substance is chronically non-toxic in mammals Molecular size 2 4.3nm	
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l	
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained	
Is sufficient data available? (if not assume substance bioaccumulates) Yes Is substance bioaccumulative? No	
Toxicity	
Is the lowest chronic NOEC for freshwater or marine organisms \$ 0.01mg/l No 0.213 SIDS (2009), NICNAS (2016) NICNAS (2016) NICNAS (2016) A 3d EC10 for the alga Chlamydomonas rehardful of 0.213mg/l. magna showed a 17d NOEC of 1.3mg/l and for fish a 14d NOEC carbio	C of 7.7mg/l for Cyprinus
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) No ECHA C&L classification for 1,1,1-trichloroethane indicates criteria	
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2) No ECHA C&L database criteria	it does not meet the
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	
Is sufficient data available? (if not assume substance is toxic) Yes Is substance toxic? No	
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? No Does not meet criteria for B or T	
Does substance pose an equivalent level of concern?	
Very persistent and very bioaccumulative?	
Half life in marine, fresh or estuarine water ≥ 60 days       Yes       0.5-1 year       SIDS (2009)       Very limited data was available on half lives of 1,1,1-trichloroethar information found generally indicated slow degradation. It is rapic this isn't considered relevant for groundwater. The SIDS review r 1 vear for 1,1,1-trichloroethare in water	dly volatilised however
Half life in marine, fresh or estuarine sediment ≥ 180 days	
Half life in soil ≥ 180 days Yes >485days HSDB Limited data was available on half lives for 1,1,1-trichloroethane If answer to any question is YES, substance is very persistent	
Is bioconcentration factor ≥ 5000 No 9 SIDS (2009) BCF value reported for fish of 9	
It answer is yes, substance is very bioaccumulative	
Is substance very persistent and very bioaccumulative? No Does not meet criteria for B	
Does substance pose a specific risk to groundwater?           Does groundwater monitoring data show half life in groundwater ≥ 1 year         Not assessed           Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?         Not assessed	
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ? Not assessed If answer to any question is YES, substance is persistent in groundwater Use between the substance is the	
Is substance persistent in groundwater? Not assessed If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Not assessed	
	it does not meet the
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on TOLIA OSL database. Harmonised C&L classification for 1,1,1-trichloroethane indicates	
Is substance very toxic?	
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health <i>If answer to any question is YES, substance is very toxic and hazardous</i> Is sufficient data available? (if not assume substance is very toxic) Yes	
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is very toxic) Is sufficient data available? (If not assume substance is ver	
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis No Does not meet criteria for P, B and T nor vPvB or Very Toxic	2
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis Does substance have breakdown products of concern? No No No ECHA C&L database Harmonised C&L classification for 1,1,1-trichloroethane indicates orteria Harmonised C&L classification for 1,1,1-trichloroethane indicates Harmonised C&L classification for 1,1,1-trichlor	2
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis No Dees not meet criteria for P, B and T nor vPvB or Very Toxic	2

	1,1,2-trichloroethane (CAS: 7				
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments	
Is substance persistent, bioaccumulative and toxic?					
Persistence Passes ready biodegradation test	No		SIDS (2000)	Based on results from an OECD 301C study which showed 5%	
Passes inherent biodegradation test				degradation after 28days)	
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required					
Half life marine water ≥ 60 days					
Half life fresh or estuarine water ≥ 40 days	Yes	85days	SIDS (2000)	1,1,2-trichloroethane is very volatile however this is not a relevant route of removal in groundwater. It is noted to be stable in water at pHs of 4 and 7 with a half life of 85 days reported at pH 9. A half life of 16years was noted in an anaerobic aquifer (HSDB)	
Half life marine sediment ≥ 180 davs Half life fresh or estuarine sediment ≥ 120 davs					
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes	6months to 1year	HSDB	Half life data in aerobic soils was noted as 6months to 1 year.	
If answer to all questions is NO, substance is not persistent					
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes Yes				
	Tes				
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	0.7-4	SIDS (2000)	BCF values reported for fish	
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No data				
If no BCF data, is log Kow ≥ 4.5?	No	2.05	SIDS (2000)	Measured value	
If answer is YES, substance is bioaccumulative					
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility 3 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)	Not assessed due to above data				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained					
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No				
Toxicity					
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	No	3	SIDS (2000)	Lowest chronic data was for the fish Pleuronectes platessa 56d NOEC 3mg/l	
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	No No		ECHA C&L database ECHA C&L database	Harmonised C&L classification ntoes it is classified as Carc 2 and	
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	NO			therefore does not meet the crtieria	
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes No				
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B or T	
Does substance pose an equivalent level of concern?					
Very persistent and very bioaccumulative?					
Half life in marine, fresh or estuarine water ≥ 60 days	Yes	85days	SIDS (2000)	1,1,2-trichloroethane is very volatile however this is not a relevant route of removal in groundwater. It is noted to be stable in water at pHs of 4 and 7 with a half life of 85days reported at pH 9. A half life of 16years was noted in an anaerobic aquifer (HSDB)	
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	Yes	6months to 1year	HSDB	Half life data in aerobic soils was noted as 6months to 1 year.	
Is bioconcentration factor ≥ 5000	No	0.7-4	SIDS (2000)	BCF values reported for fish	
If answer is yes, substance is very bioaccumulative			()		
Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for B	
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed				
Do $\geq$ 5% of groundwater monitoring data show han the in groundwater $\geq$ 1 year Do $\geq$ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed				
The LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected above the LOQ?	Not assessed				
If answer to any question is YES, substance is persistent in groundwater					
Is substance persistent in groundwater?					
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed				
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification indicates it does not meet the criteria.	
Is sufficient data available? (if not assume substance is very toxic)	Yes				
Is substance very toxic?	No				
Is substance hazardous to groundwater?	No			Does not meet the criteria for P, B and T nor vPvB or Very Toxic	
is substance nazaruous, ii so, state Uli Wildt Udsis	NU			Doug not meet the oriteria for F, D difu I flor VFVD of Very TOXIC	
Does substance have breakdown products of concern?	No				
REFERENCES ECHA C&L database SIDS (2000) Assessment review of 1,1,2-trichloroethane	http://www.inchem.org/	/documents/sids/sids	/79005.pdf	base/-/discli/details/127060	
HSDB	https://toxnet.nlm.nih.go	ov/cgi-bin/sis/search	2/1?./temp/~BkMEz6:1		

				Acrylamide (CAS: 79-06-1)	
	Yes / No / Insufficient data / Borderline / assume yes or no?	Value	Reference	Comments	
Is substance persistent, bioaccumulative and toxic?					
Persistence				The ESR noted that acrylamide is readily biodegradable when concentrations of 1mg/l and 2mg/l were	
Passes ready biodegradation test	Yes		EU RAR(2002) /NICNAS (2002)	tested with 100% degradation observed after 28days. At a concentration of 5mg/l a reduced degradation was observed with 53% degradation after 28days. The question whether this reduction was due to effects on micro-organisms was raised.	
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required					
Half life marine water ≥ 60 days	No	10.4days	EU RAR (2002)	Complete primary degradation noted after 10.4days. A lag phase of approx 7 days was reported.	
Half life fresh or estuarine water ≥ 40 days	No	4.2 - 5.2days	EU RAR (2002)	The degradation rates given relate to complete primary degradation. For degradation of acrylamide there is reported to be a lag phase with degradation rates being reported to be quicker when micro- organisms are acclimated. A study reported by the US EPA noted complete degradation of 10-20pm acrylamide in river water occurred in about 12 days with non acclimated micro-organisms, when the	
Half life marine sediment ≥ 180 daγs Half life fresh or estuarine sediment ≥ 120 daγs				micro-organisms were acclimated, degradation was complete in 2 days (US EPA 1994)	
Half life in soil ≥ 120 days	No	30 days	EU RAR (2002)	EU RAR - estimated haif life in soil 30 days. A study noted by the US EPA showed biodegradation is the major route of removal of acrylamide from soils. In aerobic soils the chemical is 74-94% degraded in 14days while in waterlogged anaerobic soil 64-89% is degraded in 14 days, depending on the soil type. Estimated half lives range from 21 to 350hs; (US EPA 1994)	
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent					
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes No				
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	<1	EU RAR (2002)	EU RAR reports that BCF values for aquatic organisms were all <1.	
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	NU		EU NAR (2002)		
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	No	-1	EU RAR (2002)	This value was used as the Log Kow in the EU risk assessment. The RAR reported log Kow values in the range of -0.67 to -1.65 $$	
Does the weight of evidence from the following criteria indicate bioaccumulation	Not considered due to				
unlikely? Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol	above data				
Octanol solubility < 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)					
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained					
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No				
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	2mg/l	EU RAR (2002)	28d NOEC for the invertebrate Mysidopsis bahia	
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes Yes	STOT RE1 Carc 1B, Muta 1B,		Harmonised C&L classification for acrylamide indicates it meets the criteria Harmonised C&L classification for acrylamide indicates it meets the criteria	
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic	res	Repr 2	ECHA CAL Galabase	namonised Coll classification for activitation indicates it meets the citiena	
If answer to all questions is NO, substance is not toxic Is sufficient data available? (if not assume substance is toxic)	Yes				
Is substance toxic?	Yes				
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Meets T criteria but not B or P	
Does substance pose an equivalent level of concern?					
Very persistent and very bioaccumulative? Half life in marine. fresh or estuarine water ≥ 60 davs	No	4.2 - 5.2 davs	EU RAR (2002)	See information in the persistence section above	
Half life in marine, fresh or estuarine sediment ≥ 160 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	No	4.2 - 5.2 days	EU RAR (2002)	See information in the persistence section above	
If answer to any question is YES, substance is very persistent		00 0010	20101((2002)		
Is bioconcentration factor ≥ 5000 If answer is ves, substance is very bioaccumulative	No	<1	EU RAR (2002)	See information in the bioaccumulation section above	
Is substance very persistent and very bioaccumulative?	No			Meets neither vP or vB criteria	
Does substance pose a specific risk to groundwater?					
Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than the	Not assessed Not assessed				
LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected	Not assessed				
above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed				
If substance is persistent in groundwater, bioaccumulative AND toxic,					
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed				
Is substance very toxic?					
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	Yes	Muta 1B	ECHA C&L database /WHO 2011/COM	that exposure should be reduced to as low a level as technically achievable. The Committee on Mutagenicity (COM) have considered acrylamide and note that it is mutagenic and that a threshold can	
If answer to any question is YES, substance is very toxic and hazardous				not be determined	
Is sufficient data available? (if not assume substance is very toxic)	Yes				
Is substance very toxic?	Yes			Meets the criteria for Very Toxic due to being mutagenic. COM note that it is not possible to determine a threshold for this substance and WHO note that exposure should be reduced to as low as technically feasible.	
Is substance hazardous to groundwater?					
Is substance hazardous, if so, state on what basis	Yes			Determination as Hazardous based on 'Very Toxic' as Muta 1B. WHO and COM have noted it is not possible to determine a threshold for mutagenicity	
Does substance have breakdown products of concern?	No				
REFERENCES					
EU RAR Acrylamide (2002)	http://echa.europa.eu/o				
ECHA C&L database US EPA (1994) NICNAS (2002)	http://www.epa.gov/che	emfact/s_acryla.txt		base/-/discli/details/104230	
NICNAS (2002) COM - Statement on acrylamide (Committee on Mutagenicity COM/07/S2) WHO (2011)	http://www.nicnas.gov.a https://cot.food.gov.uk/			23 Acrylamide Full Report PDF.pdf	

WHO (2011)
 Http://www.who.int/water\_sanitation\_health/dwg/chemicals/acry/amide.pdf

				Anionic Polyacrylamide (CAS: 9003-05-8)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic? Persistence				
Passes ready biodegradation test	No		Magnafloc 156 data sheet	
Passes inherent biodegradation test	No data		sneet	
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	No Data			
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	No Data No Data		Sojka et al (2007)	Strong affinity for sediments and soils
Half life fresh or estuarine sediment ≥ 120 days	No Data	10% degradation	Calles at al (2007)	
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Assume Yes	in 1 year	Sojka et al (2007)	
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	No			
Is substance persistent?	Yes			Assumed yes based on degradation rate quoted and the fact it is noted to not be readily biodegradable
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification?	No data No data			
If answer to either question is YES, substance is bioaccumulative	No data			
If no BCF data, is log Kow ≥ 4.5?	No data			
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?				
Substance is chronically non-toxic in mammals	Yes		ANON (2005)	Polyacrylamide itself is not significantly toxic. The size of the molecule would prevent passage across biological membranes.
Molecular size ≥ 4.3nm	Yes		Weston (2009)	References Stephens, S.H. 1991. Final report on the safety assessment of polyacrylamide. J. Am. Coll. Toxicol. 10:193–202
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l	Yes No data		Sojka et al (2007)	Large molecular weight anionic PAMs.
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			Weight of evidence indicates it does not meet the cirtiera for B
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	0.25mg/l	Weston et al (2009)	Ceriodaphnia dubia 7 day test LC50 0.25mg/l. This was based on an oil based product and oher non-oil
Is the substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No	0.25mg/	ECHA-C&L database	an IC50 of >100mq/l No EU harmonised classification available. Limited industry notifications on the C&L database with none
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	No			indicating it meets these criteria
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	NO		ECHA-C&L database	indicating it meets these criteria
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Assumed P but not T or B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days	No data			
Half life in marine, fresh or estuarine sediment ≥ 180 days	No data	100/ dependation		
Half life in soil ≥ 180 days	Assume Yes	10% degradation in 1 year	Sojka et al (2007)	
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000 If answer is ves, substance is very bioaccumulative	No			No BCF data but see weight of evidence above
Is substance very persistent and very bioaccumulative?	No			Assumed P but not B due to weight of evidence
Does substance pose a specific risk to groundwater?				
Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the	Not Assessed			
LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected	Not Assessed			
above the LOQ? If answer to any question is YES, substance is persistent in groundwater	Not Assessed			
Is substance persistent in groundwater?	Not Assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic,				
substance is hazardous Does substance pose a specific risk to groundwater?	Not Assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA-C&L database	No EU harmonised classification available. Limited industry notifications on the C&L database with none indicating it meets these criteria.
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic)	Yes			Although an EU C&L classification is not available the weight of evidence indicates it is unlikely to meet
Is substance very toxic?	No			these criteria. Anionic polyacrylamide products can be used in drinking water treatment and also in a number of products in contact with food, eq packaging.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No (see comment)			NB. Anionic polyacrylamide has been assessed as not Hazardous based on the available information. Acrylamide is often present as an impurity in anionic polyacrylamide however the amount present is tightly controlled with residual acrylamide in polyacrylamide products generally <0.1% and in those used for potable water treatment <0.05%. There are differing opinions on whether acrylamide can be formed from the degradation of polyacrylamide however the EU risk assessment on acrylamide concluded that this is unlikely to occur. Therefore presence of acrylamide is linked to its presence as an impurity rather than a breakdown product. Acrylamide has veen determined to be Hazardous
				nas voon voton fillieu tu pe nazaluuus

There are differing opinions on whether acrylamide can be formed from the degradation of polyacrylamide. However the EU risk assessment on acrylamide concluded that this is unlikely to occur as it would be an energetically unfavourable reaction. However acrylamide may be present in polyacrylamide as an impurity although residual acrylamide in polyacrylamide products is controlled.

Does substance have breakdown products of concern?

REFERENCES EU RISK ASSESSMENT(2002)- ACRYLAMIDE ECHA-C&L database ANON (2005) Weston et al (2009) Sojka et al (2007) Magnafloc 156 product data sheet

http://echa.europa.eu/documents/10162/50218bf9-ba0f-4254-a0d9-d577a5504ca7 http://echa.europa.eu/information-on-chemicals/ci-inventory-database/-/ci-inventory/view-notification-summary/58579 http://www.ncbi.min.nip.org/ubimed/161569114 http://prints.mvisrl.ars.usda.gov/1307/11/284.pdf http://natic.nai.usda.gov/1307/11/284.pdf http://natic.nai.usda.gov/1307/11/284.pdf

		hracene (CAS: 120-12-7)		
	Yes / No / Insufficent data / Borderline / assume	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	yes or no?			
Persistence				
Passes ready biodegradation test	No		EU SVHC report (2008)	MITI study showed 1.9% degradation which indicates not readily biodegraded
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent				
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	Yes		EU SVHC report	No specific half life values were provided but it was stated that available studies showed slow to very slow degradation. It noted that once released to the water
Half life fresh or estuarine water ≥ 40 days	Yes		(2008)	environment it would adsorb to sediment
Half life marine sediment ≥ 180 days		242.4	EU SVHC report	Study reported indicating half life in aerobic sediments of 210days but that it is
Half life fresh or estuarine sediment ≥ 120 days	Yes	210 days	(2008) EU SVHC report	recalcitrant in anaerobic sediments
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes	7.9 years	(2008)	
If answer to any question is FES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes Yes			
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	900-6760	EU SVHC report (2008)	Experimentally determined BCF values for fish
Does field data show evidence for biomagnification?	No data		(2000)	
If answer to either question is YES, substance is bioaccumulative			ELLOW/20 Server	
If no BCF data, is log Kow ≥ 4.5?	Yes	4.68	EU SVHC report (2008)	
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to above information			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			
Toxicity			EU SVHC report	Chronic NOEC for the bluegill sunfish. Chronic effect concentrations reported in similar
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	Yes	0.0012mg/l	(2008)	concentrations for some invertebrates
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	It is not classified as STOT RET OF RE2.
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	A formal C&L classification has not been made. Industry proposals submitted suggest it is not classified as CMR. This is supported by data on the EU ESR risk assessment which indicates that the available data indicates is not considered to meet these criteria.
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Based on chronic aquatic toxicity data
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Anthracene has been agreed at EU level as a PBT substance and as a result has been determined as a Substance of Very High Concern (SVHC) under REACH
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?	Var		EU SVHC report	No specific half life values were provided but it was stated that available studies
Half life in marine, fresh or estuarine water ≥ 60 days	Yes		(2008)	showed slow to very slow degradation. It noted that once released to the water environment it would adsorb to sediment Churdware the indicate part life is careful and in the first of 240 days but that it is
Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	210 days	EU SVHC report (2008)	Study reported indicating half life in aerobic sedimetns fo 210days but that it is recalcitrant in anaerobic sediments
Half life in soil ≥ 180 days	Yes	7.9 years	EU SVHC report (2008)	
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	Yes	900-6760	EU SVHC report (2008)	BCF values for fish considered to be reliable
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	Yes			The data indicates it meets both vP and vB criteria however the SVHC report does not note it as vPvB, and only mentions vP.
Does substance pose a specific risk to groundwater?				
Does substance pose a specific risk to groundwater $\gamma$ Does groundwater monitoring data show half life in groundwater $\geq$ 1 year Do $\geq$ 5% of groundwater samples show levels of the substance greater than the	Not assessed			
LOQ?	NOT assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic,				
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for	No		ECHA C&L database	A formal C&L classification has not been made. Industry proposals submitted suggest it is not classified mutagenic. This is supported by information in the EU ESR risk
adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous				assessment which indicates that it is not thought to be mutagenic.
Is sufficient data available? (if not assume substance is very toxic)				
Is substance very toxic?	No			Although a formal C&L classification has not been made the industry proposals indicate it has not been classified as mutagenic
Is substance hazardous to groundwater?				·····
Is substance hazardous, if so, state on what basis	Yes			Anthracene has been designated as a PBT substance at EU level and has been classified as a Substance of Very High Concern under REACH
Does substance have breakdown products of concern?	No			
REFERENCES				
EU Risk Assessment on Anthracene (2008)	nts/10162/08a49c89-91	71-4cb2-8366-10	8601ac565c	
SVHC (2008) ECHA C&L database	https://echa.europa.eu/o https://echa.europa.eu/ii	candidate-list-table	e/-/dislist/details/0b02366 emicals/cl-inventory-data	base/-/discli/details/101102
ECB (2008)	https://echa.europa.eu/c	tocuments/10162	/4253c935-2286-42a4-a	0a8-06302443dbce

	aqueous characteristics. S to form the anion Sb(OH)6 0.012 mM or 1.44 mg Sb/	lity is low, suggesting Sb(III) is potentially or S Johnson et al. (20 L at 2 mM calcium. 1	dissociation/release idised to Sb(V) dep (05) presented a sol his corresponds to	II) cations, covering Antimony (CAS 7440-36-0) & Diantimony trioxide (CAS 1309-64-4) of Sb ions may be slow. Antimony metal will release ions at particles' surface, again release rate dictated by ending on conditions: "Upon dissolution in xxic systems, Sb(III) isreadily oxidized to Sb(V), which easily hydrolyses bublity product constant (Kas p [Ca2+]B(Sb(H)B)[2) of 10-1255, which endicts an anximal antimony concentration of an antimony trioxide concentration of 1.73 mg/L. Since reconstituted standard water is more relevant for natural ing assessment of ecological risks." at low pH Sb(III) is the dominant dissolved form, while at high pH Sb(V) dominates.
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	Test not applicable for			
	metal/inorganic Test not applicable for			
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent	metal/inorganic			
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days	Degradation testing not applicable for metal/inorganic See above			
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days	See above See above			
Half life in soil ≥ 120 days Other relevant information (e.g. dissolution/transformation for	See above			
metals/inrganics) If answer to any guestion is YES, substance is persistent	Yes	360 days	EU RAR(2008)	Data quoted based on Sb <sub>2</sub> O <sub>3</sub> transforming to a more soluble form of Sb after an incubation test involving sandy/loam soils.
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			Persistence criteria were developed for organics. Metals and inorganics such as antimony are inherently persistent and are subject to transformation rather than degradation.
Bioaccumulation				
Bioconcentration factor (BCF) for a quatic species (wet weight) $\geq$ 2000	No	<2000	EU RAR (2008); Environment Canada (2010)	Data for freshwater species indicates a low potential for bioaccumulation that is regulated in many tested organisms. No study was fully relative, and many DECFs were derived from field measurements which introduces many uncertainties. The EU RAR used BCFs of both 40 (freshwater) and 15000 (marine) for modelling secondary poisoning however this is not relevant when assessing B against PBT criteria. Based on a weight of evidence, bioaccumulation of Sb is considered to be below the B criterion.
Does field data (BAF, BMF, TMF) show evidence for bioaccumulation? If answer to either guestion is YES, substance is bioaccumulative	No	-	EU RAR(2008)	Biomagnification is considered unlikely to occur as low antimony levels were found in higher animals.
	Not applicable for			Log Kow are not considered reliable estimates of the potential for bioaccumulation of inorganic substances such as
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	metals			antimony.
	Not assessed due to the			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	availability of the above information			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/I	mornauon			
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			Weight of evidence used as no one study considered reliable
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01 \text{mg/l}$	No	1.13 mg/L	EU RAR(2008); Environment Canada (2010) ECHA C&I	Chronic data for algae, invertebrates and fish were within an order of magnitude. The lowest NOEC (1.13 mg Sb/l) for fish (Pimephales promelas).
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic			database ECHA C&L	Harmonised C&L classification for diantimony trioxide indicates does not meet the criteria
for reproduction (Repr 1A, 1B, 2)	No	Carc. 2	database	Harmonised C&L classification for diantimony trioxide indicates does not meet the criteria
If answer to anv auestion is YES. substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No	P, not B, Not T		It is noted that the WHO report outlining the drinking water guideline notes that Antimony (III) may show genotoxic effects in vivo and in vitro but limited details are given. This may need consideration in the future.
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	Degradation testing not applicable for			
	metal/inorganic			
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	See above See above			Persistence criteria were developed for organics. Metals and inorganics such as antimony are inherently
If answer to any question is YES, substance is very persistent				persistent and are subject to transformation rather than degradation.
Is bioconcentration factor ≥ 5000	No	<2000	EU RAR (2008)	Data for freshwater species indicates a low potential for bioaccumulation that is regulated in many tested organisms. No study was fully reliable, and many BCFs were derived from field measurements which introduces many uncertainties. The EU RAR used BCFs of both 04 (Dreshwater) and 15000 (marrier) for modelling secondary poisoning hower this is not relevant when assessing 8 against PBT criteria. Based on a weight of evidence, bioaccumulation of Sb is considered to be below the B criterion.
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			Inherently persistent, not B. Bioaccumulation assessment based on weight of evidence
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
	1101 00505500			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous	Not op-			
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to anv question is YES. substance is very toxic and hazardous	No		ECHA C&L database	Harmonised classification for diantimony trioxide indicates does not meet the criteria
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No		WHO (2003)	The WHO report outlining the drinking water guideline for antimony notes that Antimony (III) may show genotoxic effects in vivo and in vitro but limited detail is provided. This may need consideration in the future.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Not categorised as equivalent to PBT or vPvB, no other toxicological effects leading to equivalent concern according to the criteria. Sb(III) and Sb(V) salts have similar hazard profile (viz classification of trichioride and peniachioride salts). As noted above the WHO have noted that Antimory (III) may show genotoxic effects in vivo and in witro but limited details are given. This may need consideration in the future.

 REFERENCES
 http://echa.auropa.au/documents/10162/553c71a9-565c-488b-966e-adc3af5cdf5f

 EU Risk Assessment Report (2008)- Draft - Diantimony trioxide. Sweden
 http://echa.auropa.au/information-on-chemicalarch-Inventory-database?p.p. id=cliniventory.WAR\_cli

	Arsenic as inorg	anic arsenic (III) ar	nd arsenic (V). The (III) a	and (V) valence states are reported to be the most common forms of arsenic in the environment
	Yes / No / Insufficent data /			
	Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	ussume yes of no.			
Persistence Passes ready biodegredation test	Test not applicable for me	tale/inorganice		
Passes reacy biologication rest If answer to either question is YES, substance is not persistent	Test not applicable for me			
If answer to both question is 123, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days	Degradation testing not ap See above	oplicable for metals/ii	norganics	
Half life marine sediment ≥ 180 days	See above See above			
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	See above			
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes			The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent
				and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be transformed depending on the local conditions.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	4 - 1120	Environment Agency (2007)	
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative				
	Log Kow values are			Log Kow values are not considered reliable estimates of the bioaccumulation potential of inorganic substances
If no BCF data, is log Kow ≥ 4.5?	not applicable to metals			such as arsenic.
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not considered due to above data			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	No			
Toxicity			Environment Agency	
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.005mg/l	(2007)	26d NOEC for Daphnia pulex A formally agreed C&L classification has been undertaken for arsenic and some arsenic compounds, ie
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	A romany agreed out classification has been indextrated in outper of industry classifications have been undertaken. The classifications do not indicate it meets the criteria for STOT RE1 or RE2
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes	Carc 1A	ECHA C&L database	A formally agreed C&L classification has been undertaken for arsenic and some arsenic compounds, ie
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic	163	Gale IA		The classifications for some inorganic arsenic compounds indicates it is classified as Carc 1A
If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
				Record on obvious to visity to accustic life and Care 14
Is substance toxic?	Yes			Based on chronic toxicity to aquatic life and Carc 1A
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?				Based on chronic toxicity to aquatic life and Carc 1A Does not meet criteria for B
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern?	Yes			
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in maine, fresh or estuarine water 2 60 days	Yes No Degradation testing not ar	oplicable for metals/ii	norganics	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in marine, 180 days	Yes No	pplicable for metals/ii	norganics	Does not meet criteria for B
Is substance toxic?  IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative? Half life in marine. fresh or estuarine water 2 60 days Half life in marine. fresh or estuarine sediment 2 180 days	Yes No Degradation testing not ap See above			Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in osi ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000	Yes No Degradation testing not ap See above	oplicable for metals/ii 4 - 1120	Environment Agency (2007)	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in osi ≥ 180 days l'answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 l'answer is yes, substance is very bioaccumulative	Yes No Degradation testing not ap See above See above No		Environment Agency	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be
Is substance toxic?  IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≿ 00 davs Half life in marine, fresh or estuarine water ≿ 00 davs Half life in and ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≿ 5000 If answer is ves, substance is very bioaccumulative Is substance very persistent and very bioaccumulative?	Yes No Degradation testing not ar See above See above		Environment Agency	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent
Is substance toxic?  IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≿ 00 davs Half life in marine, fresh or estuarine water ≥ 00 davs Half life in and ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is ves, substance is very bioaccumulative? Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Yes No Degradation testing not ap See above See above No		Environment Agency	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be
Is substance toxic?  IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≿ 00 davs Half life in marine, fresh or estuarine water ≿ 00 davs Half life in and ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≿ 5000 If answer is ves, substance is very bioaccumulative? Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life ingroundwater ≥ 1 year Do ≿ 5% of groundwater ≥ amples show levels of the substance greater than the LOQ?	Yes No Degradation testing not at See above See above No No No No Not assessed Not assessed		Environment Agency	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be
Is substance toxic?  IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 davs Half life in marine, fresh or estuarine water ≥ 60 davs Half life in and ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is ves, substance is very bioaccumulative? Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Doe Sf% of groundwater samples show levels of the substance greater than the LOQ?	Yes No Degradation testing not at See above See above No No No No Not assessed Not assessed		Environment Agency	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be
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Is substance toxic? IS SUBSTANCE PERSISTENT. BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater ≥ 1 year Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance pose a specific risk to groundwater? If substance is persistent in groundwater? Is substance pose a specific risk to groundwater? Is substance is persistent in groundwater? Is substance pose a specific risk to groundwater? Is substance water to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis	Yes No Degradation testing not ag See above No No No No No No No See above Not assessed Not assessed Not assessed Not assessed Yes (see comment) Yes Yes Yes		Environment Agency (2007)	Does not meet criteria for B         The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be         Does not meet criteria for v8         A formally agreed harmonised EU C&L classification has been undertaken arsenic and some arsenic compounds, le arsenic trixide and arsenic pentoxide. In addition a number of industry classifications have been undertaken arsenic and some arsenic compounds have been designated as a Car 1 carcinogen by LRC. The UK COT (2006) concluded that inorganic arsenic is genotixic and a known carcinogen. No threshold has been indictified for cancer and current UK health advice is therefore that exposure should be as low as reasonably practicable (ALRP).         Does not meet criteria for mutagenic however it has been noted to be genotoxic and that a threshold can and to be indictified for cancer and current UK health advice is therefore that exposure should be as town as reasonably practicable (ALRP).
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 00 days Half life in marine, fresh or estuarine water ≥ 00 days Half life in answer, fresh or estuarine water ≥ 00 days Half life in answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is austance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater ≥ 1 year Doe ≥ 6% of groundwater samples show levels of the substance greater than the LOQ? If answer to any question is YES, substance is persistent in groundwater ≥ 1 year Doe ≥ 10% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater ≥ 1 Is substance pose a specific risk to groundwater ≥ 1 year Doe ≥ 10% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance pose a specific risk to groundwater? It substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance wery toxic? Is substance wery toxic? Is substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance have breakdown products of concern? REFERENCES	Yes No Degradation testing not ag See above No No No No No Not assessed Not assessed Not assessed Not assessed Not assessed Ves (see comment) Yes Yes Yes No	4 - 1120	Environment Agency (2007) ECHA C&L database/COT (2006)	Does not meet criteria for B         The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be         Does not meet criteria for v8         A formally agreed harmonised EU C&L classification has been undertaken arsenic and some arsenic compounds, le arsenic trixide and arsenic pentoxide. In addition a number of industry classifications have been undertaken arsenic and some arsenic compounds have been designated as a Car 1 carcinogen by LRC. The UK COT (2006) concluded that inorganic arsenic is genotixic and a known carcinogen. No threshold has been indictified for cancer and current UK health advice is therefore that exposure should be as low as reasonably practicable (ALRP).         Does not meet criteria for mutagenic however it has been noted to be genotoxic and that a threshold can and to be indictified for cancer and current UK health advice is therefore that exposure should be as town as reasonably practicable (ALRP).
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in answer, fresh or estuarine water ≥ 60 days Half life in answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is aubstance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater ≥ 1 year Doe St% of groundwater samples show levels of the substance greater than the LOQ? Doe signature monitoring data show half life in groundwater ≥ 1 year Doe St% of groundwater samples show levels of the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater ≥ 1 year Doe St% of groundwater samples show levels of the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance pose a specific risk to groundwater? If substance pose a specific risk to groundwater? Is substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance have breakdown products of concern? REFERENCES Committe on Toxicky of Chemicals in food (2006) Commite on Toxicky of Chemicals in Food (2006) Commite on Toxicky of Chemicals in Food (2006)	Yes No Degradation testing not at See above No See above No	4 - 1120	Environment Agency (2007) ECHA C&L database/COT (2006)	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be Does not meet criteria for vB A formally agreed harmonised EU C&L classification has been undertaken arsenic and some arsenic compounds, le arsenic trixide and arsenic pentoxide. In addition a number of industry classifications have been undertaken. The classifications do not industry classifications have been undertaken arsenic trixide and arsenic pentoxide. In addition a number of industry classifications have been undertaken a drawn carcinogen by LRC. The UK COT (2006) concluded that ingragin carsenic is genoticic and a known carcinogen. No threshold has been indicided for cancer and current UK health advice is therefore that exposure should be as low as reasonably practicable. As a result it meets the criterion relating to a non-threshold chemical
Is substance toxic?  IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine water ≥ 60 days Half life in osil ≥ 180 days If answer to any question is VES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is ves, substance is very bioaccumulative Is substance pose a specific risk to groundwater ? Does goundwater monitoring data show half life in groundwater ≥ 1 year Does 5% of groundwater samples show levels of the substance is detected above the LOQ? If answer to any question is VES, substance is persistent in groundwater ? If substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance very toxic? Is substance hazardous to groundwater? Is substance very toxic? Is substance very toxic? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Committee on Toxichy of Chemicals in food (2006)	Yes No Degradation testing not ag See above No No No No No No No No Not assessed	4 - 1120	Environment Agency (2007)	Does not meet criteria for B The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as arsenic are inherently persistent and subject to transformation rather than degradation. Arsenic will therefore not degrade but will be Does not meet criteria for vB A formally agreed harmonised EU C&L classification has been undertaken arsenic and some arsenic compounds, le arsenic trixide and arsenic pentoxide. In addition a number of industry classifications have been undertaken. The classifications do not industry classifications have been undertaken arsenic trixide and arsenic pentoxide. In addition a number of industry classifications have been undertaken a drawn carcinogen by LRC. The UK COT (2006) concluded that ingragin carsenic is genoticic and a known carcinogen. No threshold has been indicided for cancer and current UK health advice is therefore that exposure should be as low as reasonably practicable. As a result it meets the criterion relating to a non-threshold chemical
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				Benzene (CAS: 71-43-2)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic? Persistence				
Passes ready biodegradation test Passes inherent biodegradation test	Yes Yes	90% (6 days)	EU RAR (2008) EU RAR (2008)	Conflicting results in OECD 301 tests. 301 F several positive results. Overall, considered readily biodegradable. OECD 302 Zahn Wellers. Benzene is inherently biodegradable
If answer to either questions is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required	105	50 % (0 days)	EU NAR (2000)	OECD 302 Zahiri Wellehs, Berizere is iniferenting Doueunadable
Half life marine water ≥ 60 days	No data			RAR noted that the available degradation data was very variable with some studies
Half life fresh or estuarine water ≥ 40 days	No	15	EU RAR (2008)	reporting no degradation and others complete mineralisation. The value of 15days was used in the risk assessment and was estimated based on ready biodegradability result. Benzene is noted to volatilise from water and is noted to be a key removal process from surface water. This fate process is not as relevant for groundwater however.
Half life marine sediment ≥ 180 davs Half life fresh or estuarine sediment ≥ 120 davs Half life in soil ≥ 120 days	No data Yes No	300 30		Estimated value Estimated value
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes No		EU RAR (2008)	Benzene is readily biodegradable; long half-lves in sediment are likely due to bioavailability
Bioaccumulation	NO		EU KAR (2008)	issues and low inoculum concentrations/diversity
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	13	EU RAR (2008)	The value of 13 was that selected for use in the EU risk assessment but all fish studies showed BCF <100 $$
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No data			
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	No	2.13	EU RAR (2008)	
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size 2 4.3nm	Not assessed due to the above information			
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/ If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	0.8 mg/L	EU RAR (2008)	Fish Early Life Stage study with Pirnephales promelas. Lower value in rainbow trout embryos available, but uncertain reliability
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE1	ECHA C&L database	EU harmonised C&L classification available for benzene which indicates it meets the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	Yes	Carc. 1A, Muta 1B	ECHA C&L database	EU harmonised C&L classification available for benzene which indicates it meets the criteria
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes	STOT RE1 , Carc. 1A, Muta 1B		Meets the criteria for toxicity based on STOT RE1, Carc 1A, Muta 1B classifications
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for P or B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	No Yes	15 300	EU RAR (2008)	See comments above See comments above
Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	No	30	EU RAR (2008)	See comments above
Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	No	13	EU RAR (2008)	The value of 13 was that selected for use in the EU risk assessment but all fish studies showed BCF <100 $$
Is substance very persistent and very bioaccumulative?	No			Not P or B
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 vear	Not Assessed			
vear Do $\geq$ 5% of groundwater samples show levels of the substance greater than the LOQ? Do $\geq$ 15% of sites have at least one sample where the substance is	Not Assessed			
detected above the LOQ? If answer to any question is YES, substance is persistent in	Not Assessed			
groundwater Is substance persistent in groundwater?	Not Assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not Assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B.2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	Yes	Muta 1B	ECHA C&L database	EU harmonised C&L classification available for benzene which indicates it meets the criteria for mutagenicity
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	Yes Yes	Muta 1B		
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			Meets criteria for Very Toxic due to its mutagenic properties
Does substance have breakdown products of concern?	No			

REFERENCES ECHA-C&L database EU RAR (2008). EU Risk assessment Report - Benzene

http://echa.europa.eu/information-on-chemicals/ci-inventory-database//ci-inventory/view-notification-summary/127390 http://echa.europa.eu/documents/10162/be2a96a7-40f6-40d7-81e5-b8c3f948efc2

				Polyaromatic Hydrocarbons (PAHs):
	Yes / No /		Be	enzo-a-pyrene (B(a)P) (CAS-No. 50-32-8)
	Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	yea or not			
Persistence		Net could.		
Passes ready biodegradation test	No	Not readily biodegradable	ECHA (2010)	OECD301C studies
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required	No data			
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	Yes			No specific degradation half life data was provided but generally noted to be slow degradation
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	Yes	120-258 days	ECHA (2009) &	
If answer to any question is YES, substance is persistent	165	120-236 uays	(2010)	
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes		ECHA (2009) &	An assessment of B(a)P for the EU notes that it is considered to meet the criteria for Persistence and Very
Is substance persistent?	Yes		(2010)	Persistent ( see below)
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	608 - 191000	ECHA (2009), ECHA (2010); Bleeker and Verbruggen ECHA 2009;REACH	Substance is generally rapidly metabolised in fish and most of the BCFs for fish were <2000, but may accumulate in some crustacea (BCF 191000 mollusc species; BCF 73000 crustacean species).
Does field data show evidence for biomagnification?	No			Biomagnification may occur in lower trophic levels, but biodilution in fish and some invertebrates able to metabolise the substance. Overall, not a bio or trophically magnifying substance.
If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	Yes	6.5	ECHA 2010	Value of 6.5 noted in ECHA (2010) with values of 5.97 - 6.13 noted in the CIS document
n answer is TES, substance is bioaccumulative	Net			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals	Not assessed due to the available BCF and log Kow data			
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes		ECHA (2009) &	An assessment of B(a)P for the EU notes that it is considered to meet the criteria for Bioaccumulation and
Is substance bioaccumulative?	Yes		(2010)	Very Bioaccumulative ( see below)
Toxicity				74 FC40 (second Consideration with standard Entrine conditions, 0.00070 and it stars FsC40
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.0005 mg/l	ECHA (2010)	7d EC10 (repro) Ceriodaphnia with standard lighting conditions; 0.00078 mg/l algae ErC10 (Pseudokirchneriella subcapitata) with UV light; Fish 6.3 ug/L (0.0063 mg/L)
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A, 1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic	No Yes	Carc 1B, Muta 1B. Repr 1B		EU harmonised classification available for B(a)P which indicates it does not meet the criteria EU harmonised classification available which indicates it does meet the criteria
If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes			Meets criteria for chronic aquatic toxicity and also noted as Carc 1B, Muta 1B and Repr 1B
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes		ECHA (2009) & (2010)	An assessment for the EU have noted that benzo(a)pyrene meets the criteria for PBT
Does substance pose an equivalent level of concern?			(=)	
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days				
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	Yes	See above		
If answer to any question is YES, substance is very persistent	163	Occ above		
Is bioconcentration factor ≥ 5000	Yes	See above		
If answer is yes, substance is very bioaccumulative			ECHA (2009) &	
Is substance very persistent and very bioaccumulative?	Yes		(2010)	An assessment for the EU have noted that benzo(a)pyrene meets the criteria for vPvB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater $\geq$ 1 year Do $\geq$ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected	Not assessed			
above the LOQ? If answer to any question is YES, substance is persistent in groundwater				
Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	Yes	Muta 1B	ECHA CLP database	EU harmonised C&L classification available which indicates meets the criteria for mutagenicity
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	Yes			Meets the criteria for mutagenicity
Is substance hazardous to groundwater?	Yes			Meets criteria for P, B and T. Also 'Very Toxic' as Muta 1B and meets criteria for vPvB Berror/altoware, has been noted at an EI Level to be BBT and vPvB (ECHA (2009) and (2010))
				Benzo(a)pyrene has been noted at an EU level to be PBT and vPvB (ECHA (2009) and (2010))
Does substance have breakdown products of concern?	No			
REFERENCES CIS Substance Data Sheet - PAHs				2bac/28_PAH_EQSdatasheet_310705.pdf
ECHA C&L database ECHA REACH Annex XV dossier (2010)	http://echa.europa.eu/in http://www.reach-clp-bi	ozid-helpdesk.de/de/D	lownloads/PAK-Dossier-	PAK.pdf?blob=publicationFile&v=2
ECHA 2009 (SVHC dossier for coal tar nitch)	http://ooho.ouropo.ou/d	ooumonte/10162/9b22	f02f-452d-459b-a043-7	Sebo9104dba

 ECHA C&L database
 http://echa.europa.eu/informatica/sic/inventory.

 ECHA REACH Annex XV dossier (2010)
 http://echa.europa.eu/documents/10162/8b23/021-452d-459b-a043-76cba8104dbe

 Bieker and Verbruggen
 http://www.rivm.nilen/Documents.rand\_publications/Scientific/Reports/2010/maar/Bibaccumulation of\_polycyclic\_aromatic\_invertorys.in\_aquatic\_organisms?sp=cm/2bXE9Z

				Benzo-b-fluoranthene (CAS: 205-99-2)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test Passes inherent biodegradation test	Insufficient data			
If answer to either question is YES, substance is not persis If answer to both questions is NO, additional data on half life				
				Estimated degradation half lives for water noted in ECHA (2010). PAHs can undergo photolysis but not considered to
Half life marine water ≥ 60 days	Yes	42-125days	ECHA (2010)	be a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water (ECHA 2009)
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	Insufficient data Insufficient data			Estimated half lives in sediment noted in ECHA (2010). PAHs with 4 or more rings undergo very slow biodegradation
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	Yes Yes	42 - 1250 113-282 davs	ECHA (2010) ECHA 2009	Estimated half lives of 420 - 1250davs noted in ECHA (2010)
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is	Yes			
persistent) Is substance persistent?	Yes		ECHA (2009) and (2010)	Agreed vP at EU level along with a number of other PAHs
Bioaccumulation			(2010)	
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	2800	HSDB	The BCF value of 2800 is reported for clams. No experimentally derived BCFs are noted in the ECHA (2009) and (2010) documents. The latter noted that on the basis of similarities of their Kow values and molecular sizes with other PAHs for which BCFs above the bioaccumulation oritient have been experimentally confirmed, it is anticipated that BCF values for this substance will be >2000. PAHs are generally rapidly metabolised in fish but accumulate in crustance and molluces.
Does field data show evidence for biomagnification?	No Data			PAHs are known to biomagnify in lower trophic levels, but biodilute in fish and some invertebrates able to metabolise the substance.
If answer to either question is YES, substance is bioaccum			ECHA (2000) 6	
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	Yes	6.12	ECHA (2009) & (2010)	Estimated; ClogP model
Dees the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size & 4.3nm	Not assessed due to the	availability of the	above info	
Molecular weight ≥ 1100g/mol Octanol solubilitv ≤ 0.002mmol/I If weight of evidence indicates bioaccumulation unlikely (i.e	VES answord substan	no in pot biogoour	nulativo	
If weight of evidence indicates bioaccumulation a possibility	(i.e. NO answers), BCF	data should be ol	btained	
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			Based on the weight of evidence have noted that it meets the criteria for Persistence. The ECHA 2009 report noted that there was insufficient experimental data to determine whether it met B
Toxicity Is the lowest chronic NOEC for freshwater or marine			E0114 (0000) 1	No chronic effect concentrations were located. EHCA (2010) notes that no effects were observed on aquatic life at
is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT	Insufficient Data		ECHA (2009) and (2010)	concentrations up to the water solubility of benzo(No effects up to limit of water solubility in available chronic studies
RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta	No Yes	Carc. 1B		EU harmonised C&L classification for benzo(b)fluoranthene indicates it does not meet the criteria EU harmonised C&L classification for benzo(b)fluoranthene indicates it meets the criteria for mutagenicity
1A. 1B) or toxic for reproduction (Repr 1A. 1B. 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	165	Gald. 10	ECHA COL Galabase	Elo namonace das classification foi perizo(u)nuclationere indicates it mess the criteria foi indiagencity
If answer to all questions is NO, substance is not toxic Is sufficient data available? (if not assume substance is				
toxic) Is substance toxic?	Yes Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Data indicates meets the criteria for persistence, bioaccumulation and toxicity. The EU SVHC report did not note that benzo(b)fluoranthene met the PBT criteria as it was noted that insufficient experimental data was available for bioaccumulation. Based on the weight of evidence have noted it meets the B criteria in this assessment.
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	Insufficient data		ECHA 2009	PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rinos undergo little biodeoradation in water
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persist	Insufficient data Yes	113-282 days	ECHA 2009 ECHA 2009	PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Assumed yes based on upper value
Is bioconcentration factor ≥ 5000	Insufficient data			The BCF value of 2800 is reported for clams (HSDB). No experimentally derived BCFs are noted in the ECHA (2009) and (2010) document. The latter noted that on the basis of similarities of their Kow values and molecular sizes with other PAHs for which BCFs above the bioaccumulation riterina have been experimentally contineed, it is anticipated that BCF values for this substance will be >2000. Although VB is not specifically mentioned based on data for cher similar compounds indicates benzoyfuburanthem en any meet the criteria for VB. PAHs are generally rapidly
If answer is yes, substance is very bioaccumulative				metabolised in fish but accumulate in crustacea and molluscs.
Is substance very persistent and very bioaccumulative?	Insufficient data			Data indicates vP but insufficient data to determine whether it meets the vB criteria. Based on the available data for similar substances it indicates there is the potential for benzo(b)/fluoranthene to meet the criteria for v9 however data is is sufficient to confirm this.
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in	Not assessed			
proundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the	Not assessed			
substance oreater than the LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in Is substance persistent in groundwater?	n groundwater Not assessed			
If substance is persistent in groundwater, bioaccumulative /	AND toxic, substance is	hazardous		
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic a	No nd hazardous		ECHA C&L database	EU harmonised C&L classification for benzo(b)fluoranthene indicates it does not meet the criteria for mutagenicity
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			
Is substance hazardous to groundwater?	¥.			
Is substance hazardous, if so, state on what basis	Yes			Meets the criteria for persistence, bioaccumulation and toxicity
Does substance have breakdown products of concern? REFERENCES HSDB	No	//mi_hin/eie/eacco	h2	
HSDB CIS. 2005. Substance datasheet - PAH's				1b2bac/28 PAH_EQSdatasheet_310705.pdf

HSDB	http://toxnet.nlm.nih.gov/cgi-bin/sis/search2
CIS. 2005. Substance datasheet - PAH's	https://circabc.europa.eu/sd/a/996c9804-30c4-4ea1-b16d-3cbc571b2bac/28_PAH_EQSdatasheet_310705.pdf
	https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/45772
	http://www.reach-clp-biozid-helpdesk.de/de/Downloads/PAK-Dossier-PAK.pdf? blob=publicationFile&v=2
ECHA 2009 SVHC report for coal tar pitch	http://echa.europa.eu/documents/10162/8b23f02f-452d-459b-a043-76cba8104dbe

				Benzo-ghi-perylene (CAS: 191-24-2)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	assume yes of no:			
Persistence Passes ready biodegradation test Passes inherent biodegradation test	No data No data			
If answer to either question is YES, substance is not persiste If answer to both questions is NO, additional data on half life				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days	No data Yes	590-650 days	Databank of Environmental	PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs
Half life marine sediment ≥ 180 days	No data	590-050 days	Chemicals; ECHA 2009	with 4 or more rings undergo little biodegradation in water
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	No data Yes	365-535 days	ECHA 2009 ECHA 2009	PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes Yes			An assessment of benzo(ghi)perylene for the EU (ECHA 2009) notes it is considered to meet the criteria for
Is substance persistent?	Tes			Persistence
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	28288	ECHA 2009	Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and molluscs. PAHs are known to biomagnify in lower trophic levels, but biodilute in fish and some invertebrates able to metabolise
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumul	ative		ECHA 2009	the substance.
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	Yes	6.22	ECHA 2009	Measured (slow stir method)
Does the weight of evidence from the following criteria	Not assessed due to the availability of the			
indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals	above information			
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l // weight of evidence indicates bioaccumulation unlikely (i.e.	1/50			
If weight of evidence indicates bioaccumulation animely (i.e. If weight of evidence indicates bioaccumulation a possibility (				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			An assessment of benzo(ghi)perylene for the EU (ECHA 2009) notes it is considered to meet the criteria for Bioaccumulation
Toxicity Is the lowest chronic NOEC for freshwater or marine	Yes	0.0012 mg/L (1.2	CIS	NOEC Freshwater Algae (Selenastrum capricornutum)
organisms ≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1	Insufficient Data	ug/L)	ECHA C&L Database	No EU harmonised C&L classification. ECHA C&L database contains very little data for benzo(ghi)perylene and no notifications listed other than aquatic toxicity. By analogy with other PAHs likely to have similar effects although level
or STOT RE2)	insumoent sata		Lorin Code Database	may differ. No EU harmonised C&L classification. ECHA C&L database contains very little data for benzo(ghi)perylene and no
				notifications listed other than aquatic toxicity. By analogy with other PAHs likely to have similar effects although level may differ.No information was available to assess the carcinogenicity and reproductive toxicity of this substance. IARC considered that this substance was not classifiable as to its carcinogenicity to humans (Group 3) and that inadequate
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Insufficient Data		CIS, ECHA C&L Database	evidence for the carcinogenicity of this substance was available in experimental animals. The ATSDR toxicity profile for polyaromatic hydrocarbons noted that benzo[g,h,i]perylene had been reported to be
				mutagenic in S. typhimurium and to cause DNA damage in E. coli. It had also been shown to be responsible for the formation of DNA adducts isolated after topical application of pharmaceutical grade coal tar to the skin of mice (Hughes et al. 1993). In the absence of data to the contrary it would be prudent to regard as potentially mutagenic.
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			The available aquatic toxicity data indicates it meets the criteria. The data relating to the criteria for human health are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity.
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern?				are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity. Meets criteria for persistence, bloaccumulation and toxicity.
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?		590-650 days	Databank of Environmental	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity. Meets criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	590-650 days 365-535 days	Databank of Environmental Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity Meets criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days	Yes Yes No data		Chemicals ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity. Meets criteria for persistence, bloaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo phololysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in partice, fresh or estuarine sediment 2 180 days Half life in p	Yes Yes No data		Chemicals ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity. Meets criteria for persistence, bloaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo phololysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water
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IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in isi ≥ 80 days Half life in size 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is ves, substance is very bioaccumulative Is substance very persistent and very bioaccumulative?	Yes Yes No data Yes	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity. Meets criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in all ≥ 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is ves. substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater Y ager	Yes No data Yes Yes	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for parsistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacee and moliuscs.
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IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Hall file in marine, fresh or estuarine water 2 60 days Hall file in soil 2 180 days Hall file in the soil 2 180 days Does substance presistent and very bioaccumulative? Does substance presistent and very bioaccumulative? Does substance greater than the LOQ? Do 2 15% of groutwater samples show levels of the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in	Yes No data Yes Yes Yes	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for parsistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacee and moliuscs.
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in marine, fresh or estuarine sediment 2 180 days I answer to any question is YES, substance is very persistent Is bioconcentration factor 2 5000 If answer is ves. substance is very bioaccumulative Does substance pose a specific risk to groundwater? Does groundwater maniforing data show half life in groundwater 4 year Doe 5% of groundwater than be LOQ? Doe 2 15% of sites have at least one sample where the substance posed tected above the LOQ?	Yes No data Yes Yes Yes Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However hased on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and moliuscs.
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bloaccumulative? Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in all 180 days If answer to any question is YES, substance is very persistent is bloconcentration factor ≥ 5000 If answer is ves. substance is very bloaccumulative te substance open a specific risk to groundwater? Does groundwater monitory data show half life in Torondwater 2 yam Do ≥ 5% of groundwater monitory data show half life in Does substance pose a specific risk to groundwater? Does substance on y question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater? If substance is persistent in groundwater? ND toric, substance is how levels of the substance to any question is YES, substance is persistent in droundwater? If substance is persistent in groundwater? If substance is persistent in groundwater?	Yes No data Yes Yes Yes Yes Not assessed Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for parsistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacee and moliuscs.
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IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bloaccumulative? Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in all 180 days If answer to any question is YES, substance is very persistent is bloconcentration factor ≥ 5000 If answer is ves. substance is very bloaccumulative te substance open a specific risk to groundwater? Does groundwater monitory data show half life in Torondwater 2 yam Do ≥ 5% of groundwater monitory data show half life in Does substance pose a specific risk to groundwater? Does substance on y question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater? If substance is persistent in groundwater? ND toric, substance is how levels of the substance to any question is YES, substance is persistent in droundwater? If substance is persistent in groundwater? If substance is persistent in groundwater?	Yes No data Yes Yes Yes Yes Not assessed Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for toxicity.  Meets criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo phololysis bit not a significant pathway as only operates in top few on of water column; PAHs with 4 or more rings undergo little biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr PAHs with 4 or more rings undergo very slow biodegradation in avaitr An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for vPvB No EU harmonised dassification. ECHA C&L database contains very little data for benzo(ghi)perylene and no notifications listed other than aquatic toxicity. By analogy with other PAHs likely to have similar effects athough level
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine sadment ≥ 80 days Half life in solit. 180 days Half life in govern life life in groundwater and life in groundwater 2 year Does 15% of groundwater samples show levels of the substance is detected above the LOQ? Hanswer to any question is YES, substance is persistent in droundwater Hanswer to any question is YES, substance is persistent in droundwater Hanswer to any question is YES, substance is persistent in droundwater Hanswer to any question is YES, substance is persistent in droundwater Hanswer to any constance is departed as Dees substance persistent in groundwater? Dees substance persistent in groundwater? Half life in the life in groundwater and the substance is departed by the substance is departe	Yes No data Yes Yes Yes Yes Not assessed Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for brokich.  Meets criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo pholohysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo title biodegradation in avater PAHs with 4 or more rings undergo title biodegradation in avater PAHs with 4 or more rings undergo title biodegradation in avater PAHs with 4 or more rings undergo title biodegradation in avater PAHs with 4 or more rings undergo title biodegradation in avater PAHs with 4 or more rings undergo the biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo the biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation in avater PAHs with 4 or more rings undergo to biodegradation to biodegradati
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Hall file in marine, fresh or estuarine water 2 60 days Hall file in soil a 180 days If answer to any question is YES, substance is very persistent is bioconcentration factor 2 5000 If answer is ves. substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance years substance is very bioaccumulative Is substance one a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater? I year Substance is vess bios there where the substance persistent in groundwater, boa 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to years on y question is YES, substance is persistent in droundwater? If substance poses a specific risk to groundwater? If substance poses is heard read. Does substance poses is heard read. Substance is heard to be the LOQ? If answer to any question is YES, substance is persistent in droundwater? If substance poses a specific risk to groundwater? If substance is persistent in groundwater, Does substance pose a specific risk to groundwater? Is substance to a period to a deverse effects on human health	Yes No data Yes Yes Yes Yes Not assessed Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for parsistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo little biodegradation in nauatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and molluscs. An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for vPvB
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IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Hall life in marine, fresh or estuarine water z 60 days Hall life in marine, fresh or estuarine sediment z 180 days Hall life in agina it 180 daye li answer to any question is YES, substance is very persistent is bioconcentration factor z 5000 If answer is ves. substance is very bioaccumulative Es substance very persistent and very bioaccumulative Does substance pose a specific risk to groundwater? Does groundwater monitoring data show hall life in groundwater y level Do z 5% of groundwater monitoring data show hall life in groundwater? I wer Do z 5% of groundwater monitoring data show hall life in groundwater? Bis substance base have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in droundwater? If substance pose a specific risk to groundwater? If substance pose a specific risk to groundwater? Is substance wry toxic? Is substance to any question is XES, substance is very toxic and hizardous.	Yes No data Yes Yes Yes Not assessed Not assessed Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column, PAHs with 4 or more rings undergo the biodegradation in water PAHs with 4 or more rings undergo the biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and molluscs. An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for VPVB
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IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Hall life in marine, fresh or estuarine water 2:60 days Hall life in marine, fresh or estuarine sedment 2:180 days Hall life in scills. 180 days Hall life in scills. 180 days Hall life in scills. 180 days Hall life in scills. 2:000 Il answer for any question is YES, substance is very persistent Is bioconcentration factor 2:5000 Il answer for sets. substance is very bioaccumulative Is substance very persistent and very bioaccumulative Is substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? If substance is detected above the LOQ? If answer for any question is YES, substance is persistent in droundwater Substance pose a specific risk to groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is heardows Dees substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Is substance and pose a specific risk to groundwater? Is substance and pose a specific risk to groundwater? Is substance and pose a specific risk to groundwater? Is substance is devise effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (if not assume substance is very toxic)	Yes No daa Yes Yes Yes Yes Yes Not assessed Not assessed Not assessed Not assessed Not assessed Insufficient Data (but No No No No No No No No No No No No No	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for presistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo phololysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo very alow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and moliuscs. An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for VPVB No EU harmonised classification. ECHA C&L database contains very little data for benzo(ghi)perylene and no notifications listed of the TASP toxicity. By analogy with other PAHs likely to have similar been shown to be temperated to be mutagenic. In Styphinurium and to cause DNA damage in E. col. It had also been shown to be town site of the absence of data to the contrary it would be prudent to regard as optientially mutagenic. Insufficient data is available to make an assessment of the mutagenicity of benzo(ghi)perylene. The fact the available data indicates it meets the criteria for P, B and T means that it is deemed Hazardous based on
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in solit. 160 days Half life in solit. 160 days Half life in solit. 180 days Half life in solit. 190 days Half life in days Half li	Yes No data Yes Yes Yes Yes Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed	365-535 days 28288	Chemicals ECHA 2009 ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo pholohysis but not a significant pathway as only operates in top few on of water column; PAHs with 4 or more rings undergo little biodegradation in water PAHs with 4 or more rings undergo little biodegradation in avail Meessured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and molluscs. An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for vPvB No EU harmonised classification. ECHA CAL database contains very little data for benzo(ghi)perylene and no notifications ised classification. ECHA CAL database contains very little data for benzo(ghi)perylene had been responsible for the formation of DNA adducts is oldeted after topical application of pharmaceutical grade coal tar to the responsible for the formation of DNA adducts is oldeted after topical application of pharmaceutical grade coal tar to the available data indicates it meets the criteria for P, B and T means that it is deemed Hazardous based on those properties
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IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine waters 20 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or estuarine satement 2 180 days Half life in marine, fresh or groundwater? Does substance pose a specific risk to groundwater? Haubstance greater han he LO27 Haubstance is persistent in groundwater? Haubstance is persistent in groundwater? Haubstance presents haus and a substance is persistent in croundwater? Is substance haus anglesis (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health Hanswer to any question is YES, substance is very toxic mark hauardous Is substance hazardous in groundwater? Is substance hazardous is orgoundwater? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis	Ves No data Yes No data Yes Not assessed Not	365-535 days	ECHA 2009 ECHA 2009 ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meet the criteria for persistence, bioaccumulation and toxicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photolysis bit not a significant pathway as only operates in top few on of water column; PAHs with 4 or more rings undergo live biodegradation in water PAHs with 4 or more rings undergo iteologication in water PAHs with 4 or more rings undergo very slow biodegradation in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and moliaces. An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for vPvB No EU harmonised classification. ECHA C&L database contains very little data for benzo(ghi)perylene and no indications listed other than aquatic toxicity. By analogy with other PAHs likely to have similar effects although level may diffications listed other than aquatic toxicity. By analogy with other PAHs likely to have similar effects although level may differ. The ATSDR toxicity profile for polyaromatic hydrocatoons noted that benzo(ghi)perylene. The fact the exponsible for the formation of DNA adducts isolated after topical application of pharmaceutical grade coal tar to the exponsible for the formation of DNA adducts isolated after topical application of pharmaceutical grade coal tar to the exponsible for the formation of DNA adducts isolated after topical application of pharmaceutical grade coal tar to the axis of mice (Hydres et al. 1993). In the absence of data to the contrary it would be prudent to regard as potentially mutagenic.
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2:80 days Half life in marine, fresh or estuarine sedment 2:180 days Half life in scill 2:180 days. If answer fo any question is YES, substance is very persistent Is bioconcentration factor 2:5000 If answer for any question is YES, substance is very persistent Is bioconcentration factor 2:5000 If answer for sets, substance is very bioaccumulative Is substance opeos a specific risk to groundwater? Does guotekeer monitoring data show half life in groundwater 2:1 year Does guotekeer monitoring data show half life in 50 2:15% of this shave at least one sample where the substance greater than the LOQ? If answer for any question is YES, substance is persistent in droundwater? Does substance boses a specific risk to groundwater? If substance bersistent in groundwater? If substance proses a specific risk to groundwater? Is substance proses a specific risk to groundwater? Is substance prose a specific risk to groundwater? Is substance prose a specific risk to groundwater? Is substance prose a specific risk to groundwater? Is substance house in ary question is YES, substance is very toxic and hazardous Is substance hazardous to groundwater? Is substance hazardous to groundwa	Ves No data Yes No data Yes Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed Insufficient Data (but see comments) Not see comments) Not see comments Not See comments Not Not Not See comments Not Not Not Not Not Not Not Not Not Not	365-535 days 28288 Yes	ECHA 2009 ECHA 2009 ECHA 2009 ECHA 2009	are more limited. However based on the available data and knowledge of the effects of other PAHs can assume it will meetite criteria for basicity. An assessment for the EU (ECHA 2009) have noted that benzo(ghi)perylene meets the criteria for PBT PAHs can undergo photohysis but nd a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rines undergo libeologication in water PAHs with 4 or more rines undergo the biologication in aquatic sediments Measured BCF in Daphnia magna. PAHs are generally rapidly metabolised in fish but accumulate in crustacea and moliuacs. An assessment for the EU have noted that benzo(ghi)perylene meets the criteria for VPAB No EU harmonised datasification. ECHA C&L database contains very little data for benzo(ghi)perylene and no notifications listed other than aquatic toxicity. By analogy with other PAHs list likely to have similar effects almough level reported to be mutagenic. IS - Dybhuarium at to cause DNA damage in E. coit. It had also been shown to be reported to be mutagenice. IS - Dybhuarium at to cause DNA damage in E. coit. It had also been shown to be reported to be mutagenice. IS - Dybhuarium at to cause DNA damage in E. coit. It had also been shown to be reported to be mutagenice. IS - Dybhuarium at to cause DNA damage in E. coit. It had also been shown to be reported to be mutagenice. IS - Dybhuarium at to cause DNA damage in E. coit. It had also been shown to be reported to be mutagenice. IS - Dybhuarium at to cause DNA damage in E. coit. It had also been shown to be reported to be mutagenice. It personalities for the criteria for P. B. and T means that it is deemed Hazardous based on those properties

				Benzo-k-fluoranthene (CAS: 207-08-9)
	Yes / No / Insufficent data / Borderline /	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	assume yes or no?			
Persistence				
Passes ready biodegradation test Passes inherent biodegradation test	Insufficient Data			
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is				
required				
Half life marine water ≥ 60 days				Estimated half lives of 42-125days were noted in the ECHA (2010) report. PAHs can undergo photolysis but not a significant
Half life fresh or estuarine water ≥ 40 days	Yes	42-125days	ECHA 2010	pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water (ECHA, 2009)
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days	Yes	>1250 days	ECHA 2010	Estimated half lives of >1250dyas were noted in ECHA (2010) report. PAHs with 4 or more rings undergo very slow
Half life in soil ≥ 120 days	Yes	143-359 days	ECHA 2009	biodegradation in aquatic sediments (ECHA, 2009) Estimated half lives of 420 - 1250days were reproted in ECHA (2010)
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes		ECHA (2009) and (2010)	An assessment of benzo(k)fluoranthene for the EU (ECHA 2009)(ECHA 2010) notes that it is considered to meet the criteria for Persistence
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) $\ge 2000$	Yes	13225	ECHA (2009) and (2010)	bCP in a crustacean species. PARs are generally rapidly metabolised in rish but accumulate in crustacea and moliuscs.
Does field data show evidence for biomagnification?				PAHs are known to biomagnify in lower trophic levels, but biodilute in fish and some invertebrates able to metabolise the substance.
If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	Yes	6.84	ECHA (2010)	Supported by a value of 6.11 noted in ECHA (2009)
Does the weight of evidence from the following criteria indicate	Not assessed due to			
bioaccumulation unlikely?	the availability of the above information			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/I				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes	Yes		
Is substance bioaccumulative?	Yes	Yes	ECHA 2009	An assessment of benzo(k)fluoranthene for the EU (ECHA 2009) notes that it is considered to meet the criteria for Bioaccumulation
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mq/l	Yes	0.17 ug/L	ECHA (2010), EU (2011)	Chronic EC10 value for the fish Brachydanio rerio with an EC10 for effect on length of 0.17ug/l reported
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No	-	ECHA C&L Database	EU harmonised C&L classification indicates it does not meet these criteria
Is substance carcinogenic (Carc 1A, 1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Carc 1B	ECHA C&L database; CIS	EU harmonised C&L classification indicates it meets the criteria for Carc 1B
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Meets the criteria for chronic aquatic toxicity and carcingoenicity
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Meets criteria for persistence, bioaccumulation and toxicity An assessment for the EU (ECHA 2009) have noted that benzo(k)fluoranthene meets the criteria for PBT
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	Yes	42-125days	ECHA 2010	Estimated half lives of 42-125days were noted in the ECHA (2010) report. PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings undergo little biodegradation in water
Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	>1250 days	ECHA 2010	(ECHA, 2009) Estimated half lives of >1250dyas were noted in ECHA (2010) report. PAHs with 4 or more rings undergo very slow
Half life in soil ≥ 180 days	Yes	143-359 days	ECHA 2009	biodegradation in aquatic sediments (ECHA, 2009) Estimated half lives of 420 - 1250days were reproted in ECHA (2010)
If answer to any question is YES, substance is very persistent	Yes	13225	ECHA 2009	BCF in a crustacean species
Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	Yes	13225	ECHA 2009	BCF in a crustacean species
Is substance very persistent and very bioaccumulative?	Yes			An assessment for the EU (ECHA 2009 and 2010) have noted that benzo(k)fluoranthene meets the criteria for vPvB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
Do ≥ 5% of groundwater samples show levels of the substance greater	Not assessed			
than the LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected beyon the LOQ2.	Not assessed			
detected above the LOQ? If answer to any question is YES, substance is persistent in				
groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic,				
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?			FOUL CT	
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No	-	ECHA C&L database	EU harmonised C&L classification for benzo(k)fluoranthene indicates it does not meet these criteria
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic? Is substance hazardous to groundwater?	No			
	Yes			Nexts aritistic for participants, biogenumulation and taxisity and for 20 and 20 (2014, 2000, and 2010)
Is substance hazardous, if so, state on what basis	Tes			Meets criteria for persistence, bioaccumulation and toxicity and for vP and vB (ECHA, 2009 and 2010)
Does substance have breakdown products of concern?	No			
REFERENCES	https://airoat-a	IndialApt2=4=1.0	760 4055 -404 000	7cd4ce82/PAH%20EQS%20dossier%202011.pdf
EU (2011) EQS dossier ECHA 2009 SVHC report for coal tar pitch Databask of Environmental Chemicals	http://echa.europa.eu/doc	cuments/10162/8b	23f02f-452d-459b-al	043-76cba8104dbe
Databank of Environmental Chemicals ECHA C&L Database ECHA (2010)	https://echa.europa.eu/in	formation-on-cher	nicals/cl-inventory-da	dd=MAKECHEMdetailsform&txtChemId=1775 tabase/-/discli/details/58814 seise-RAM cdfbhdsmublicationEile&urg2
ECHA (2010)	mup.//www.reach-clp-bioz	u-neipaesk.de/de	DOWINO20S/PAK-Do	ssier-PAK.pdf?blob=publicationFile&v=2

	_			n (as boron (III))
	such as sodium borate (be	orax). Commonly	found boron compounds	ron (III) and include boron oxides, sulphides and halides as well as borate salts include sodium borate (borax), boric acid, sodium perborate, boron oxide. The
	majority of bo Yes / No / Insufficent data / Borderline /			the most common forms in water being boric acid and borate ion.
Is substance persistent, bioaccumulative and toxic?	assume yes or no?			
Persistence Passes ready biodegradation test	Test not applicable for metals/inorganics			
Passes inherent biodegradation test	See above			
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
r ensiver to bourt questions is two, additional data on naif life is required	Degradation testing not			
Half life marine water ≥ 60 days	applicable for metals/inorganics			
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	See above See above			
Hall life fraine seduntent ≥ 100 days Half life fraine seduntent ≥ 120 days Half life in soil ≥ 120 days	See above See above			
Trail life ill soli e i zo days If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent	See above			
Is sufficient data available? (if not assume substance is persistent)	Yes			
is sumcleni, data available? (in not assume substance is persistent)	res			The persistence criteria are not directly applicable to metals/inorganics and
Is substance persistent?	Yes		EHC (1998), ESR (2007), CCME 2009	were developed principally for organic substances. Metals and inorganics such as boron are inherently persistent and subject to transformation rather than degradation. Boron will therefore not degrade but will be transformed, with the most common forms present in the freshwater environment being boric acid and borates.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	0.3	ESR (2007)	Data collated for boric acid and borate indicate boron does not have a high potential to bioaccumulate in aquatic organisms
				Although boron was found to be incorporated into plant cell walls it is not considered
Does field data show evidence for biomagnification?	No		ESR (2007)	to biomagnify in the food chain and it is noted that levels of boron are found to decrease in higher trophic level organisms
If answer to either question is YES, substance is bioaccumulative				
				Log Kow are not considered reliable estimates of the potential for bioaccumulation of
If no BCF data, is log Kow ≥ 4.5?	Log Kow values are not applicable to metals			inorganic substances such as boron. Log Kow values have been reported for boric acid and borax (-1.09 and -1.53 respectively) but are not considered reliable
If answer is YES, substance is bioaccumulative				indicators of bioaccumulation.
	Not considered due to			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals	Not considered due to above information			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weicht ≥ 1100µmol				
Octanol solubility ≤ 0.002mmol/I				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01 mg/l$	No	1mg/l	CCME 2009	Elodea canadensis NOEC. The lowest data for a fish species was a 87day NOEC for Onchorhynchus mykiss of 2.1mg/l
is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	Classifications have been made for a number of boron compounds. Those of key relevance here including boric acid, boron oxide, sodium borate indicate that this criterion is not met, ie not STOT RE1 or RE2
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Repr 1B	ECHA C&L database	Classifications have been made for a number of boron compounds. Those of key relevance here including boric acid, boron oxide, sodium borate indicate that this criterion is met, ie Repr 1B
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
ir answer to all questions is ivo, substance is not toxic Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Based on Repr 1B
S SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet the criteria for B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	See comment See comment			The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics
Half life in soil ≥ 180 days	See comment			were developed principally for organic substances, wetals and inorganics such as boro are inherently persistent and subject to transformation rather than degradation. Boron will therefore not degrade but will be transformed, with the most common forms present in the freshwater environment being boric acid and borates.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	0.3	ESR (2007)	Data collated for boric acid and borate indicate boron does not have a high potential to bioaccumulate in aquatic organisms
If answer is yes, substance is very bioaccumulative				to oncertaintate in aquatic organisms
Is substance very persistent and very bioaccumulative?	No			Does not meet the criteria for vB
Is substance very persistent and very bioaccumulative r				
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≿ 1 year Do ≿ 5% of groundwater samples show levels of the substance greater than the LOQ? Do ≿ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed Not assessed Not assessed			
	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?				
Is substance persistent in groundwater?				
Is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous	Not seeseend			
Is substance pensistent in arcundwater? If substance is persistent in groundwater, bioeccumulative AND toxic, substance is bazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance writ toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	Not assessed No		ECHA C&L database	Classifications have been made for a number of boron compounds. Those of key relevance here including boric acid, boron oxide, sodium borate indicate that this criterion is no met.
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance wrat toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	relevance here including boric acid, boron oxide, sodium borate indicate that this
Is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance uncer toxic? Is substance uncer toxic? Is substance unlagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous If an sufficient data available? (if not assume substance is very toxic)			ECHA C&L database	relevance here including boric acid, boron oxide, sodium borate indicate that this
hazardous Does substance pose a specific risk to groundwater? Is substance verv toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	No Yes		ECHA C&L database	relevance here including boric acid, boron oxide, sodium borate indicate that this
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Dees substance pose a specific risk to groundwater? Is substance wry toxic? Is substance wry toxic? Is substance wry toxic? Is substance heat: If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic? Is substance very toxic? Is substance hazardous to groundwater?	No Yes No		ECHA C&L database	relevance here including boric acid, boron oxide, sodium borate indicate that this criterion is not met.
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Does substance opse a specific risk to groundwater? Is substance very toxic? Is substance in utagenic (Multa IA, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is substance very toxic? Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis	No Yés No		ECHA C&L database	relevance here including boric acid, boron oxide, sodium borate indicate that this
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Does substance very toxic? Is substance very toxic? Is substance very toxic? Is substance very toxic and hazardous If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic? Is substance hazardous, if so, state on what basis Does substance have breakdown products of concern?	No Yes No		ECHA C&L database	relevance here including boric acid, boron oxide, sodium borate indicate that this criterion is not met.
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Does substance opse a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Mula 1A, 1B, 2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance vary toxic? Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis Does substance have breakdown products of concern? REFERENCES	No Yes No No	umation on the		relevance here including botic acid, boron oxide, sodium borate indicate that this oriterion is not met.
Is substance persistent in groundwater?  If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Dees substance very toxic? Is substance very toxic? Is substance very toxic? Is substance very toxic, and hazardous Is sufficient data available? (If not assume substance is very toxic and hazardous Is substance very toxic? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis ECHA C&L database	No Yes No No No	url?url=http://ced	micals/cl-inventory-data gg-roge.come.ca/down	relevance here including botic acid, boron oxide, sodium borate indicate that this oriterion is not met.
Is substance persistent in groundwater? If substance is persistent in groundwater, bicaccumulative AND toxic, substance is hazardous Does substance opse a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Mula 1A, 1B, 2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance vary toxic? Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis Does substance have breakdown products of concern? REFERENCES	No Yes No No No	url?url=http://ceo CCsQFjAD&us cuments/ehc/ef	micals/cl-inventory-data groce.come.ca/downi g=AFQ(CNFx.KZ2BzC uc/ehc204.htm	relevance here including botic acid, boron oxide, sodium borate indicate that this oriterion is not met.

				Cadmium as cadmium (II)
	Cadmium (II) ions and Yes / No / Insufficent data / Borderline / assume yes or no?	compounds are con Value	mmonly found in the f	reshwater environment. Even relatively insoluble Cd (II) compounds have been found to release the toxic Comments
Is substance persistent, bioaccumulative and toxic?	40001110 YES UT 110 ?			
Persistence	Toot pot and in the	otolo/in		
Passes ready biodegredation test Passes inherent biodegredation test	Test not applicable for m See above	netals/inorganics		
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	Degradation testing not	applicable for metals/	inorganics	
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	See above See above			
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	See above See above			
If answer to any question is YES, substance is persistent	Occ above			
If answer to all questions is NO, substance is not persistent Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes			Persistence criteria were developed for organics. Metals and inorganics such as cadmium (II) are inherently persistent, subject to transformation rather than degradation.
Pieseeumulation				
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	229 and 994	ESR (2007)	These values are the median BCF values for invertebrates and fish respectively based on data collated for the
Does field data show evidence for biomagnification?	110	220 010 001	2011(2001)	ESR. The value for algae is much higher 7535 however it may be due to adsorption and not accumulation
If answer to either question is YES, substance is bioaccumulative				
	Log Kow values are			Log Kow values are not considered a reliable approach for assessing the potential for inorganic substances such
If no BCF data, is log Kow ≥ 4.5?	not applicable to metals			as cadmium to bioaccumulate.
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to the	above information		
Substance is chronically non-toxic in mammals				
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) sub	stance is not bioaccumula	ative		
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers),				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	Yes	0.0008mg/l	ESR (2007)	21d NOEC for the invertebrate Daphnia magna. Other studies on inverebrates and fish showed effect concentrations below the criterion of <0.01mg/l.
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE1	ECHA C&L database	A number of cadmium (II) compounds have been classified under C&L and have been determined as STOT RE1
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes	Muta 1B, Carc 1B,	ECHA C&L database	A number of cadmium (II) compounds have been classified under C&L and have been determined as Muta 1B or 2. Core 1B and Borr 1
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic		Repr 1B		2, Carc 1B and Repr 1B and 2.
If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes			STOT RE1 but also Muta,Carc and Repr 1B. Also meets criteria for chronic aquatic toxicity
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet the criteria for bioaccumulation
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?	_			
Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	See comment See comment			Persistence criteria were developed for organics. Metals and inorganics such as cadmium (II) are inherently persistent subject to transformation rather than degradation
Half life in soil ≥ 180 days	See comment			persistent, subject to transformation rather than degradation.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	229 and 994	ESR (2007)	These values are the median BCF values for invertebrates and fish respectively based on data collated for the ESR. The value for algae is much higher 7535 however it may be due to adsorption and not accumulation
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for vB
Does substance pose a specific risk to groundwater?				
Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
$Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater	Not comment			
Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	Yes	Muta 1B	ECHA C&L database	A number of cadmium (II) compounds have been classified under C&L and have been determined as Muta 1B or 2. (See comment below)
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No (see comment)		WHO (2011)	Although classified as Muta 2 under C&L the WHO (2011) have derived a threshold for cadmium for drinking water. They note that there is limited evidence for genotoxic effects via the oral route. It is not considered as a
	, , , , , , , , , , , ,		(	non-threshold substance for genotoxic effects hence why it has not been classified as Very Toxic
Is substance hazardous to groundwater?				
				Does not meet the criteria for P, B, T due to the criteria for bioaccumulation not being met. Although
Is substance hazardous, if so, state on what basis	No			classed as Muta 2 under C&L WHO (2011) noted there is limited evidence for genotoxic effects via the oral route and it is not considered to be a non-threshold substance for genotoxic effects and therefore
	.10			not considered to meet the criteria for Very Toxic.
Does substance have breakdown products of concern?	No			

REFERENCES ECHA C&L database EU (2007) ESR risk assessment on cadmium oxide WHO (2011)

https://echa.europa.eu/information-on-chemicals/cl-inventory-database?p\_p\_id=clinventory\_WAR\_clinventoryportlet&p\_p\_lifecycle=0&p\_p\_state=normal&p\_p\_mode=view&p\_p\_col\_id= http://echa.europa.eu/documents/10162/66h725c2-0bb5-483d-8557-e4069be0d681 http://www.who.int/water\_sanitation\_health/dwg/chemicals/cadmium.pdf

			Chloroalka	ines C10-13 (CAS: 85535-84-8)
	Yes / No / Insufficent data / Borderline / assum yes or no?	e Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	,			
Persistence			ECHA SVHC	A ready biodegradability study, using the OECD 301C method, which was
Passes ready biodegradation test	No		report (2008a)	assessed in the ECHA report indicated it did not meet the criteria for ready biodegradability
Passes inherent biodegradation test	No		ECHA SVHC report (2008a)	An inherent biodegradability study assessed in the ECHA report indicated it did not meet the criteria for inherent biodegradability (basedon OECD 302).
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	No data		ECHA SVHC	The ECHA SVHC report noted no reliable half life data was available for water
Half life fresh or estuarine water ≥ 40 days	No data		report (2008a) ECHA SVHC	See above
			report (2008a)	The ECHA SVHC decision document notes that aerobic degradation half life of
Half life marine sediment ≥ 180 days	Yes	450days	ECHA SVHC report (2008b)	335days noted in marine sediment for C10 and 680days for C13. The report notes that if a mean half life is calculated this is assumed to be representative of half life for C10-13. This mean value is 450days. The ECHA SVHC decision document notes that aerobic degradation half life of
Half life fresh or estuarine sediment ≥ 120 days	Yes	1630days	ECHA SVHC report (2008b)	1340days noted in freshwater sediment for C10 and 1790days for C13. The report notes that if a mean half life is calculated this is assumed to be representative of half life for C10-13. This mena value is 1630days.
Half life in soil ≥ 120 days	No data		ECHA SVHC report (2008a)	The ECHA SVHC report noted no reliable half life data was available for soil.
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			Chloroalkanes C10-13 are noted to meet the P criteria following assessment under REACH. SCCPs have also been classified as Persistent
				Organic Pollutant (POP).
Bioaccumulation			ECHA SVHC	Maseurad BCE in fish. High concentrations have been found in other species
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	7816	report (2008b, 2008a)	Measured BCF in fish. High concentrations have been found in other species including whales and seals
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5?	Yes	4.39 - 8.69	ECHA SVHC	A range of Log Kow values have been reported with the value being influenced by
If answer is YES, substance is bioaccumulative			report (2008a)	the chlorine content.
Does the weight of evidence from the following criteria indicate bioaccumulation	Not assessed due to	above data		
unlikely? Substance is chronically non-toxic in mammals				
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) subs	tance is not bioaccum	lative		
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), B		ained		
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes Yes			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	Yes	0.005mg/l	ECHA SVHC report (2008b)	The ECHA SVHC decision document notes that the lowest NOEC reported was a 21d NOEC Daphnia maona of 0.005mg/l.
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	The EU harmonised classification indicates chloroalkanes C10-13 are not classified as STOT RE1 or RE2
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	The EU harmonised classification indicates chloroalkanes C10-13 are classified as Carc 2 only and therefore does not meet this criterion.
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes	Based on chronic aquatic toxicity		
		data		Obert als in allowed ways have been acted as DDT (allowing and an far
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Short chain chloroalkanes have been noted as PBT following review for SVHC under REACH (ECHA, 2008b). In addition this group of chemicals have been classified as POPs.
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	No data		ECHA SVHC report (2008a)	It was noted no reliable half life data was available for water
			ECHA SVHC	The ECHA SVHC decision document notes that aerobic degradation half life of
Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	1630days	report (2008b)	1340days noted in freshwater sediment for C10 and 1790days for C13. The report notes that if a mean half life is calculated this is assumed to be
Half life in soil ≥ 180 days	No data		ECHA SVHC report (2008a)	representative of half life for C10-13. This mena value is 1630days. It was noted no reliable half life data was available for soil
If answer to any question is YES, substance is very persistent			Teport (2000a)	
Is bioconcentration factor ≥ 5000	Yes	7816	ECHA SVHC report (2008b)	Measured BCF in fish
If answer is yes, substance is very bioaccumulative			100011(20000)	
Is substance very persistent and very bioaccumulative?	Yes	Meets criteria for		Short chain chloroalkanes have been noted as vPvB following review for SVHC under REACH (ECHA, 2008b). In addition this group of chemicals
	100	vPvB		has been classified as POPs under the Stockholm Convention
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic,				
Il substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database	The EU harmonised classification for chloroalkanes C10-13 indicates it is not classified as mutagenic.
If answer to any question is YES, substance is very toxic and hazardous			UGIGUdSE	
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	Yes No			
Is substance hazardous to groundwater?				
		The available data		Short chain chloroalkanes have been noted as PBT and vPvB following
Is substance hazardous, if so, state on what basis	Yes	I he available data indicates it meets the criteria for		review for SVHC under REACH. In addition this group of chemicals has
		the criteria for PBT and vPvB		been classified as Persistent Organic Pollutant (POP) under the Stockholm Convention.
Does substance have breakdown products of concern?	No			
Does substance have breakdown products of concern?	UN			
REFERENCES EU Risk Assessment Report (2008) ECHA SVHC decision document (2008b)		u/documents/10162/c157 au/documents/10162/6e3		
ECHA SVHC decision document (2008b) ECHA SVHC support document (2008a)	https://echa.europa.e	eu/documents/10162/2ed	cfedb-ec53-4754-	8598-e787a8ff7a58

ECHA SVH0 Suppri document (2008a) https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-disclidetails/55/19

		18540-29-9), includi	ing soluble/diss	ociating Cr(VI) salts (chromium trioxide (1333-82-0), sodium chromate (7775-11-3), sodium dichromate (10588-01-9), ammonium dichromate (7789-09-5), potassium dichromate (7778-50-9))
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	jes er no.			
Persistence Passes ready biodegradation test Passes inherent biodegradation test	Test not applicable for See above	metal/inorganic		
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≿ 80 daye Half life frosh or sestainine water ≿ 40 days Half life frosh or sestainine sediment ≿ 180 days Half life frosh or sestainine sediment ≿ 120 days Half life in soil ≿ 120 days Other relevant information (e.g. dissolution/transformation for metals/impranics) If answer to any question is VES, substance is persistent		vant form for groundv	water. Cr(VI) can	react with a wide range of reducing agents to form Cr(III), depending on conditions (pH, redox potential) and presence of suitable reducing agent -half life concentrations of reducing agents exist) soils, sediments and waters Cr(VI) is rapidy reduced to Cr(III) but 3% will be oxidised back to Cr(VI). Under
If answer to all questions is NO, substance is not persistent sufficient data available? (if not assume substance is				
persistent) Is substance persistent?	Yes			Persistence criteria were developed for organics. Metals and inorganics such as chromium (VI) are inherently persistent, subject to
Bioaccumulation				transformation rather than degradation.
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification?	No No data	1	EU RAR (2005)	BCF result noted relates to fish. BCF data indicates low potential to bioaccumulate
If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5?	Log Kow values are not applicable to metals			Log Kow are not considered reliable estimates of the potential for bioaccumulation of inorganic substances such as chromium (VI).
If answer is YES, substance is bioaccumulative Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to th	e information above		
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility \$ 0.002mmol/ If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.0047	EU RAR (2005)	Lowest 7 day NOEC = 4.7ug/l (Ceriodaphnia dubia), lowest 21 day NOEC = 18ug/l (Daphnia magna)
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE1	ECHA C&L database	Based on EU harmonised C&L classifications for a number of Cr(VI) compounds as identified above
Is substance carcinogenic (Carc 1A, 1B), mulagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO. substance is not toxic	Yes	Carc 1B, Muta 1B, Repr 1B	ECHA C&L database	Majority of the studies used were based on inhalation; oral route information not sufficient (see notes below re: mutagenicity)
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Inherently P, meets criteria for T, but not B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soli ≥ 180 days	See comment See comment See comment			Persistence criteria were developed for organics. Metals and inorganics such as chromium (VI) are inherently persistent, subject to transformation rather than degradation.
If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000	No	1	EU RAR (2005)	BCF result noted relates to fish. BCF data indicates low potential to bioaccumulate
If answer is yes, substance is very bioaccumulative	No			Inherently P, does not meet criteria for vB
Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater?	NO			Innerently P, does not meet criteria for VB
Does groundwater monitoring data show half life in groundwater $\geq$ 1 year Do $\geq$ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in	Not assessed			
groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater? Is substance very toxic?	Not assessed			
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	Yes	Muta. 1B	ECHA C&L database	Chromium VI trioxide EU harmonised C&L classification and C&L classifications for the other CrVI identified above indicate Muta 1B. The UK Committe for Mulagenidry (COM) (2012) stated that chromium VI compounds are mutagenic and it is not possible to assume that there is a level at which there is no cancer risk. WHO (2003) note that because of the carcinogenicity of chromium(V) by the inhalation route and its genotoxicity, the current drinking water guideline value of 0.05 mg/litre has been questioned, but the available toxicological data do not support the derivation of a new value. As a practical measure, 0.05 mg/litre, which is considered to be to isignificant risks to health, has been retained as a provisional guideline value en idaditional information becomes available and chromium can be re-evaluated. The opinion formed by COM however that there is on lose however unit there is a UK experiment for the considered do but point there is a UK experiment committee view to the considered above indicate in the sistence has the site of the considered above indicate in the site of the considered on the provisional guideline value and there is a UK experiment committee view to the contrary and there considered above indicate in this hormonian (VI) however is still in place however unit there is a UK experiment to view to the contrary and there considered above prioritial in this hormonian (VI) however is still in place however unit there is a UK experiment to even the considered above prioritial in this hormonian (VI) however is still in place however unit there is a UK experiment to even the considered above indicate in this still experiment.
If answer to any question is YES, substance is very toxic and I	azardous			assessment.
Is sufficient data available? (if not assume substance is very toxic)	Yes	No. of The State		
Is substance very toxic? Is substance hazardous to groundwater?	Yes	Muta 1B		
Is substance hazardous, if so, state on what basis	Yes	Mutagenic		The determination of Cr(VI) as Hazardous takes into account the available data and guidance given by a range of organisations. It is acknowledged that different opinions exist on Cr(VI). The determination of Cr(VI) as Hazardous is based on the decision to be consistent with the current UK position on Cr(VI) as set out by the UK Committee for Mutagenicity (COM) (2012) which states that Cr(VI) compounds are mutagenic and so it is not possible to assume there is a level at which there is no cancer risk.
Does substance have breakdown products of concern?	No			
REFERENCES EU Risk Assessment Report. 2005. Chromium trioxide, sodium chromate, sodium dichromate, ammonium chromate,	http://echa.europa.eu/d	locuments/10162/3be	377f2-cb05-455f	-b620-ar3cbe2d570b
	http://echa.europa.eu/in 1&p p col pos=1&n r	nformation-on-chemic col count=2& cliny	cals/cl-inventory-d	latabase?p p id=clinventory WAR clinventoryportiet&p p lifecycle=0&p p state=normal&p p mode=view&p p col id=column- ventoryportiet searching=true& clinventory WAR clinventoryportiet jspPage=%2Fhtm%2Fview.jsp
ECHA C&L Database WHO 2003 COM (2012) Committee on Mutagenicity Guidance on the significance of chemical-induced mutation for human health	http://www.who.int/wat	er_sanitation_health/	dwq/chemicals/ch	

		<b>A</b> • • •	- O-b-b <sup>20</sup>	
		nate salts readily dise	sociate to give the dicatio	ng Cobalt (CAS 7440-48-4), Cobalt carbonate (CAS: 513-79-1), cobalt sulfate (CAS 10124-43-3) in in solution under normal environmental conditions; pH, DOC and hardness will all influence the "available" fraction in solution. In
	the 7-day OECD transi m2/g. (Env Can)	formation/dissolutior	i protocol, cobalt metal re	eleased concentrations of Co(II) of 0.3 - 12.78 mg/l at loadings of 1, 10 and 100 mg/l and specific surface areas of 0.127 - 0.65
	Yes / No / Insufficent data /			
	Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegredation test	Test not applicable (se	e comment)		Test not applicable for metals/inorganics
If answer to either question is YES, substance is not persistent	See above	o commonly		See above
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days	Test not applicable (se See above	e comment)		Degradation testing not applicable for metals/inorganics
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days	See above See above			
Half life in soil ≥ 120 days Other relevant information (e.g. dissolution/transformation for metals/inrganics)	See above			
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes (See comment)		CICAD (2006)	The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as cobalt are inherently persistent and subject to transformation rather than
	conment)			degradation. Cobalt will therefore not degrade but will be transformed depending on the local conditions.
Bioaccumulation			Environment Canada	Cobalt uptake and accumulation will be regulated in many aquatic organisms and as such will depend on exposure concentrations
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	<2000	(2011), EQS (Defra)	A number of studies were reported for invertebrates and fish. Only one study in an invertebrate was above the threshold of 2000; fish studies <2000. Using weight of evidence Co(II) does not meet the criteria for bioaccumulation
Does field data show evidence for biomagnification?	No	<1	Environment Canada (2011)	BMF values were noted as less than 1 which indicates it doesn't biomagnify
If answer to either question is YES, substance is bioaccumulative	Log Kow not			
If no BCF data, is log Kow ≥ 4.5?	applicable to metals/inorganics			Log Kow is not relevant for inorganic substances such as cobalt and its inorganic salts
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not considered due to	above data		
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO				
in weight of evidence indicates bloaccumulation a possibility (i.e. NO answers). BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	Yes	0.0055mg/l	Environment Canada(2011)	28d EC10 Hyaliela azteca
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	No Yes	Repr 1B, Muta 2		Based on C&L classification for sulfate and carbonate salts on basis of Co(II) Based on C&L classification for sulfate and carbonate salts on basis of Co(II) (Also noted as Carc 1B but via inhalation)
reproduction (Repr 1A. 1B. 2) If answer to any question is YES, substance is toxic	100	1000 10, 1100 2		
If answer to all questions is NO, substance is not toxic Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days	Test not applicable (se	e comment)	CICADS (2006)	The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	As above As above			substances. Metals and inorganics such as cobalt are inherently persistent and subject to transformation rather than degradation. Cobalt will therefore not degrade but will be transformed depending on the local conditions.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	<2000	Environment Canada (2011), EQS (Defra)	Cobalt uptake and accumulation will be regulated in many aquatic organisms and as such will depend on exposure concentrations A number of studies were reported for invertebrates and fish. Only one study in an invertebrate was above the threshold of 2000; The studies 2000. Liniae were reported for invertebrates could be an empty the interface for biogenerity linits
If answer is yes, substance is very bioaccumulative				fish studies <2000. Using weight of evidence Co(II) does not meet the criteria for bioaccumulation
Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for B
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
Do ≥ 5% of groundwater samples show levels of the substance greater than				
the LOQ?	Not assessed			
the LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected above the LOQ?	Not assessed Not assessed			
the LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected				
the LOQ? ID > 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic,	Not assessed			
the LOQ? Do > 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is harardrous	Not assessed			
the LOQ? ID > 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic,	Not assessed			
the LOQ? ID > 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hararrous Does substance pose a specific risk to groundwater?	Not assessed			The EU harmonised classifications for sulfate and carbonate saits on basis of Co(II) indicate Muta 2. A range of evidence has been considered alongside the C&L classification. A number of reviews of the impact of cobat have been undertaken by a range
the LOQ? ID > 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hararrous Does substance pose a specific risk to groundwater?	Not assessed	Muta 2	ECHA C&L database	been considered alongside the C&L classification. A number of reviews of the impact of cobalt have been underaken by a range of organisations including Environment Canada and OECD. The data on the genotoxic effects of cobalt (II) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicty of cobalt and had derived a threshold. A threshold
the LOQ? Do 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is hazardous Dees substance persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Dees substance persistent is groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for	Not assessed Not assessed Not assessed	Muta 2	ECHA C&L database	been considered alongside the C&L classification. A number of reviews of the impact of cobat have been undertaken by a range of organisations including Environment Canada and DECD. The data on the genotoxic effects of cobalt (i) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobatt and had derived a threshold. A threshold was also set for cobalt in food contact materials/plastics (EFSA, 2012). The weight of evidence indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to
the LOQ? Do 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is hazardous Does substance persistent in groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for	Not assessed Not assessed Not assessed	Muta 2	ECHA CâL database	been considered alonguing the C&L classification. A number of reviews of the impact of cotebat have been undertaken by a range of organisations including Environment Canada and DECC. The detain on the genotoxic detain two been undertaken by a range by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobait and denved a threshold. Alter work, and we was also set for cobait in food contains (EFESA, 2012). The weight of devince indications of inclusion in inclusion of the set of the
the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance benesistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance New Statement in arguindwater, bioaccumulative AND toxic, substance New Statement in groundwater, Bes substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous is sufficient data available? (If not assume substance is very toxic)	Not assessed Not assessed Not assessed Yes	Muta 2	ECHA C&L database	been considered alongside the C&L classification. A number of reviews of the impact of cobat have been undertaken by a range of organisations including Environment Canada and DECD. The data on the genotoxic effects of cobalt (i) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobatt and had derived a threshold. A threshold was also set for cobalt in food contact materials/plastics (EFSA, 2012). The weight of evidence indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to
the LOQ? Do > 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater? If substance is parsistent in groundwater? Does substance or paradous Does substance or paradous Does substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	Not assessed Not assessed Not assessed	Muta 2	ECHA C&L database	been considered alongside the C&L classification. A number of reviews of the impact of cobat have been undertaken by a range of organisations including Environment Canada and DECD. The data on the genotoxic effects of cobalt (i) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobatt and had derived a threshold. A threshold was also set for cobalt in food contact materials/plastics (EFSA, 2012). The weight of evidence indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to
the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance benesistent in groundwater, bioaccumulative AND toxic, substance is persistent in groundwater, bioaccumulative AND toxic, substance New Statement in arguindwater, bioaccumulative AND toxic, substance New Statement in groundwater, Bes substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous is sufficient data available? (If not assume substance is very toxic)	Not assessed Not assessed Not assessed Yes	Muta 2	ECHA C&L database	been considered alongside the C&L classification. A number of reviews of the impact of cobat have been undertaken by a range of organisations including Environment Canada and DECD. The teat on the genotocic effects of cobalt (1) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobait and had derived a threshold. A threshold was also set for cobait in food contact materials/plastics (EFSA, 2012). The weight of evidence indicates some indication of genotoxicity but that thresholds had been devide in relation to intake and use in contact with floods. As a result it is proposed to
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the LOQ? Do 2 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance is persistent in groundwater? If substance is parsistent in groundwater? Does substance AND toxic, substance have a specific risk to groundwater? Is substance wrut toxic? Its substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	Not assessed Not assessed Not assessed Yes	Muta 2	ECHA C&L database	been considered alongside the C&L classification. A number of reviews of the impact of cobalt have been undertaken by a range of organisations including Environment Canada and OECD. The data on the genotoxic effects of cobalt (1) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobalt and had derived a threshold. At threshold was also set for cobalt in food contact material/splasitics (EFSA, 2012). The weight of devidence indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to determine as non-hazardous at this time based on the available data.
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the LOQ? Do 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? If substance is persistent in groundwater? Substance have a specific risk to groundwater? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance water toxic? Is substance water toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance very toxic? Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis Does substance hazer breakdown products of concern? REFERENCES	Not assessed Not assessed Not assessed Yes Yes Yes No Yes No			been considered alongside the C&L classification. A number of reviews of the impact of cobalt have been undertaken by a range of organisations including Environment Canada and DECD. The data on the genotoxic effects of cobalt (1) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobalt and had derived a threshold, was also set for cobalt in food contact materia/splasities (EFSA, 2012). The weight of devidence indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to determine as non-hazardous at this time based on the available data.
the LOQ? Do 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater? If substance is persistent in groundwater? Is substance wrow toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance hazardous for YES, substance is very toxic and hazardous Is substance very toxic? Is substance wrow toxic? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous (2011) EPHA C&I, database	Not assessed Not assessed Not assessed Yes Yes Yes Yes No No bltp://www.en.gr.ca/es	e-ees/8E18277B-45	7E-4073-8F27-EF58784	been considered alongside the C&L classification. A number of reviews of the impact of cobalt have been undertaken by a range of organisations including Environment Canada and OECD. The data of effects of cobalt (1) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobalt and had derived a threshold. A threshold was also set for cobalt in food contact material/splasitics (EFSA, 2012). The weight of devidence indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to determine as non-hazardous at this time based on the available data.
the LOQ? Do 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater? If substance is persistent in groundwater? Is substance appeared by the substance of the substance with the substance to any duestion is YES, substance is very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is substance way toxic? Is substance very toxic? Is substance very toxic? Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis Does substance hazardous (2011) ECHA CSL database EOS for cobalt (DETR 1998) EFSA (2012)	Not assessed Not assessed Not assessed Yes Yes Yes Yes No No bltp://www.enc.gor.go.ass bltp://wwww.enc.gor.go.ass bltp://www.enc.gor.go.ass bltp://w	e-ees/8E18277B-45 information-on-cher caiwat/wg/BCguide	7E-4073-8F27-EF58764	been considered alongside the C&L classification. A number of reviews of the impact of cobalt have been undertaken by a range of organisations including Environment Canada and DECD. The data on the genotoxic effects of cobalt (1) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobalt and had derived a threshold was also set for cobalt in food contact material/splasitis (EFSA, 2012). The weight of devices indicates some indication of genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to determine as non-hazardous at this time based on the available data.
le LOQ? or 15% of tilse have at least one sample where the substance is detected bow the LOQ? answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater? is substance is persistent in groundwater? is substance or pose a specific risk to groundwater? is substance nutagenic (Muta 1A, 1B,2) or have no determinable threshold for dverse effects on human health answer to any question is YES, substance is very toxic and hazardous is substance very toxic? Is substance hazardous to groundwater? Is substance hazardous, if so, state on what basis coss substance hazardous to groundwater? IFEFENCES mycoment Canada (2011) CHA CAL database (S for cobalt (CDET 1998))	Not assessed Not assessed Not assessed Yes Yes Yes No Yes No http://www.es.ps.ca/es https://www.es.ps.ca/es https://wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww	e-ecs/8E182778-45 Informatioon-cher viewartwa/BCauldel c.com/doi/10.2003/	7E-4073-8F27-EF58786 incade/c1-hyventory-ddata resclobalt/codat. Horh p refsa_2012/2005/abstract im/2003.edf	been considered alongside the C&L classification. A number of reviews of the impact of cotalt have been undertaken by a range of organisations including Environment Canada and OcEO. The data on the genotoxicefics of cotalt (in) are varying. A review by the EVM (2003) noted mixed results had been obtained for the genotoxicity of cobait and had derived a threshold. A threshold was also set for cobait in food contact materials/plastics (EFSA, 2012). The weight of evidence indicates core indicates on genotoxicity but that thresholds had been derived in relation to intake and use in contact with foods. As a result it is proposed to determine as non-hazardous at this time based on the available data.

				Cyanide (Hydrogen cyanide) (CAS: 74-90-8)
				HCN and the free cyanide ion (CN). HCN predominates at pH <9. This assessment would also be relevant to simple g sodium and potassium cyanide along with some metal cyanide complexes which readily dissociate, eg zinc and cadmium
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test				
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days				
Half life fresh or estuarine water ≥ 40 days	No	15days	EQS report (2012)	A half life of 15days has been reported for the cyanide ion. HCN has been reported to biodegrade but is noted to be toxic to unaccimated micro-organisms which would impact on the rate of biodegradation. HCN is noted to be volatile and volatilisation is a key removal process with half lives reported in the order of hours to days. As the assessment relates to groundwater the importance of volatilisation is more limited.
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life in soll ≥ 120 days // answer to any question is YES, substance is persistent				
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes No			
	NU			
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	1.69 - 4.12	EQS report (2012)	Experimental BCF values for the rainbow trout. These low BCF values are supported by a calculated BCF of 0.73 reported in
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	140	1.03 - 4.12	Equilibrium (2012)	the assessment reports (ECHA 2014) produced under the Biocidal Products Directive.
If no BCF data, is log Kow ≥ 4.5?	No	0.35 - 1.07	EQS report (2012)	This is supported by a log Kow of 0.66 being reported in assessment reports (ECHA, 2014) under the Biocidal Products Directive
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?				
unikev? Substance is chronically non-toxic in mammals Molecular size ≥ 4.3.mm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/ If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) subst	ance is not bioaccumulati	ve		
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), B	CF data should be obtaine	ad		
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes No	0.0052mg/l	EQS report (2012) ECHA C&L database	289d LOEC Bluegill sunfish. Other chronic fish studies showed similar chronic effect concentrations Harmonised C&L classification for hydrogen cyanide indicates it does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	No			Harmonised C&L classification for hydrogen cyanide indicates it does not meet the criteria
reproduction (Reor 1A. 1B. 2) If answer to any question is YES, substance is toxic				
If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes	Based on long term aquatic		
		toxicity		
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No	Meets criteria for T but not P or B		
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	No	15days	EQS report (2012)	A hall life of 15days has been reported for the cyanide ion. HCN has been reported to biodegrade but is noted to be toxic to unacclimated micro-organisms which would impact on the rate of biodegradation. HCN is noted to be volatile and volatilisation is a key removal process with hall lives reported in the order of hours to days. As the assessment relates to groundwater the
Half life in marine, fresh or estuarine sediment ≥ 180 days				importance of volatilisation is more limited.
Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	1.69 - 4.12	EQS report (2012)	Experimental BCF values for the rainbow trout
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			Does not meet either vP or vB criteria
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the	Not assessed			
LOQ? Do $\geq$ 15% of sites have at least one sample where the substance is detected	Not assessed			
above the LOQ? If answer to any question is YES, substance is persistent in groundwater	Not assessed			
Is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic,	Not assessed			
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for	No		FCHA C&L database	Harmonised C&L classification for hydrogen cyanide indicates it does not meet the criteria for mutagenicity
adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	140		CONFLORE UDIDUDSE	<ul> <li>An invesse our sessimation for hyprogen symbol manages it upps for filder the different initial principly</li> </ul>
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	No			
is substance very toxic?	NU			
Is substance hazardous, if so, state on what basis	No			Does not meet criteria for P, B and T nor vPvB or Very Toxic
	.10			
Does substance have breakdown products of concern?	No			

 REFERENCES

 EQS roport (2012) Proposed EQS for Water Framework Directive Annex VIII sub <a href="https://www.wfuk.org/sites/default/files/Media/Cyanide\_Final\_pdf">https://www.wfuk.org/sites/default/files/Media/Cyanide\_Final\_pdf</a>

 ECHA (2014)
 https://ccha.europa.eu/information-on-chemicats/bloc/dafault/files/Media/Cyanide\_Final\_pdf

 ECHA (2014)
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 BCHA (2014)
 https://ccha.europa.eu/information-on-chemicats/bloc/dafault/files/Media/Cyanide\_Final\_pdf

				Di(2-ethylhexyl)phthalate (CAS: 117-81-7)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	Yes		ECHA SVHC	A number of reported studies indicating ready biodegradability
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent			report	
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days				Degradation half life in surface water estimated from DT50 in eutrophic lake water.Degradation in surface waters
Half life fresh or estuarine water ≥ 40 days	Yes	50days	EU RAR (2008)	observed to be temperature dependent. No biodegradation observed at 4oC. Biodegradation is the main route of removal.
Half life marine sediment ≥ 180 davs Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes Yes	300days 300days	EU RAR (2008) EU RAR (2008)	Degradation rate expected to be much longer under anaerobic conditions. Difficult to esimate DT50 but estimate of half life at 10oC is 300days and at room temperature 150days
If answer to all questions is NO, substance is not persistent				
is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes No			The available data for DEHP is conflicting. Studies have shown that DEHP is readily biodegradable and the SVHC report notes that it is classified as readily biodegradable. Half life data shows that in some circumstances eg low temperatures and anaerobic then it can be persistent. Estimated half lives used by the EU meet the circler is for persistence. Nower for EU assessments to date (eg the SVHC report) it is considered as readily biodegradable and not to meet the criteria for persistence. To be consistent with these assessments have therefore noted it does not meet the criteria for persistence. To be consistent with these assessments have therefore noted it does not meet the criteria for Put have included details of the half life data to indicate that under some circumstances has been found to have relatively long half lives.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	840	SVHC report	The highest BCF for fish is noted to be 840. Measured BCFs for fish were reported in the range of 114 - 1380 in the EU RAR. A higher BCF is reported for invertebrates in the SVHC report with a BCF of 2700 being reported for
Does field data show evidence for biomagnification?	No	0.07	EU RAR (2008)	Gammarus Field evidence appears to show that DEHP does not biomagnify with the highest BMF value being 0.07
If answer to either question is YES, substance is bioaccumulative If no BCF data, is log Kow ≥ 4.5?	Yes	7.5	FURAR (2009)	This value was recommended in the EU RAR based on log Kow values in the range of 4.8 to 9.6
If no BCF data, is log Row 2 4.5? If answer is YES, substance is bioaccumulative	105	1.5	LU RAR (2008)	The range was recommended in the Lo road based on high ruw values in the fallige of 4.0 to 9.0
Does the weight of evidence from the following criteria indicate biaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size 2 4.3mm Molecular size 2 4.3mm Molecular size 3 4.3mm Molecular s				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			The log Kow indicates it meets the criteria for bioaccumulation. However as BCF data is available this is
Is substance bioaccumulative?	No			used in preference. The assessment is based on the BCF data available for fish.
Toxicity				It is not considered appropriate to specify a chronic NOEC for DEHP following exposure via water due to difficulties in
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No ) No		EU RAR (2008) ECHA C&L	studying effects due to low solubility of DEHP. Indications are that DEHP does not show genuine toxic effects at concentrations up to and exceeding water solubility Harmonised C&L classification indicates DEHP does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic	Yes	Repr 1B	database ECHA C&L database	Harmonised C&L classification is available and indicate it meets the criteria for reproductive effects. Its reported
for reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic			database	effects on reproduction are why DEHP has been identified as an SVHC under REACH
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes			Based on it being classified as Repr 1B
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days	No	50days	EU RAR (2008)	Surface water DT50 estimated from biodegradation in eutrophic lake water
Half life in marine, fresh or estuarine water ≥ 00 days	Yes	300days	EU RAR (2008)	Difficult to estimate DT50 but at temps F-120C biodegradation is not significant. Estimated half life of 300days. Degradation in anaerobic sediment noted to be slower than in aerobic
Half life in soil ≥ 180 days	Yes	300days	EU RAR (2008)	Difficult to estimate DT50 but rough estimate of half life at 10oC is 300days, and at room temperature 150days. The available degradation data for sediment and soil indicate that it meets the criteria for persistence as
If answer to any question is YES, substance is very persistent	No (see comment)			under some conditions of low temperature and low oxygen levels then it will be more slowly degraded. Other studies report that it is readily degraded. EU assessments to date have noted that it is considered to be readily biodegradable and not considered persistent based on the criteria. To be consistent with other assessments have noted it as not meeting the criteria for persistence but included data to show that under some circumstances has been found to have relatively long half lives.
Is bioconcentration factor ≥ 5000	No	840	SVHC report	The highest BCF for fish is noted to be 840. Measured BCFs for fish were reported in the range of 114 - 1380 in the EU RAR. A higher BCF is reported for invertebrates in the SVHC report with a BCF of 2700 being reported for Gammarus
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not assessed Not assessed			
the LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic,				
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database	Harmonised C&L classification indicates it does not meet these criteria
If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (if not assume substance is very toxic)				
Is substance very toxic?	No			Does not meet the criteria for mutagenicity.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet criteria for P, B and T. Some question over P but not considered to meet B. Not considered Very Toxic as not mutagenic and not considered to have no determinable threshold.
Does substance have breakdown products of concern?	No			
REFERENCES EU RAR (2008) EU Risk Assessment Report - Di(2-ethylhexyl)phthalate	http://echa.europa.eu/docume	nts/10162/e614617d-	58e7-42d9-b7fb-d7bab	8f26feb

 REFERENCES
 http://echa.europa.eu/documents/10162/e6146170-58e7-42d9-b7tb-d7bab8/26feb

 EU RAR (2006) EU Risk Assessment Report - Di(2-ethylhexyl)phthalate
 http://echa.europa.eu/documents/10162/e6146170-58e7-42d9-b7tb-d7bab8/26feb

 ECHA C&L database
 http://echa.europa.eu/information-on--pre-intervisation-three-intervisati

				Dibutyl phthalate (CAS: 84-74-2)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence	~		511 84 8/884	The report notes that a number of studies indicate ready biodegradability but that degradation rates may be slower in anaerobic
Passes ready biodegradation test Passes inherent biodegradation test	Yes No data		EU RAR(2004)	environments
If answer to both question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is requir				
Half life marine water ≥ 60 days	No	1-23 days	EU RAR(2004)	No degradation half life data given in ESR however as noted above noted to be readily biodegradable although degradation expected to be
Half life fresh or estuarine water ≥ 40 days	No data			slower in anaerobic environments
Half life marine sediment ≥ 180 days	No	2-180 days	EU RAR(2004)	No degradation half life data given in ESR however as noted above noted to be readily biodegradable although degradation expected to be slower in anaerobic environments
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days				
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	No			
Bioaccumulation				BCF of 2125 reported for Pimephales promelas, however this is based on 14-C and so will include all metabolites of the parent molecule
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	1.8	EU RAR(2004)	and so over-estimates the substance's bioaccumulation potential. The selected value only accounts for the parent and not the monoester (known common metabolite), and so may under-estimate the BCF. However, the most relevant BCF, ie that which accounts for the parent and the monoesters. will lie intoetween these two values and will be <2000 in fish.
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	See comment	4.57	EU RAR(2004)	Log Kow marginally above threshold however as BCF data is available latter is used in the assessment
Does the weight of evidence from the following criteria indicate	Not assessed due to			
bioaccumulation unlikely? Substance is chronically non-toxic in mammals	above information			
Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	No			BCF values do not exceed the threshold
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	0.1 mg/L	EU RAR(2004)	NOEC (10d) Gammarus pulex and NOEC (60d) (post hatch) for Onchorhynchus mykiss
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	Harmonised C&L classification is available for dibutyl phthalate which indicates it does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Repr 1B	ECHA C&L database	Harmonised C&L classification is available for dibutyl phthalate which indicates it meets the criteria for reproductive toxicity. It has been classified as an SVHC (Substance of Very High Concern) based on its reproductive effects.
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Harmonised C&L classification indicates it meets the criteria for reproductive toxicity.
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for P or B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				No degradation half life data given in ESR however as noted above noted to be readily biodegradable although degradation expected to be
Half life in marine, fresh or estuarine water ≥ 60 days	No No Data	1-23 days	EU RAR(2004)	No degradation namine data green in ESR nowever as noted above noted to be readily biodegradable annough degradation expected to be slower in anaerobic environments
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	No Data No	2-180 days	EU RAR(2004)	No degradation half life data given in ESR however as noted above noted to be readily biodegradable although degradation expected to be
If answer to any question is YES, substance is very persistent				slower in anaerobic environments
le bioconcentration factor > 5000	No	1.0	ELL DAD(2004)	BCF of 2125 reported for Pimephales promelas, however this is based on 14-C and so will include all metabolites of the parent molecule and so over-estimates the substance's bioaccumulation potential. The selected value only accounts for the parent and not the monoester
Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	NU	1.8	EU RAR(2004)	(known common metabolite), and so may under-estimate the BCF. However, the most relevant BCF, ie that which accounts for the parent and the monoester, will lie inbetween these two values and will be <2000 in fish.
	N-			Dess net meet artistis for vB as vB
Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for vP or vB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1	Not assessed			
vear Do ≥ 5% of groundwater samples show levels of the substance				
greater than the LOQ? Do ≥ 15% of sites have at least one sample where the substance is	Not assessed			
detected above the LOQ? If answer to any question is YES, substance is persistent in	Not assessed			
groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database	Harmonised C&L classification for dibutyl phthalate indicates it does not meet the criteria for mutagenicity
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			Does not meet the criteria for mutagenicity or no determinable threshold.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet the criteria for P, B and T nor those for either of the equivalent concern criteria, e vPvB or vT (Muta) NB Dibutyl phthalate has been identified as a Substance of Very High Concern under REACH due to its reproductive effects
Does substance have breakdown products of concern?	No			

 REFERENCES
 Impulsion

 EU Risk Assessment Report dibutyl phthalate (with addendum 2004)
 http://echa.europa.eu/documents/10162/04/79b21-0b6d-4e67-91b9-0a704ea7500

 ECHA C&L database
 http://echa.europa.eu/information-on-chemicata/cl-inventory-database/-dc-inventory/isex-notification-summary/16769

	Yes / No / Insufficent			Dichloromethane (CAS: 75-09-2)
	data / Borderline /	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	assume yes or no?			
ersistence				
asses ready biodegradation test	Yes	Readily biodegraded	HSDB	Noted to be readily biodegradable based on the results of an OECD 301 study.
asses inherent biodegradation test answer to either question is YES, substance is not persistent				
answer to entre question is FES, substance is not persistent answer to both questions is NO, additional data on half life is required				
łalf life marine water ≥ 60 days łalf life fresh or estuarine water ≥ 40 days				
lalf life marine sediment ≥ 180 days				
lalf life fresh or estuarine sediment ≥ 120 days	No	10.9days	OECD SIDS	Study noted a half life of 10.9days in natural sediment with an initial concentration of dichloromethane of 3.3
lalf life in soil ≥ 120 days				
answer to any question is YES, substance is persistent answer to all questions is NO, substance is not persistent				
s sufficient data available? (if not assume substance is persistent)				
s substance persistent?	No			Limited data was available on the persistence of dichloromethane. The data indicated hydrolysis was not a lip process but that vidailisation was an important process along with biodegradation. Vidailisation however is a key consideration for an assessment for groundwater. The available data do not indicate it meets the crite
Sigaccumulation				for persistence.
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	2.3	Canadian EPA	Supported by data in the OECD SIDS assessment which noted BCFs in the range of 0.9 - 40
loes field data show evidence for biomagnification? answer to either question is YES, substance is bioaccumulative				
			Canadian EPA;	
no BCF data, is log Kow ≥ 4.5? answer is YES, substance is bioaccumulative	No	1.25	OECD SIDS	This is reported to be a measured log Kow value.
Does the weight of evidence from the following criteria indicate bioaccumulation inlikely?	Not assessed due to the	above information		
Substance is chronically non-toxic in mammals				
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
ubstance is not bioaccumulative				
weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), ICF data should be obtained				
s sufficient data available? (if not assume substance bioaccumulates)	Yes			
substance bioaccumulative?	No			
oxicity				
				28d NOEC for body weight endpoint in Pimephales promelas (fish); NOEC for mortality, larval survival endp = 142 mg/l. These were the lowest chronic toxicity endpoints located. Considering the acute toxicity data t
the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	No	83 mg/l	OECD SIDS	The might measure the kinet of the local time backing or department because. Or department of the constraints are the most sensitive of the organisms tested. Chronic data was not availab for this species. Due to the acute sensitivity the chronic toxicity was predicted using QSARs in the OECD SIDS assessment. The QSAR estimates gave a predicted 21d NOEC of 6.2 mg/l and 13.3 mg/l. This data supports the data indicating dichloromethane does not meet the oriteria for aquatic toxicity.
there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	the database noted these.
s substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for eproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	EU harmonised classification indicated Care 2. No classification for mutagenicity although some industry notifications provided for the C&L process indicated Muta 2. Some studies have indicated that DCM may b mutagenic in some organisms as noted in USEPA (2011). The OECD SIDS document noted that overall it data indicate dichloromethane is not genotoxic in vitro. WHO (2003) also note that the data indicate it is no enotoxic carrinogen.
f answer to any question is YES, substance is toxic f answer to all questions is NO, substance is not toxic				
s sufficient data available? (if not assume substance is toxic)	Yes			
s substance toxic?	No			
S SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			
Does substance pose an equivalent level of concern?				
<pre>/ery persistent and very bioaccumulative? lalf life in marine, fresh or estuarine water ≥ 60 days</pre>	No	7-56 days		Study on ECHA-CHEM in natural water/sediment system noted a half life of 10.9days. Study included on
laf life in marine, fresh or estuarine water ≥ 00 days	No Data	7-50 days	through eChemPortal)	EnviroChem noted a groundwater estimated half life of 56days.
alf life in soil ≥ 180 days	No	9.4 - 191days	ECHA-CHEM	Studies on ECHA-CHEM in different soils indicated half lives in the range of 9.4 - 191days. The majority of
f answer to any question is YES, substance is very persistent				studies were below the criterion
s bioconcentration factor ≥ 5000	No	2.3	Canadian EPA	Supported by data in the OECD SIDS assessment which noted BCFs in the range of 0.9 - 40
answer is yes, substance is very bioaccumulative				
substance very persistent and very bioaccumulative?	No			Does not meet criteria for vP and vB
oes substance pose a specific risk to groundwater?				
loes groundwater monitoring data show half life in groundwater ≥ 1 year lo ≥ 5% of groundwater samples show levels of the substance greater than the	Not Assessed			
$\sim$ 2 15% of sites have at least one sample where the substance is detected	Not Assessed			
bove the LOQ?	Not Assessed			
answer to any question is YES, substance is persistent in groundwater substance persistent in groundwater?	Not Assessed			
substance is persistent in groundwater, bioaccumulative AND toxic,				
ubstance is hazardous oes substance pose a specific risk to groundwater?	Not Assessed			
substance very toxic? substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for			ECHA C&L database;	EU harmonised classification indicates no classification for Muta. Some studies have indicated that DCM n
substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for dverse effects on human health	No		ECHA C&L database; WHO (2003)	be mutagenic in some organisms as noted in USEPA (2011). However in line with WHO guidelines on drin water, are proposing that dichloromethane does not meet the criteria for mutagenic.
answer to any question is YES, substance is very toxic and hazardous				water, are proposing that divinormaticane does not filled the different for filled terms
sufficient data available? (if not assume substance is very toxic)	Yes			
substance very toxic?	No			
Is substance hazardous to groundwater?				
s substance hazardous, if so, state on what basis	No			Does not meet the criteria for P, B and T or those for equivalent concern, ie vPvB and Very Toxic
loes substance have breakdown products of concern?	No- Eurochlor Environ hydrogen chloride (HC			ents (2013) "Complex sequences of reactions then lead to the formation of products that include (HCOC))"
	nyarogen chioride (HC	iy, priosgene (COCI2	and for myr chioride	
EFERENCES anadian Environmental Protection Act- Priority Substances List Assessment Re	¢ <u>http://www.hc-sc.gc.</u> ca/e	ewh-semt/alt_formats	/hecs-sesc/pdf/pubs/co	ontaminants/psl1-lsp1/dichloromethane/dichloromethane-eng.pdf
ECHA C&L database	https://echa.europa.eu/in	formation-on-chemic	als/cl-inventory-databas	e/-/discli/details/7285

 Internet
 Consistence
 Display
 Display

				Dioxins
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test				
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent				
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	Yes	1.5 years	US EPA fact sheet	
Half life fresh or estuarine sediment ≥ 120 days Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	Yes	>10years	POPS Toolkit	
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent	165	Proyears	FOF3 TOOINI	
Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes			Dioxins have been identified as a Persistent Organic Pollutant (POP) under the Stockholm Convention. POPs are of concern in the environment due to the fact they can accumulate in the tissues of organisms, are persistent and can be transported long distances and are toxic to organisms.
Bioaccumulation		Approx 7000 to	EU WFD EQS	
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification?	Yes	Approx 7900 to >173000	dossier	POP summary notes a BCF of 26707 in rainbow trout
If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5?	Yes	6 to 8.2	EU WFD EQS dossier	
If answer is YES, substance is bioaccumulative				
Dees the weight of evidence from the following criteria indicate bioaccumulation unikely? Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unikely (i.e. YES answers) sub If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers),	to above data stance is not bioaccum			
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	Yes	0.00000038mg/l	POP toolkit	56day NOEC Onchorhynchus mykiss Harmonised C&L classification not available. As other data, eg aquatic NOEC,
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	See comment		ECHA C&L database	and IARC classification supports high toxicity have not pursued this further
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes (see comment)	IARC Group 1 carcinogen	IARC	Harmonised C&L classification not available. 2,3,7,8-TCDD classified as a Group 1 carcinogen by IARC. Group1 indicates that is sufficient evidence to indicate carcinogenicity to humans
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes <b>Yes</b>			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Meets the criteria for persistence, bioaccumulation and toxicity. Dioxins are classified as a POP (Persistent Organic Pollutant). Under the Stockholm Convention POPs are identified based on the fact they are substances that are persistent in the environment and can be transported for long distances, are toxic and also can accumulate in the tissues of organisms.
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	1.5 years	US EPA fact sheet	
Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	Yes	>10years	POPs Toolkit	
Is bioconcentration factor ≥ 5000	Yes	Approx 7900 to	EU WFD EQS	
If answer is yes, substance is very bioaccumulative		>173000	dossier	
Is substance very persistent and very bioaccumulative?	Yes			Dioxins are classified as a POP (Persistent Organic Pollutant)
Dees substance pose a specific risk to groundwater? Dees groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed Not assessed Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				Harmonised C&L classification not available. IARC has been identified as a
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No (see comment)			Group 1 carcinogen, which indicates sufficient information to indicate carcinogenicity to humans. Mutagenic effects have not been reported. WHO note that dioxins are not genotoxic carcinogens and therefore it is noted they have a threshold for carcinogenicity.
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	Yes No			Does not meet criteria for mutagencity or no determinable threshold.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			Meets the criteria for P, B and T as well as vP and vB. Dioxins are classified as a POP (Persistent Organic Pollutant)
Does substance have breakdown products of concern?	No			
REFERENCES EU WFD EQS dossier (2012)				326c14/Dioxins%20&%20PCB-DL%20EQS%20dossier%202011.pdf
US EPA Factsheet POPs Toolkit LARC (2012)	http://www.epa.gov/og http://www.popstoolkit	gwdw/pdfs/factsheet: t.com/about/chemica	s/soc/tech/dioxin.pdf	
	naparnionographs.lari	C.II/EING/MO/Ograph	arvorroor/mon0100F-2	

Is substance persistent, bioaccumulative and toxic? Persistence Passes internet biodegradation test Passes internet biodegradation test If answer to either question is YES, substance is not persistent If answer to bith questions is NO, additional data on half life is required Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life fresh or estuarine water ≥ 40 days	Yes / No / Insufficent data / Borderline / assume yes or no?		Luiyion	e glycol (CAS Number: 107-21-1)
Persistence Passes ready biodegradation test Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required Half life marine water ≥ 60 days Half life rest or estuarine water ≥ 40 days		Value	Reference	Comments
Passes ready biodecradation test Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required Half life fresh or estuarine water ≥ 40 days				
Passes inherent biodegradation test If answer to binter question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days	Mar		01045-00	
lf answer to both questions is NO, additional data on half life is required Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days	Yes		CICAD 22	SIDS report notes an OECD 301 study showing 96% degradation in 28days
Half life fresh or estuarine water ≥ 40 days				
	No	<20days	CICAD 22	
	No	<21days	CICAD 22	
Half life fresh or estuarine sediment ≥ 120 days				
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	No	2-12days	Environment Canada (2000)	
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	No			The available data indicates it does not meet the criteria for persistence
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	0.6 to 190	CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe
Does field data show evidence for biomagnification?	NO	0.010190	CICAD 22	Teo relets to algae, BCF or to measured in the golden one
If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5?	No	-1.36	CICAD 22	
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to the above information			
Substance is chronically non-toxic in mammals	above information			
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers),				
BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			The available data indicates it does not meet the criteria for bioaccumulation.
				The available data indicates it does not meet the criteria for bioaccumulation.
Toxicity	No	8590mg/l	US EPA Ecotox database;	NOEC (7d) Ceriodaphnia
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	NO	6590mg/i	CICAD 22	
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	EU harmonised C&L classification for ethylene glycol indicates it does not meet the criteria as not classified as STOT RE1 or RE2
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	No		ECHA C&L database	EU harmonised C&L classification for ethylene glycol indicates it does not meet the criteria for
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic				carcinogenicity, mutagenicity or toxic for reproduction
If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes No			The available data indicates it does not meet the criteria for toxicity
	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?				Doesn't meet criteria for P, B or T
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC? Does substance pose an equivalent level of concern?				Doesn't meet criteria for P, B or T
Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative?	'n		0.010 m	Doesn't meet criteria for P, B or T
Does substance pose an equivalent level of concern?	No	<21days	CICAD 22	Doesn't meet criteria for P, B or T
Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	No	<21days 2-12days	CICAD 22 Environment Canada (2000)	
Does substance pose an equivalent level of concern? Very persistent and very bloaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days				
Does substance pose an equivalent level of concern?           Very persistent and very bloaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in soll ≥ 180 days           If affite in soll ≥ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000				
Does substance pose an equivalent level of concern? Very persistent and very bloaccumulative? Half life in marine, fresh or estuarine water ≿ 60 days Half life in marine, fresh or estuarine sediment ≿ 180 days Half life in soll ≿ 180 days If answer to any question is YES, substance is very persistent	No	2-12days	Environment Canada (2000)	
Does substance pose an equivalent level of concern?           Very persistent and very bloaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in soll ≥ 180 days           If affite in soll ≥ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000	No	2-12days	Environment Canada (2000)	
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in on an question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves. substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?	No No <b>No</b>	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≿ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in soil ≥ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is yes, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?	No No No Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≿ 80 days           Half life in soil ≈ 180 days           Half life in soil ≈ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves. substance is very bioaccumulative           Is substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater ≥ 1 vear           Doe Siv of groundwater samples show levels of the substance greater than the LOQ?	No No No assessed Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≿ 80 days           Half life in marine, fresh or estuarine sediment ≿ 180 days           Half life in soil ≥ 180 days           If answer to any question is VES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves. substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does divolavater monitoring data show half life in aroundwater ≥ 1 vear           Do% of groundwater samples show levels of the substance greater than the LOQ?           Do 2 16% of sites have at least one sample where the substance is detected above the LOQ?	No No No Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in onl ≥ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer to every persistent and very bioaccumulative           Is substance very persistent and very bioaccumulative?           Dees substance pose a specific risk to groundwater?           Does Substance pose a specific risk to groundwater?           Does 2 5% of groundwater monitoring data show half life in aroundwater ≥ 1 vear           Do ≥ 15% of groundwater monitoring data show half life in aroundwater ≥ 1 vear           Do ≥ 15% of groundwater monitoring data show half life in aroundwater ≥ 1 vear           Do ≥ 15% of groundwater	No No No assessed Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≿ 80 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in soli ≥ 180 days           If answer to any question is VES, substance is very persistent           Is bioconcentration factor ≿ 5000           If answer is ves, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater?           Does down the LOQ?           If answer to any question is YES, substance is persistent in groundwater lies substance bis estistent in groundwater           If auswer to any question is YES, substance is persistent in groundwater lies substance persistent in groundwater           If auswer to any question is YES, substance is persistent in groundwater           If substance is persistent in groundwater?	No No No Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in soli ≥ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer to any question is YES, substance is very persistent           Is substance very persistent and very bioaccumulative           Is substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater ≥ 1 vear           Do ≥ 15% of groundwater monitoring data show half life in aroundwater ≥ 1 vear           Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?           If answer to any question is YES, substance is persistent in groundwater	No No No Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≿ 80 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in morine, fresh or estuarine sediment ≥ 180 days           Half life in soli ≥ 180 days           If answer to any question is VES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does for discharce pose a specific risk to groundwater?           Does 16% of groundwater samples show levels of the substance is detected above the LOQ?           If answer to any question is YES, substance is persistent in groundwater is substance is persistent in groundwater?           If substance is persistent in groundwater?           If substance is persistent in groundwater?           Does substance is persistent in groundwater?           Does substance is persistent in groundwater?           Does substance pose a specific risk to groundwater?           Is substance pose a specific risk to groundwater?	No No No Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in oil: 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance overy persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does for ondwater monitoring data show half life in aroundwater ≥ 1 vear           Do ≥ 15% of groundwater monitoring data show half if in aroundwater ≥ 1 text           Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If substance presistent in groundwater?           If substance is hearardous           Does substance persistent in groundwater?	No No No Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000)	190 refers to algae, BCF of 10 measured in the golden orfe
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in straine, fresh or estuarine sediment ≥ 180 days           Half life in 12 80 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does 15% of groundwater monitoring data show half life in aroundwater ≥ 1 vear           Do2 15% of groundwater samples show levels of the substance is detected above the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If substance parsistent in groundwater?           If substance is persistent in groundwater?           Is substance paralytic.           Is substance paralytic.           Is substance very toxic?           Is substance insugenic (Muta 1A, 1B,2) or have no determinable threshold for	No No No Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in one: 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater ≥ 1 vear           Doe 3 toxid of sites have at least one sample where the substance greater than the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If substance presistent in groundwater?           If substance pose a specific risk to groundwater?           Is substance presistent in groundwater?           Is substance pose a specific risk to groundwater?           Is substance with province?           Is substance with agenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health if answer to any question is YES, substance is very toxic and hazardous	No No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in an extra to a stuarine sediment ≥ 180 days           Half life in an extra to a stuarine sediment ≥ 180 days           Half life in all 2180 days           If answer to any question is YES, substance is very persistent           is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           ts substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does 15% of optimidater monitoring data show half life in aroundwater ≥ 1 vear           Doe 2 5% of optimidater samples show levels of the substance greater than the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If substance presistent in groundwater?           If substance presistent in groundwater?           Is substance very toxic?           Is substance with agenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health.           In answer to any question is YES, substance is very toxic and hazardous           Is substance very toxic?           I	No No No Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in one: 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater ≥ 1 vear           Doe 3 toxid of sites have at least one sample where the substance greater than the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If answer to any question is YES, substance is persistent in groundwater?           If substance presistent in groundwater?           If substance pose a specific risk to groundwater?           Is substance presistent in groundwater?           Is substance pose a specific risk to groundwater?           Is substance with province?           Is substance with agenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health if answer to any question is YES, substance is very toxic and hazardous	No No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB
Does substance pose an equivalent level of concern?           Yary persistent and very bioaccumulative?           Half life in marine, fresh or estuarine valer ≥ 60 days           Half life in marine, fresh or estuarine valer ≥ 60 days           Half life in anie, fresh or estuarine valer ≥ 60 days           Half life in anie, fresh or estuarine valer ≥ 80 days           Half life in anie, fresh or estuarine valer ≥ 60 days           Half life in anie, 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater ≥ 1 vear           Do ≥ 15% of groundwater monitoring data show half life in aroundwater ≥ 1 vear           Do ≥ 15% of groundwater sample where the substance is detected           above the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If substance presistent in groundwater?           If substance is heazerdous?           Dees substance pose a specific risk to groundwater?           Is substance ward question is YES, substance is very toxic, and hazardous           Des substance very toxic?           Is substance in an question is YES, substance is very toxic and hazardous           Des substance	No No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vΒ
Does substance pose an equivalent level of concern?           Yery persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in all > 180 days           If all fife in soll > 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is yes, substance is very bioaccumulative           Is substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater ≥ 1 vear           Do ≥ 15% of groundwater monitoring data show hell file in groundwater ≥ 1 vear           Do ≥ 15% of siles have at least one sample where the substance is detected above the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If substance is hazerdous?           Des substance pose a specific risk to groundwater?           If substance is hazerdous?           If substance very existent in groundwater?           If substance very toxic?           Is substance water question is YES, substance is very toxic and hazardous           Does effects on human healting any duestion is YES, substance is very toxic and hazardous           Is substance very toxic?           Is substance very toxic?           Is substance very toxic?	No No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB EU harmonised C&L classification available and no classification for mutagenicity assigned
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in sol ≥ 180 days           If answer to any question is YES, substance is very persistent           is bioconcentration factor ≥ 5000           If answer to any question is YES, substance is very persistent           is bioconcentration factor ≥ 5000           If answer to any question is YES, substance is very bioaccumulative           Is substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater?           Does 15% of sites have at least one sample where the substance is detected above the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           If substance persistent in groundwater?           If substance persistent in groundwater?           If substance pose a specific risk to groundwater?           Is substance provery toxic?           Is substance on mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human heath.           If answer to any question is YES, substance is very toxic)           Is substance very toxic?           Is substance very toxic?           Is substance very toxic?           Is substance very toxic?	No No No Not assessed No	2-12days	Environment Canada (2000) CICAD 22	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB EU harmonised C&L classification available and no classification for mutagenicity assigned
Does substance pose an equivalent level of concern?           Vary paraistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine water ≥ 80 days           Half life in marine, fresh or estuarine water ≥ 180 days           Half life in marine, fresh or estuarine substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is ves, substance is very bioaccumulative           Is substance very persistent and very bioaccumulative?           Does substance pose a specific risk to groundwater?           Does groundwater monitoring data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1 year           Does data show half in oroundwater ≥ 1           # substance presistent in groundwater?           If substance is persistent in groundwater?           If substance wategoin is YES, substance is very toxic, and hazardous           Is substance wategoin is YES, substa	No No No No No Not assessed No	2-12days 0.6 to 190	Environment Canada (2000) CICAD 22 ECHA C&L database	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB EU harmonised C&L classification available and no classification for mutagenicity assigned Does not meet criteria for P, B and T nor those for vPvB or Very Toxic
Does substance pose an equivalent level of concern?           Very persistent and very bloaccumulative?           Half life in a 180 days           Half life in a 180 days           If all rife in all 180 days           If all rife in all 180 days           If all rife in all 180 days           If answer to any question is YES, substance is very persistent           Is bloconcentration factor ≥ 5000           If answer is ves, substance is very bloaccumulative           Is substance very persistent and very bloaccumulative?           Does substance pose a specific risk to groundwater?           Does dupt and were monitorin data show half in aroundwater ≥ 1 year           Does for ondwater monitorin data show half in a roundwater ≥ 1 year           Does dupt and were monitorin data show half in aroundwater ≥ 1 year           Does dupt and were monitorin data show half in a roundwater ≥ 1 year           Does substance pose a specific risk to groundwater?           If substance persistent in groundwater?           If substance persistent in groundwater?           If substance were to any question is YES, substance is persistent in aroundwater           Is substance pose a specific risk to groundwater?           Is substance or question is YES, substance is very toxic, and hazardous           Is substance were to any caustion is YES, substance is very toxic and hazardous           Is substance hazardous,	No No No No No Not assessed Not	2-12days 0.6 to 190	Environment Canada (2000) CICAD 22 ECHA C&L database	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB EU harmonised C&L classification available and no classification for mutagenicity assigned Does not meet criteria for P, B and T nor those for vPvB or Very Toxic
Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water 2 60 days           Half life in marine, fresh or estuarine water 2 60 days           Half life in anie, fresh or estuarine water 2 60 days           Half life in anie, fresh or estuarine water 2 60 days           Half life in anie, fresh or estuarine water 2 60 days           Half life in anie, 180 days           If answer to any question is YES, substance is very persistent           is bioconcentration factor 2 5000           If answer is ves, substance is very bioaccumulative           Is substance pose a specific risk to groundwater?           Does substance pose a specific risk to groundwater?           Does 15% of or sites have at least one sample where the substance greater than the LOQ?           If answer to any question is YES, substance is persistent in groundwater?           is substance parsistent in groundwater?           If substance is persistent in groundwater?           If substance pose a specific risk to groundwater?           Is substance pose a specific risk to groundwater?           Is substance in undgenic (Muta 1A, 1B,2) or have no determinable threshold for it answer to any question is YES, substance is very toxic and hazardous           Is substance hazardous, if so, state on what basis           Does substance have breakdown products of concern? <tr< td=""><td>No No No No Not assessed Not as</td><td>2-12days 0.6 to 190</td><td>Environment Canada (2000) CICAD 22 CICAD 22 ECHA C&amp;L database</td><td>190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB EU harmonised C&amp;L classification available and no classification for mutagenicity assigned Does not meet criteria for P, B and T nor those for vPvB or Very Toxic</td></tr<>	No No No No Not assessed Not as	2-12days 0.6 to 190	Environment Canada (2000) CICAD 22 CICAD 22 ECHA C&L database	190 refers to algae, BCF of 10 measured in the golden orfe Doesn't meet criteria for vP or vB EU harmonised C&L classification available and no classification for mutagenicity assigned Does not meet criteria for P, B and T nor those for vPvB or Very Toxic

				Flufenacet (CAS: 142459-58-3)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test Passes interent biodegradation test	No		EU PPPD review	Notes flufenacet is not readily biodegradable
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 davs Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	Yes	46.3 - 61.7days	EU PPPD review	
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	No No	76.4 - 84.6days 15-86days	EU PPPD review EU PPPD review	Study involving the whole system, ie water and sediment Results from studies using various soil types. A half life of 86days was noted for cooler temperatures
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes Yes			
Bioaccumulation	Ne	74.4		DOE units for fish and in the Ellipsism
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No No data	71.4	EU PPPD review	BCF value for fish noted in the EU review
If no BCF data, is log Kow ≥ 4.5?	No	3.2	EU PPPD review	
If answer is YES, substance is bioaccumulative				
Dees the weight of evidence from the following criteria indicate bioaccumulation unikely? Substance is chronically non-toxic in mammals Molecular size 24.3nm Molecular weight 2: 1100g/mol Costance individiry c 0.002mmol/	Not assessed due to abo	we data being availabl	le	
Octanol solubility s 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			Neither the BCF or log Kow data indicate it meets the criteria for B
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.002	EU PPPD review	Lowest acute toxicity value was a the value of 0.002mg/l reported for the 72hr EC50 for the alga Selenastrum capricornutum. Alga species are much more sensitive than either invertetrates or fish. No chronic data located however based on the acute data potential to meet the criteria. The chronic fish study NOEC (97days) for Onchorynchus mykiss was 0.2mg/
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes	STOT RE2	ECHA C&L database	criterion.
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	No		ECHA C&L database	for C, M or R
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes			Meets criteria for chronic NOEC as well as STOT RE2
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days // answer to any question is YES, substance is very persistent	Borderline ves No No	46.3 - 61.7days 76.4 - 84.6days 15-86days	EU PPPD review EU PPPD review EU PPPD review	The upper value given for the water degradation half life indicates exceedance of the criteria
Is bioconcentration factor ≥ 5000	No	71.4	EU PPPD review	BCF value reported for fish
If answer is yes, substance is very bioaccumulative				Does not meet vB criteria although persistence in water criteria is met based on some of the
Is substance very persistent and very bioaccumulative?	No			degradation results
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the	Not assessed Not assessed			
LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater	Not assessed			
Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database	Harmonised C&L classification available for flufenacet. It is not classified as mutagenic.
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	Yes No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			
Does substance have breakdown products of concern?	No			

REFERENCES

EU PPPD review (2003) ECHA C&L database

http://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/public/?event=activesubstance.detail&language=EN&selectedID=1380 https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/107101\_

				Gluteraldehyde (CAS: 111-30-8)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	Yes		OECD SIDS	OECD 301D study (74% in 28 days). Gluteraldehyde is also noted to be readily biodegradable in an EU review undertaken for the EU biocide regulations (EU, 2014).
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent				
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	No data			
Half life fresh or estuarine water ≥ 40 days	No	10hours	OECD SIDS	Limited data is available on the degradation of gluteraldehyde. The available data indicates it does not meet the persistence criteria as supported by the ready biodegradability study noted above.
Half life marine sediment ≥ 180 days	No data			
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	No data No data			
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	No			Gluteraldehyde has been observed to be readily biodegradable. This is supported by limited data on the degradation half lives for gluteraldehyde. Although the data is limited the available information indicates it does not meet the persistence criteria.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No		OECD SIDS	No BCF data was located. The SIDS review notes that as gluteraldehyde is hydrophilic and non- persistent it is not expected to bioaccumulate. This is supported by the log Kow data
If answer to either question is YES, substance is bloaccumulative				
If no BCF data, is log Kow ≥ 4.5?	No	-0.01, -0.18	OECD SIDS, EPA (2007)	These low values are also supported by data in the EU reviews undertaken for the purposes of the biocidal regulations. Log Kow of -0.33 and -0.36 were reported in the review for some biocidal uses (EU, 2014).
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to the availability of the above information			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l # weight we shrulen a molecularitation uninery (i.e. FLS driswers)				
ії медля сі суловисе илисаю́з йлассалиялання а роззилясу (г.е. 140				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			Limited data is available but the weight of evidence indicates it does not meet the criteria for
Is substance bioaccumulative?	No			bioaccumulation
Toxicity			0505 0/50	
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	No	0.625 mg/L	OECD SIDS	0.625 mg/L algae (biomass endpoint), 2.1 mg/l 21d Daphnia magna study 
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	meet the criteria.
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database; OECD SIDS	EU harmonised C&L classification available for gluteraldehyde. The classification shows it does not meet the criteria.
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Gluteraldehyde does not meet the criteria for persistence, bioaccumulation or toxicity
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	No	10hours	OECD SIDS	Limited data is available on the degradation of gluteraldehyde. The available data indicates it does not meet the persistence criteria as supported by the ready biodegradability study noted above.
Half life in marine, fresh or estuarine sediment ≥ 180 days	No data			
Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	No data			
				No BCF data was located. The SIDS review notes that as gluteraldehyde is hydrophilic and non-
Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	No		OECD SIDS	persistent it is not expected to bioaccumulate. This is supported by the log Kow data
in answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			Gluteraldehyde does not meet the criteria for either vP or vB
Does substance pose a specific risk to groundwater?	Not			
Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than the	Not assessed			
LOQ? Do $\geq$ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
is substance persistent in groundwater? Il substance is persistent in groundwater, bioaccumulative Arvo toxic,	1401 03953560			
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L Database; OECD SIDS	EU harmonised C&L classification available for gluteraldehyde. The classification shows it does not meet the criteria.
If answer to any question is YES, substance is very toxic and hazardous			-	
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet the criteria for P, B or T nor vPvB or Very Toxic
Does substance have breakdown products of concern? REFERENCES	No			
EPA (2007) Reregistration Eligibility Decision for Glutaraldehyde EPA 739-R-07 OECD SIDS for Gluteraldehyde	http://webnet.oecd.org/H	lpv/UI/handler.axd	?id=da11e1ee-332f-4be	e5-96ef-d1d4f81d3d57
ECHA C& L Database EU (2014)	https://echa.europa.eu/ir http://dissemination.ech/	nformation-on-che	micals/cl-inventory-datal	base/-/discli/details/115859 310-02/1310-02_Assessment_Report.pdf.

	Yes / No / Insufficent data / Borderline / assume yes or	Value	Reference	locyclododecane (HBCDD) (CAS: 25637-99-4) Comments			
Is substance persistent, bioaccumulative and toxic?	no?						
Persistence							
Passes ready biodegradation test	No	None in 28 days	EU RAR	No biodegradation of HBCDD at 7.7 mg/l was observed over the 28-day test period.			
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required	No data						
Half life marine water ≥ 60 davs	No data						
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	No data No data						
Half life fresh or estuarine sediment ≥ 120 days	Yes	210 days	ECHA SVHC	OECD 308 study. This is a half life in sediment recalculated at 12oC and based on the alpha isomer. A further study on the gamma isomer indicated a half life of 197 days at 12oC.			
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes	No degradation	ECHA SVHC	No degradation refers to one study in aerobic soil. Another study study value of 119 days is reported.			
If answer to any question is rEs, substance is persistent If answer to all questions is NO, substance is not persistent							
Is sufficient data available? (if not assume substance is	Yes			Based on soll data with sediment data supporting conclusion (although some isomers may			
Is substance persistent?	Yes			not fulfill P criterion). HBCDD has been identified as a POP, ie Persistent Organic Pollutant under the Stockholm Convention and has been reported to be detected in remote areas providing evidence of persistence in the environment			
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥							
2000	Yes	18100		32-day study, steady state result, for the fish <i>Pimephales promelas</i> Lab study for dietary uptake in trout clearly demonstrating biomagnification (dietary BMFs for the 6- and v-disateromers calculated as 92, 4.3 and 72, respectively). The SVHC report notes a large			
Does field data show evidence for biomagnification?	Yes		EU RAR; ECHA SVHC	set of measured data in biota in the field show, that HBCDD is biomagnified in the environment. Increasing concentrations of HBCDD have been found in several time series of, e.g. birds and marine mammals.			
If answer to either question is YES, substance is bioaccumulative							
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	Yes	5.63	EU RAR	Value measured for the technical product (mixture of isomers)			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to the availability						
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol	of the above info						
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative							
answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained							
Is sufficient data available? (if not assume substance bioaccumulates)	Yes						
Is substance bioaccumulative?	Yes			Based on BCF and log Kow data			
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms a	Yes	0.0031mg/l	EU RAR	NOEC (21d) Daphnia magna			
0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1 or	No		ECHA-C&L database	EU harmonised C&L classification. It is not classified as either STOT RE1 or RE2 and therefore			
STOT RE2)	110		Lonin out database	doesn't meet the criteria.			
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Repr 2	ECHA-C&L database	EU harmonised C&L classification. It is classsified as Repr 2 and therefore meets the criteria			
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic							
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes						
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND				Annual DDT is the Fill under DF 4011 or antilized in the DMIC annual Also identified on a DDD			
TOXIC?	Yes			Agreed PBT in the EU under REACH as outlined in the SVHC report. Also identified as a POP (Persistent Organic Pollutant)			
Does substance pose an equivalent level of concern?							
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days	No data						
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 davs	Yes	210 days No degradation;	ECHA SVHC ECHA SVHC	OECD 308 study No degradation refers to one study in aerobic soil; second study value represents dissipation Time			
If answer to any question is YES, substance is very persistent	165	119 days	LOIKSVIC	50, therefore underestimates degradation.			
Is bioconcentration factor ≥ 5000	Yes	18100	EU RAR; ECHA SVHC	32-day study, steady state result, for the fish Pimephales promelas			
If answer is ves. substance is verv bioaccumulative							
Is substance very persistent and very bioaccumulative?	Yes			The SVHC agreement report notes that it is VB but does not indicate vP even though a study reported for sediment indicates a half life of >180days.			
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater	Not assessed						
≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance	Not assessed						
greater than the LOQ? Do ≥ 15% of sites have at least one sample where the substance							
is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater							
Is substance persistent in groundwater?	Not assessed						
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed						
Is substance very toxic?							
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database	EU harmonised C&L classification. It is not classified as Muta 1A, 18 or 2. The EU risk assessment report for this substance has summarised the available data and states that the preponderance of evidence from available studies includes that HE/DCDD tacks significant genotack potential in vitro as			
				well as in vivo'. This supports the proposal that HBCDD does not meet the criteria for Very Toxic			
If answer to any question is YES, substance is very toxic and hazardous							
Is sufficient data available? (if not assume substance is very tovic) Is substance very toxic?	Yes No						
Is substance hazardous to groundwater?							
Is substance hazardous, if so, state on what basis	Yes			Has been identified as a PBT substanceunder REACH (ECHA SVHC report). HBCD has also been designated as a POP under the Stockholm Convention.			
Does substance have breakdown products of concern?	No						
REFERENCES EU RISK ASSESSMENT- Hexabromocyclododecane (2008)			2/661bff17-dc0a-4475-975				
ECHA SVHC support document (2008) ECHA-C&L database ECHA SVHC Agreement (2008)	https://echa.europa https://echa.europa https://echa.europa	.eu/aocuments/1016 .eu/information-on-c .eu/documents/1016	2/3f5de199-8732-4881-ae hemicals/cl-inventory-data 2/47d061d9-e336-4139-8	ccF-7200F04909a36 base-//disc/Utal/14361 830-f00331278cda			

	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Hexachlorobenzene (CAS: 118-74-1) Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test				
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent K exercise to the test exercise is NC, substance is not persistent				
If answer to both questions is NO, additional data on half life is required Half life marine water ≥ 60 days				
Half life fresh or estuarine water ≥ 40 days	Yes	2.7 to 5.7 years	EFSA (2006)/ Eurochlor (2005)	Eurochlor (2005) reported half lives in groundwater of 5.3 - 11.4 years have been estimated
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days				
Half life in soil ≥ 120 days <i>f answer to any question is</i> YES, substance is persistent	Yes	3 to 6 years	EFSA (2006)	
If answer to all question is FES, substance is persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes Yes			The available data indicates that hexachlorobenzene meets the criteria for P. It has been
	163			identified as a POP, ie Persistent Organic Pollutant under the Stockholm Convention
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	22000	EFSA (2006)	This BCF value relates to fish. A number of BCFs for fish have been reported with a large proportion
Does field data show evidence for biomagnification?				being above the threshold of 2000
If answer to either question is YES, substance is bioaccumulative If no BCF data, is log Kow ≥ 4.5?	Yes	5.2 to 6.5	EFSA (2006)	
If answer is YES, substance is bioaccumulative	165	5.2 10 0.5	EF3A (2000)	
Does the weight of evidence from the following criteria indicate bioaccumulation	Not assessed due to the above			
unlikely? Substance is chronically non-toxic in mammals	information			
Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanol solubility ≥ 0.002mmol//				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.0049mg/l	POPs Toolkit	32d NOEC for fathead minnow
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE1		Harmonised C&L classification
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes	Carc 1B		Harmonised C&L classification
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic	res	Carcins	ECHA CAL dalabase	Harmonised C&L classification
If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) is substance toxic?	Yes Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Meets the criteria for P, B and T
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≿ 60 days	Yes	2.7 to 5.7years	EFSA (2006)	Hexachlorobenzene has been identified as a POP, ie Persistent Organic Pollutant
Half life in marine, fresh or estuarine sediment ≥ 180 days	163			riezachiologiczene nasioeen kientineu as a ron, ne riersistent organie ronutant
Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent	Yes	3 to 6 years	EFSA (2006)	
Is bioconcentration factor ≥ 5000	Yes	22000	EFSA (2006) and POPs Toolkit	This BCF value relates to fish. A number of BCFs for fish have been reported with a large proportion being above the threshold of 2000
If answer is yes, substance is very bioaccumulative			FOFSTOORI	
Is substance very persistent and very bioaccumulative?	Yes			Meets criteria for both vP and vB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
Do $\geq$ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
Do $\ge$ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health (* accurate any quantum is a VES, substance in use taxis and hasardaus)	No		ECHA C&L database	Harmonised C&L classification. It is not classified as mutageni
If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (if not assume substance is very toxic)				
Is substance very toxic?	No			Does not meet the criterion for Very Toxic as not classified as mutagenic.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			It meets the criteria for PBT and vPvB. It has not however been formally noted as a PBT substance within the EU under REACH. Hexachlorobenzene has been identified as a POP (Persistent Organic Pollutant)
Dees substance have breakdown products of concern? REFERENCES	No			
EFSA (2006) Opinion of the Scientific Panel on Contaminants in the food chain on a request from the Commission related to hexachlorobenzene as undesirable substances in animal feed ECHA C&L database	https://echa.europa.e	eu/information-on-ch	emicals/cl-inventory-data	main_documents/CONTAM_op_e(402_hexachlorobenzene_en%2C3.pdf base/-/disclidetails/65830
POPs Toolkit Environment Canada (1993) Eurochlor (2005)	http://www.popstoolki http://www.hc-sc.gc.c http://www.eurochlor.	ca/ewh-semt/pubs/c		xachlorobenzene/index-eng.php al.bdf

manual of the second				Hexa	chlorobutadiene (HCBD) (CAS: 87-68-3)
NameNameNameNameNameNameInternational SectorSec					
		Borderline /	Value	Reference	Comments
Name       No       <	Is substance persistent, bioaccumulative and toxic?	-			
Name       No       <	Persistence				
Name of the set o	Passes ready biodegradation test	No		UNEP	Results from a test on ready biodegradability undertaken according to OECD TG 301 C(adapted for volatile substances) indicated not readily biodegradable
Constrained and a problem of the series of	Passes inherent biodegradation test	No data			
Note of the second se	If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Note	Half life marine water ≥ 60 days	No data			
Note of the sector of the se	Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days		28-360	UNEP	The half lives at the upper end of the reported range exceed the criteria
Antional and a series of the	Half life fresh or estuarine sediment ≥ 120 days	No data			
Note of the second of the s	Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes	28-180	UNEP	The half lives at the upper end of the reported range exceed the criteria
Analog angement       Image: state of the s	If answer to all questions is NO, substance is not persistent				
	Is sufficient data available? (if not assume substance is persistent)	Yes			
Note of the set	Is substance persistent?	Yes			Upper bound values used as worst case. Hexachlorobutadiene is an agreed POP, ie Persistent Organic Pollutant
Note of the set	Rioscumulation				
Name of the sector of the se		Yes	29-18000	UNEP	The BCF values at the upper end of the reported range exceed the criteria
Note of the set of the s	Does field data show evidence for biomagnification?	No Data			
Construction       Note of the second of the s	If answer to either question is YES, substance is bioaccumulative				
Substrate of the number of	If no BCF data, is log Kow ≥ 4.5?	Yes	4.78-4.9	UNEP	
	Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?				
	Molecular weight ≥ 1100g/mol				
	Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
auto back and with the set of the s	substance is not broaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers). BCF data should be obtained				
auto back and with the set of the s	Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
a la start data	Is substance bioaccumulative?	Yes			
a la start data	Toxicity				
reg     res     Color data data     Restruction data data data data data data data dat	Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.0065 mg/l	UNEP	NOEC Pimephales promelas
her	Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA- C&L database	No formal EU harmonised C&L classification. Industry have submitted proposals
Backeter         NB         DDV CR Backeters         Somether is Terrely and Table All All and the Machine Is and Consumer Towards and the Machine Is and the Machin					
	Is substance carcinogenic (Carc 1A, 1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes		ECHA- C&L database, COT (2000)	Committee on Toxicity and that on Mutagenicity of chemicals in Food Consumer Products and the Environment (COT and COM) have considered this substance to be mutagenic with no assumed
	If answer to any question is YES, substance is toxic				
skew own off     Yes       Statistical FREESTIGRT, NOACCOULTING AND TOOP     Yes     Residuate and fully for any statistical regulation of any statis regulation of any statis regul					
Desistation protein a significant level of concent?         Interpret of the significant designed of the significant of the significa	Is sufficient data available? (if not assume substance is toxic) Is substance toxic?				
Desistation protein a significant level of concent?         Interpret of the significant designed of the significant of the significa					
	IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Meets the criteria for persistence, bioaccumulation and toxicity. Hexachlorobutadiene is designated as a Persistent Organic Pollutant
	Does substance pose an equivalent level of concern?				
sind is a many, two is evaluate solutions (2000)       No. Data       No. Data         sind is a solutions (2000)       No. Data       No. Data         sind is a solutions (2000)       No. Data       No. Data         sind concentration functor 2000       Yes       20-1000       UREP       The bdF values at the upper end of the reported range enced the orienter         sind concentration functor 2000       Yes       20-1000       UREP       The bdF values at the upper end of the reported range enced the orienter         sind concentration functor 2000       Yes       20-1000       UREP       The bdF values at the upper end of the reported range enced the orienter         concentration functor 2000       Yes       20-1000       UREP       The bdF values at the upper end of the reported range enced the orienter         concentration functor 2000       Yes       20-1000       UREP       The bdF values at the upper end of the reported range enced the orienter         concentration functor 2000       Yes       20-10000       UREP       The bdF values at the upper end of the reported range enced the orienter         concentration functor 2000       Yes       Yes       UREP       Yes       Yes         concentration functor 2000       Yes       Yes       Yes       Yes       Yes         concentration functor 2000000000000000000000000000000000000					
training and you dogs       Yes       28-100       UREP       The large watch are the upper end of the reported range enced the orders         a block one of the reported is a you does on a way deal of the reported in any enced the orders       Yes       28-100       UREP       The DCF values at the upper end of the reported range enced the orders         a substance very president and very block on multiple       Yes       28-100       UREP       The DCF values at the upper end of the reported range enced the orders         comparing the reported is any offic to growtherer       Yes       Upper values used as word cass. Heachdrombulations is an agreed PDP, is Persistent         comparing the reported is any offic to growtherer       Not Assessed       Sector very operation of the reported is any offic to growtherer       Not Assessed         comparing the reported is any offic to growtherer       Not Assessed       Sector very operation of the reported range enced the order to growtherer       Not Assessed         comparing the reported is any offic to growtherer       Not Assessed       Sector very operation of the reported range enced the reported range enced the order to growtherer       Not Assessed         comparing the reported is any offic to the tog ondreater 1       Not Assessed       Sector very operation of the reported range enced the reported rang	Half life in marine, fresh or estuarine water ≥ 60 days		28-360	UNEP	The half lives at the upper end of the reported range exceed the criteria
ka backnown lade i 2 3000 (1) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	Half life in soil ≥ 180 days		28-180	UNEP	The half lives at the upper end of the reported range exceed the criteria
Parametri per substance is uny bioaccumulative? Va Upper values used as vorti class. Metachlorobuscience is an agreed POP, ie Persistent Ognic Poliutari   Des substance para supper values used as vorti class. Metachlorobuscience is an agreed POP, ie Persistent Ognic Poliutari   Des substance para supper values used as vorti class. Metachlorobuscience is an agreed POP, ie Persistent Ognic Poliutari   Des substance para supper values used as vorti class. Metachlorobuscience   De Start of poliutarie is in groundwater? Net Assessed   De Start of poliutarie is upper values used as vorti class. Metachlorobuscience   Substance Net vorti NDT Metachlorobuscience   Start of poliutarie is upper values used as vorti values. Net Assessed   Substance is persistent in groundwater? Net Assessed	If answer to any question is YES, substance is very persistent				
is addance vay persistent and vary bioaccumulative? Vis Wisconderates? Vis Addances of the Seconderate Propersistent and vary bioaccumulative? Vis Addances of the Seconderate Propersistent and vary bioaccumulative? Vis Addances of the Seconderate Propersistent And Vis Addances of the Seconderate Propersistent P	Is bioconcentration factor ≥ 5000	Yes	29-18000	UNEP	The BCF values at the upper end of the reported range exceed the criteria
is ausiance way personent and very personent and ve	If answer is yes, substance is very bioaccumulative				
	Is substance very persistent and very bioaccumulative?	Yes			Upper values used as worst case. Hexachlorobutadiene is an agreed POP, ie Persistent
Does growtered ender enderster a tange some keels of the substance growter base in the some keels of the substance growter base in the some keels of the substance is and the substance is and the substance is and the substance is and the substance is persister in groundwater?       Not Assessed         If and the some is and the substance is and the substance is and the substance is persister in groundwater?       Not Assessed       If and the some is and the substance is and the substance is and the substance is and the some is and the so					g
bo 2b 3 dy conclusions samples show here is a bis shok are greater in a hori A seased in the DOT of the have a fleat on example where the substance is a model of the Seased in the Sease is a bis show are were shown in VSS. Builtance is persistent in groundwater? Not A seased in the Sease is a bis show are were shown in the Sease is a bis show are were shown in the Sease is a bis shown in the Sease is bis shown in the S	Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not Assessed			
	$Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not Assessed			
s ubstance pressent in groundwater? NKI Assessed Tadatance in persistent in groundwater? NKI Assessed Tadatance in thermitian in Food Consume Products and the Environmet (COT and COM) have considered This advance in very toxic? Takes advance multiperic (MAs 1A, 18, 2) of have no determinable threatood Tadatance in very toxic? Takes advance multiperic (MAs 1A, 18, 2) or have no determinable threatood Takes effects on human health Tadatance in very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic and hazardous Target on any question in VES, substance is very toxic on the toxic of very one considered threatood Target on any question in VES, substance hazardous to groundwater? Target on the toxic of persident of threatood Target on the toxic of concern? No References NUEP Societ on PPOF (2015) Dud it is management NUEP Societ on the toxic of text on toxic on text on the perside of text on the toxic on text on text on the toxic on text	detected above the LOQ?	Not Assessed			
underweiter       Not Assessed         is aubstance supplicit fakt og roundwater?       Not Assessed         is aubstance very todic?       Satustance mulageric (MAs 1A, 1B, 2) of have no determinable threahold       Yes         is aubstance mulageric (MAs 1A, 1B, 2) of have no determinable threahold       Yes       COT (2000)         is aubstance mulageric (MAs 1A, 1B, 2) of have no determinable threahold       Yes       COT (2000)         is aubstance is very toxic and hazerboux       Ves       Ves         is aubstance is very toxic and hazerboux       Yes       Ves         is aubstance very toxic?       Yes       Athough no formal C&L harmonised cassification is available a review of evidence by two UK Committee has indicated HCBD is mutageric with no assumed threahold         is substance hazerbous to groundwater?       Yes       Ves         is substance hazerbous to groundwater?       Yes       Poilutario. Section is for PBT and vPvB. Has been designated as a PDP (Persistent Organic Poilutario.) Also meets criteria for Very Toxic         Does substance hazerbous (of concern?       No       No       Poilutario.) Also meets criteria for PBT and vPvB. Has been designated as a PDP (Persistent Organic Poilutario.) Also meets criteria for Very Toxic         Does substance hazerbous (of concern?       No       No         EFFERCES       This //rub auropa withformation on chemicas is inversory. Substance HaserbousproPDPCPC200 concented HaserbousprOPDPC200 concented H	If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not Assessed			
underweiter       Not Assessed         is aubstance supplicit fakt og roundwater?       Not Assessed         is aubstance very todic?       Satustance mulageric (MAs 1A, 1B, 2) of have no determinable threahold       Yes         is aubstance mulageric (MAs 1A, 1B, 2) of have no determinable threahold       Yes       COT (2000)         is aubstance mulageric (MAs 1A, 1B, 2) of have no determinable threahold       Yes       COT (2000)         is aubstance is very toxic and hazerboux       Ves       Ves         is aubstance is very toxic and hazerboux       Yes       Ves         is aubstance very toxic?       Yes       Athough no formal C&L harmonised cassification is available a review of evidence by two UK Committee has indicated HCBD is mutageric with no assumed threahold         is substance hazerbous to groundwater?       Yes       Ves         is substance hazerbous to groundwater?       Yes       Poilutario. Section is for PBT and vPvB. Has been designated as a PDP (Persistent Organic Poilutario.) Also meets criteria for Very Toxic         Does substance hazerbous (of concern?       No       No       Poilutario.) Also meets criteria for PBT and vPvB. Has been designated as a PDP (Persistent Organic Poilutario.) Also meets criteria for Very Toxic         Does substance hazerbous (of concern?       No       No         EFFERCES       This //rub auropa withformation on chemicas is inversory. Substance HaserbousproPDPCPC200 concented HaserbousprOPDPC200 concented H	If substance is persistent in groundwater, bioaccumulative AND toxic,				
a backance multigeric (Mds 14, 16, 10) of have no determinable threaded Yes No ED harmoniaed C&L classification. Both the UK Committee on Toxicity and that on Multigericity, deminals in Food Consumer Products and the Environment (COT and COM) have considered his advance to be multigerice with no assumed threadod for adverse effects.   a subcance multigeric (Mds 14, 16, 10) of have no determinable threadod. Yes   a subcance multigeric (Info assume substance is very toxic and hazardous Yes   a subcance hazardous, if Yes, substance is very toxic. Yes   a subcance hazardous, if so, state on what basis Yes   A though no formal C&L harmoniaed Catastification is a variable a review of evidence by two UK Committees has indicated HCBD is multigeric with no assumed threahold   a substance hazardous, if so, state on what basis Yes   No Meets criteria for PET and vPrB. Has been designated as a PDP (Persisteent Organic CPU) CPU subcance is threahold   Does substance hazardous, if so, state on what basis Yes	substance is hazardous Does substance pose a specific risk to groundwater?	Not Assessed			
a backance multigeric (Mds 14, 16, 10) of have no determinable threaded Yes No ED harmoniaed C&L classification. Both the UK Committee on Toxicity and that on Multigericity, deminals in Food Consumer Products and the Environment (COT and COM) have considered his advance to be multigerice with no assumed threadod for adverse effects.   a subcance multigeric (Mds 14, 16, 10) of have no determinable threadod. Yes   a subcance multigeric (Info assume substance is very toxic and hazardous Yes   a subcance hazardous, if Yes, substance is very toxic. Yes   a subcance hazardous, if so, state on what basis Yes   A though no formal C&L harmoniaed Catastification is a variable a review of evidence by two UK Committees has indicated HCBD is multigeric with no assumed threahold   a substance hazardous, if so, state on what basis Yes   No Meets criteria for PET and vPrB. Has been designated as a PDP (Persisteent Organic CPU) CPU subcance is threahold   Does substance hazardous, if so, state on what basis Yes	Is substance very toxic?				
a substance Mula IA, IB, or have no determinable inveshold a wise wise wise wise wise wise wise wise					No EU harmonised C&L classification. Both the UK Committee on Toxicity and that on Mutagenicity of
s sufficient data available? (if not assume substance is very toxic) Yes  s substance very toxic? Yes Athough no formal C&L harmonised classification is available a review of evidence by two UK Committees has indicated HCBD is mutagenic with no assumed threahold s substance hazardous, if so, state on what basis Yes Meets criteria for PBT and vPsB. Has been designated as a POP (Persistent Organic Politater). No REFERENCES EVIDENCES E	is substance mutagenic (Muta 1A, 15.2) or have no determinable threshold for adverse effects on human health	Yes		COT (2000)	chemicals in Food Consumer Products and the Environment (COT and COM) have considered this substance to be mutagenic with no assumed threshold for adverse effects
a substance very todi?? Yes Atthough no formal CAL harmonised classification is available a review of evidence by wo UK Committees has indicated HCBD is mutagenic with no assumed threshold UK Committees has indicated HCBD is mutagenic with no assumed threshold threshold is mutagenic with no assumed threshold thresh	If answer to any question is YES, substance is very toxic and hazardous				
s substance hazardous (or groundwater? Is substance hazardous, if so, state on what basis Yes Yes Meets criteria for PBT and vPvB. Has been designated as a POP (Persistent Organic s substance hazardous, if so, state on what basis Yes Meets criteria for PBT and vPvB. Has been designated as a POP (Persistent Organic Pollutant). Also meets criteria for Vey Tosic REFERENCES CVA - C.M. classes International Pollutant, State on POP (2013) Duit risk management MEPS and vPvB (2013) Duit risk man	Is sufficient data available? (if not assume substance is very toxic)	Yes			
is substance hazardous, if so, state on what basis Yes Meets criteria for PBT and vPrB. Has been designated as a POP (Persistent Organic Poliutant). Also meets criteria for Very Tosic	Is substance very toxic?	Yes			Although no formal C&L harmonised classification is available a review of evidence by two UK Committees has indicated HCBD is mutagenic with no assumed threshold
Constraints have breakdown products of concern?     No     Concern?     Instructure on operation on chemicals in writery     Concern?     Instructure on operation on chemicals in writery     Concern?     Instructure on operation     Concern?     Instructure on operation     Concern?     Instructure on operation     Concern?     Instructure     Concern?     Instructure     Concern?     Instructure     Concern?     Instructure     Concern?     Instructure     Concern?     Instructure     Concern?     Concer	Is substance hazardous to groundwater?				
	Is substance hazardous, if so, state on what basis	Yes			Meets criteria for PBT and vPvB. Has been designated as a POP (Persistent Organic
REFERENCES ECHA - C&L database Englishter beschlored by database/Englishter by datab					Poliutantj. Also meets criteria for Very Toxic
REFERENCES ECHA - C&L database Englishter beschlored by database/Englishter by datab	Dees substance have bre-				
ECHA - C&L database to the structure of		NO			
UNEP Stockhaim Convertion on POPS (2013) Draft risk management http://shn.pops.ir/TheConvertionFDPEReviewCommitteeMeetings/PDFRCsDocuments/habid/3231/ctfDounloadims/10330Default.app/7d=1496/bjD=16844	REFERENCES ECHA - C&L database	https://echa.eurona.eu/	information-on-ch	emicals/cl-inventory-datat	xase/-/discli/details/80395
COT (2000) http://cot.food.gov.uk/committee/committee-on-taxicity/cotstatements/cotstatements/cotstatements/2000/hexachlorobutatiene	UNEP Stockholm Convention on POPS (2013) Draft risk management evaluation: hexachlorobutadiene				
	COT (2000)	http://cot.food.gov.uk/co	ommittee/committ	ee-on-toxicity/cotstatemer	tls/colstatementsyrs/cotstatements2000/hexachlorobutadiene

	Hexachlorocyclohexane (assessment based on gamma- hexachlorocyclohexane (CAS: 58-89-9) (also known as lindane) however also relevant to other			
	isomers eg beta and alpha which are also designated as POPs) Yes / No / Insufficent data /			
	Borderline / assume yes or	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence Passes ready biodegradation test				
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent				
If answer to both questions is NO, additional data on half life is required Half life marine water ≿ 60 davs				
				The half lives in the upper range of the reported range exceed the criteria. Gamma HCH (also known
Half life fresh or estuarine water ≥ 40 days	Yes	3 - 300days	UNEP (2006)	as lindane has been identified as a POP (Persistent Organic Pollutant) along with the alpha and beta isomers of hexachlorocyclohexane
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days				
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes	88 - 1146days	UNEP (2006)	See above
If answer to all questions is NO, substance is not persistent Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomacnification? If answer to either question is YES, substance is bioaccumulative	Yes	10 to 4220	UNEP (2006)	The BCFs at the upper end of the reported range exceed the criteria
If no BCF data, is log Kow ≥ 4.5? If answer is YES, substance is bioaccumulative	No	3.72	HSDB	
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?				
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm	information			
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			Based on the BCF data. This is also supported by field data which indicates the presence of lindane in a range of sea birds and mammals in relatively remote areas eg Arctic
Toxicity	Yes	0.0029mg/l	UNEP (2006)	Fish NOAEC
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE2		HISTINUCAEL
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	Harmonised C&L classification. The classification indicates it does not meet the criteria
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Yes based on aquatic toxicity and STOT RE2.
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Meets the criteria for P, B and T. Has been designated as a POP
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				The half lives in the upper range of the reported range exceed the criteria. Gamma HCH (also known
Half life in marine, fresh or estuarine water $\ge$ 60 days	Yes	3 - 300days	UNEP (2006)	as indane has been identified as a POP (Persistent Organic Pollutant) along with the alpha and beta isomers of hexachlorocyclohexane
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	Yes	88 - 1146days	UNEP (2006)	See above
If answer to any question is YES, substance is very persistent	N	40.1.4000		
Is bioconcentration factor ≥ 5000 If answer is ves. substance is verv bioaccumulative	No	10 to 4220	UNEP (2006)	
Is substance very persistent and very bioaccumulative?	No			The BCF values did not meet the criteria
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
$Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification. The classification indicates it does not meet the criteria for mutagenicity.
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			It meets the critiera for P, B and T although not formally classified as PBT in the EU. Isomers of hexachlorocyclohexane have been designated as POPs.
Does substance have breakdown products of concern?	No			
REFERENCES				
HSDB (Hazardous Substance Database)	http://toxnet.nlm.nih.g	ov/cai-bin/sis/htmlae	n?HSDB	
UNEP (2006) Persistent Organic Pollutants Review Committee - Lindane Risk	http://echa.europa.eu	information-on-chem	icals/cl-inventory-databas	<u>10</u>

			Ind	eno (1,2,3-cd) pyrene (CAS: 193-39-5)
	Yes / No / Insufficent data /			
	Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	Insufficient data			
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required	Insufficient data			
				PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water
Half life marine water ≿ 60 days	Insufficient data		ECHA 2009	column; PAHs with 4 or more rings, which includes indeno(123cd)pyrene, undergo little biodegradation in water
Half life fresh or estuarine water ≥ 40 days	Insufficient data		ECHA 2009	PAHs can undergo photolysis but not a significant pathway as only operates in top few cm of water column; PAHs with 4 or more rings, which includes indeno(123cd)pyrene, undergo little biodegradation in water
Half life marine sediment ≥ 180 days	Insufficient data		ECHA 2009	PAHs with 4 or more rings, eg indeno(123cd)pyrene undergo very slow biodegradation in aquatic sediments
Half life fresh or estuarine sediment ≥ 120 days	Insufficient data		ECHA 2009	ECHA 2009 noted no experimental data available but that estimated data indicated half lives of >400days.
Half life in soil ≥ 120 days	Yes	139-289 days	Toxnet	ECHA 2009 noted no experimental data available but that estimated data indicated half lives of >400days.
If answer to any question is YES, substance is persistent If answer to all questions is NO. substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			The available experimental data for degradation of indeno (123cd)pyrene was limited however based on the available data and that for other PAHs it was considered to meet the criteria for persistence.
Bioaccumulation				
Bioconcentration factor (BCF) for equatic species (wet weight) $\gtrsim 2000$	Yes	>2000	ECHA 2009; Bleeker and Verbruggen	Limited data with no experimentally varied DFP is noted in the ECHA 5000 Accurate. The latter table of the other has been of minimates and information and monotoxical accurate with the PAIs for which BCPs above the backcomation ordered has been experimentally confirmed. It is anticipate that BCF values the substance with the 2000. PAHs are generally rapidly metabolised in fait but accumulate in crustases and moliuscs.
Does field data show evidence for biomagnification?	No data			PAHs are known to biomagnify in lower trophic levels, but biodilute in fish and some invertebrates able to metabolise the substance.
If answer to either question is YES, substance is bioaccumulative If no BCF data, is log Kow ≥ 4.5?	Yes	6.58	ECHA 2009	Calculated; ClogP method
If answer is YES, substance is bioaccumulative	Not assessed due to			
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size 2 4.3nm	the above information being available			
Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/ If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative? Toxicity	Yes			
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.00027	CIS 2005; ECHA 2009	7d EC10 in Ceriodaphnia with standard lighting conditions
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Insufficient data		ECHA C&L database	<ul> <li>indeno(123cd)pyrene and no notifications from industry are listed other than for carcinogenicity.</li> <li>The notifications submitted do not give information re: STOT RE</li> </ul>
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Insufficient Data		ECHA C&L database; IARC	No ELI bernonied CAL classification. ECHA CAL detabase contains very life data for inden(122:digress and no contralisation lised date than the reconsignedicity. The notifications submitted indicate Care 2. This substance has been considered by IARC on a number of occasions (1971, 1983 and 2010). These analyses and classifies that as variable to assess the carcinopenity of this substance. IARC concluded that it was possibly carcinogenic to humans (Goup 28) and that there was sufficient evidence in experimental animals for the carcinogenicity of this substance.
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is fool: If answer to ad suestions is NO, substance is not toxic	Insufficient Data		ECHA C&L database; IARC	submitted indicate Carc 2. This substance has been considered by IARC on a number of occasions (1973, 1983 and 2010). These analyses indicate that there is data available to assess the carcinogenicity of this substance. IARC concluded that it was possibly carcinogenic to humans (Group 2B) and that there was sufficient evidence in experimental animals for the carcinogenicity of
reproduction (Repr 1Â, 1B, 2) If answer to any question is YES, substance is toxic	Insufficient Data Yes Yes		ECHA C&L database; IARC	submitted indicate Carc 2. This substance has been considered by IARC on a number of occasions (1973, 1983 and 2010). These analyses indicate that there is data available to assess the carcinogenicity of this substance. IARC concluded that it was possibly carcinogenic to humans (Group 2B) and that there was sufficient evidence in experimental animals for the carcinogenicity of
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				Lead ater environmental Pb(II) is found to predominate. Although many lead compounds are relatively
	insoluble eg lead carbo	nate some forms are	soluble, eg lead chloride	and lead nitrate. In addition the amount of free lead ion present is dependent on factors such as the pH of the water.
	data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic? Persistence				
Passes ready biodegradation test Passes inherent biodegradation test	Test not applicable for met See above	als/inorganics		
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	Degradation testing not ap metals/inorganics	plicable for		
Half life fresh or estuarine water ≥ 40 days	See above			
Half life marine sediment ≥ 180 days	See above			
Half life fresh or estuarine sediment ≥ 120 days	See above			
Half life in soil ≥ 120 days	See above			
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes			The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as lead are inherently persistent and subject to transformation rather than degradation. Lead will herefore not degrade but will be transformed depending on a range of factors including the local conditions, eg pH, and other salts present.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) $\gtrsim 2000$	Yes	5 to 8000	ESR (2008)/ WHO/EFSA	BCF values for a range of organisms including crustaceans, molluscs, insects and fish were reported in the valunitary risk assessment. These indicated BCF values in the range of 5 - 8000. In addition information or human health indicates that lead accumulates in the bones following long rem exposure with half lives reported in the order of 10 - 30years. Available bioconcentration factor (BCF) values are wide ranging, however based on the number of BCP values reported baove 2000, along with evidence of accumulation in humans, the weight of evidence suggests lead met the criteria.
Does field data show evidence for biomagnification?	No		ESR (2008)/EU EQS (2011)	The available data report that although plants and animals may bioconcentrate lead it does not appear to biomagnify in the aquatic food chain. It is noted this may be partly explained by the fact that in vertebrates lead is stored mainly in bone which reduces the risk of lead tansferring to other organisms in the food chair
If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5?	Log K <sub>ow</sub> values are not applicable to metals			$Log K_{ouv}$ values are not considered reliable estimates of the bioaccumulation potential of inorganic substances such as lead.
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size 4 3mm Molecular weight ≥ 1100mmol Octanol subulity < 0.002mmol/	Not considered due to the above data			
If weight of evidence indicates bicaccumulation unlikely (i.e. YES answers) substance is not bicaccumulative fi weight of evidence indicates bicaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes Yes			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01 \text{ mg/l}$	Yes	0.0017mg/l	EU EQS dossier	Lymnaea stagnalis EC10 1.7ug/l Chronic effect concentrations of <10ug/l were reported for other species including Hyallela azteca and Pseudokirchneriella subcapitata
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE2	ECHA C&L database	A number of lead compounds have been classified under CLP and have been determined as STOT RE2.
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Repr 1A	ECHA C&L database	A number of lead compounds have been classified under CLP and have been determined as Repr 1A. A nubmer of lead compounds have been identified as Substances of Very High Concern under REACH as a result of meeting the criteria for Travic for Reproduction?
If answer to anv question is YES, substance is toxic If answer to all questions is NO, substance is not toxic Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Meets criteria for chronic aquatic toxicity and human toxicity through STOT RE2 and Repr 1A
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	See comment			The percentage original are not directly applicable to metals/increasing and were developed principally for
Half life in marine, fresh or estuarine sediment ≥ 180 days	See comment			The persistence criteria are not directly applicable to metals/morganics and were developed principally for organic substances. Metals and inorganics such as lead are inherently persistent and subject to transformation rather than degradation. Lead will therefore not degrade but will be transformed depending on the local conditions, eg pH and other salts present.
Half life in soil ≥ 180 days If answer to anv question is YES, substance is verv persistent	See comment			
If answer to any question is YES, substance is very persistent	Yes	5 to 8000	ESR (2008)/ WHO/EFSA	BCF values for a range of organisms including crustaceans, molluscs, insects and fish were reported in th voluntary risk assessment. These indicated BCF values in the range of 5 - 8000. In addition information human health indicates that lead accumulates in the bones following long term exposure with half lives reported in the order of 10 - 30yeas. Available blocomentation factor (BCF) values are wide ranging, however based on the number of BCF values reported above 2000, along with evidence of accumulation in humans, the weight of evidence suggests lead met the criteria.
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	Yes			
Does substance pose a specific risk to groundwater? Does droundwater monitorind data show half life in droundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed Not assessed			
LOG? Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic,				
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B.2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	Yes	No determinable threshold'	ECHA C&L database/WHO/EFSA	A number of lead compounds have been classified under C&L however none were classified as mutagenin Reviews undertaken by both WHO and EFSA report that there is no evidence of a threshold for critical lea induced effects and therefore lead meets the criteria for 'no determinable threshold'.
Is sufficient data available? (if not assume substance is very toxic and nazaroous	Yes			
Is substance very toxic?	Yes			WHO and EFSA have noted that no evidence of a threshold for critical lead induced effects. A drinking water threshold for lead remains however this reflects technical achievability based on lead pipes etc rather than the intrinsic properties of lead.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			WHO and EFSA have noted thatno evidence of a threshold for critical lead induced effects
Does substance have breakdown products of concern?	No			
REFERENCES ECHA 6208, database ECHA (2008) WHO (2015) WHO (2011)	http://echa.europa.eu/inforn http://echa.europa.eu/web/ http://www.who.int/mediaco http://www.who.int/water_s	guest/voluntary-risk-a entre/factsheets/fs379	ssessment-reports-lead-and /en/	Head-compounds

WHO (2015) WHO (2011) EFSA (2013) EU EQS Dossier (2012) bip.//www.ho.in/mediacontentistasteetssa.veex http://www.aba.entention.healthowlearlinet.com/entential/end.pdf http://www.aba.entention.healthowlearlinet.com/entential/ST0.pdf http://www.aba.entention.healthowlearlinet.com/entential/ST0.pdf http://www.aba.entential/standartistasteers/abartarearlinet.com/entential/ST0.pdf

			Mecoprop (racen	nate)(CAS: 7085-19-0); mecoprop-p (CAS: 16484-77-8)
	Yes / No / Insufficent data / Borderline / assume yes or	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence				
Passes ready biodegradation test Passes inherent biodegradation test				
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days				
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	Yes	24 - 49days	EU PPPD review (2003)	
Half life fresh or estuarine sediment ≥ 120 days	No	23-67days	EU PPPD review (2003)	
Half life in soil ≥ 120 days	No	6.3 - 12days	EU PPPD review (2003)	
If answer to any question is YES. substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			Upper degradation half life in water is above the criterion
Bioaccumulation				
	Ne		EU PPPD review/EA	The BCF values noted in the EU PPPD assessment were in the range of 3 - 5.5 for fish which also
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	3-141	(2007)	indicates that mecoprop does not meet the criteria for biaoccumulation
Does field data show evidence for biomagnification? If answer to either question is YES. substance is bioaccumulative	No data			
If no BCF data, is log Kow ≥ 4.5?	No	0.6	EU PPPD review	The value is the log Kow for pH 7. Log Kow varies with pH log Kow 0.23 for pH 10
If answer is YES, substance is bioaccumulative			(2003)	
Dese the weight of evidence from the following criteria indicate bioaccumulation untilety? Subtance is chronically non-toxic in mammals Medecular size 4-3 mm Medecular weight > 1.000/mol Octanol solubilly 5.0.002mmol/I	Not assessed due to the above data			
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			The available BCF and log Kow data indicate it does not meet the criteria for bioaccumulation
Toxicity	110			The available bor and fog fow data indicate it does not meet the orienta for bloaccumulation
Is the lowest chronic NOEC for freshwater or marine organisms \$ 0.01mg/l	No	0.055	EA 2007	Lowest value is a NOEC for Navicula peliculosa. The values in the EU PPPD are much higher, ie the lowest chronic NOEC was for an invertebrate and was 22mg/l. This provides additional support that the chronic criterion was not exceeded
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	Harmonised C&L classification. Classification indicates that the criteria are not met
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	Harmonised C&L classification. Classification indicates that the criteria are not met
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B or T
Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	No	24- 49days	EU PPPD review (2003)	
Half life in marine, fresh or estuarine sediment ≥ 180 days	No	23-67days	EU PPPD review (2003)	
Half life in soil ≥ 180 days	No	6.3 - 12days	EU PPPD review (2003)	
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	3-141	EU PPPD review/EA (2007)	The BCF values noted in the EU PPPD assessment were in the range of 3 - 5.5 for fish which also indicates that mecoprop does not meet the criteria for biaoccumulation
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Doe 5 % of groundwater samples show levels of the substance greater than the	Not assessed			
$Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected	Not assessed			
above the LOQ? If answer to any question is YES, substance is persistent in groundwater	Not assessed			
Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Dees substance pose a specific risk to groundwater? De substance vary toxic?	Not assessed			
Is substance very toxic? Is substance wutgenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification. Classification indicates that the criteria are not met
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	No No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet the criteria for P, B and T nor those for Equivalent Concern, ie vPvB or mutagenic/no determinable threshold
Does substance have breakdown products of concern? REFERENCES	No			
EA 2007 - Environmental Quality Standard for the protection of aquatic life - mecoprop	https://www.gov.uk/g	overnment/upload	s/system/uploads/attachm	ent_data/file/291213/scho1110bteo-e-e.pdf
EU PPPD (2003) - risk assessment reports for mecoprop (CAS: 7085-19-0) and (16484-77-8)				public/?event=activesubstance.detail&language=EN&selectedID=1538
ECHA C&L database	парлесна.евгора.ев	a montauun-on-cr	nemicals/cl-inventory-data	<u></u>

[				
				Mercury as mercury (II)
	Mercury (II) is the me assessment would a	ost commonly found f also extend to methyl	form of inorganic merc mercury as an environ	ury in the freshwater environment, eg mercury (II) chloride, mercury (II) oxide, mercury (II) nitrate. The mentally relevant form, inorganic mercury is commonly converted in the environment to organic forms obes. Methyl mercury is more toxic and bioaccumulates to a greater extent than inorganic mercury.
	of mercury such as	s methyl mercury thro	ugh the action of micro	obes. Methyl mercury is more toxic and bioaccumulates to a greater extent than inorganic mercury.
	Yes / No / Insufficent data /			Commante
	Borderline / assume yes or no?	Value		Comments
Is substance persistent, bioaccumulative and toxic? Persistence				
Passes ready biodegredation test	Test not applicable for			
Passes inherent biodegredation test If answer to either auestion is YES, substance is not persistent	Test not applicable for			
If answer to both questions is NO. additional data on half life is required	Degradation testing	a not annicable for		
Half life marine water ≥ 60 days	metals/in Degradation testing	organics o not applicable for		
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days	metals/in Degradation testing	organics g not applicable for		
Half life fresh or estuarine sediment ≥ 120 days	metals/in Degradation testin metals/in	g not applicable for		
Half life in soil ≥ 120 days	Degradation testin metals/in	g not applicable for		
If answer to any question is YES, substance is persistent If answer to all auestions is NO. substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes			Mercury is a metal. Metals do not degrade but transform into various species of varying toxicity, dependent upon environmental aconditions (e.g. pH, redox, temperature). The persistence official were developed for organics. Metals and introgenics are inherently persistent and are subject to transformation rather than degradation.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	Range of 5 to 4994	FU FOS doesies	Values given for mercury chloride BCFs in two species of fish. A geometric mean for BCF values in molluscs for inorganic mercury was 1750. For fish the geometric mean was noted to be 3050
		. migo oi o to 4994		molluscs for inorganic mercury was 1750. For fish the geometric mean was noted to be 3050
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	Yes		EU EQS dossier	
If no BCF data, is log Kow ≥ 4.5?	NA (see comment)			Log Kow values are not considered a reliable approach for assessing the potential for inorganic or most organometallic substances to bioaccumulate.
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not considered due to above			
Substance is chronicallv non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01$ mg/l	Yes	0.0007	EU EQS dossier	21d NOEC Daphnia magna. There are a number of invertebrate and fish chronic studies showing effect concentrations below the threshold of 0.01mg/l.
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE1	ECHA C&L database	A number of mercury (II) compounds have been classified under C&L as STOT RE1 or RE2
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Repr 2	ECHA C&L database	A number of mercury (II) compounds have been classified under C&L. One of these, mercury dichloride, has been classified as Repr 2 $$
If answer to any question is YES, substance is toxic				
If answer to all questions is NO, substance is not toxic Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Mercury (III) is persistent in the environment, is of high toxicity and has the potential to bioaccumulate. The US EPA have identified mercury compounds as PBT.
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	See comment			Mercury is a metal. Metals do not degrade but transform into various species of varying toxicity,
Half life in marine. fresh or estuarine sediment ≥ 180 davs	See comment			dependent upon environmental conditions (e.g. pH, redox, temperature). The persistence criteria were developed for organics. Metals and inorganics are inherently persistent and are subject to
Half life in soil ≥ 180 days	See comment			transformation rather than degradation.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000 If answer is ves. substance is verv bioaccumulative	No	Range of 5 to 4994	EU EQS dossier	Values given for mercury chloride BCFs in two species of fish. A geometric mean for BCF values in molluscs for inorganic mercury was 1750. For fish the geometric mean was noted to be 3050
Is substance very persistent and very bloaccumulative?	No			Although the available data indicate it bioaccumulates it does not meet the criteria for vB
Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than	Not assessed Not assessed			
the LOQ? Do $\ge$ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
				A number of mercury (II) compounds have been classified under C&L. One of these ie mercury dictionide has been classified as Muta 2. Other mercury (II) compounds however do not have a classification for mutagenicity. Further information from an EFSA report indicates that certain forms
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold fo adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	r Yes	Muta 2	ECHA C&L database	classification for mutagenicity. Further information from an EFSA report indicates that certain form: of mercury hree been found to show genotoxic effects in mammalian cells in with obtaint data from laboratory animals and humans is inconsistent. The most likely mechanism of genotoxicity appears to be via oxidative stress, which would be exceeded to be thresholded (EFSA, 2012).
Is sufficient data available? (if not assume substance is verv toxic)	Yes			A susher of manual /B approved to the state of the state
Is substance very toxic?	No (See comment)			A number of mercury (I) compounds have been classified under C&L. One of these is mercury dischoride has been classified as Mula. 2: O ther mercury (I) compounds howeved not have a classification for mutagenicity. Further information from an EFSA report indicates that certain form of mercury have been found to show periodice effects in marmalian cells in vitro but that data for laboratory animals and humans is inconsistent. The most likely metanhars of genotoxicy appears to be via oxidative stees, which voaub be expected to be thresholded (EFSA, 2012).
Is substance hazardous to aroundwater?				
Is substance hazardous, if so, state on what basis	Yes			Meets the criteria for P, B and T
Does substance have breakdown products of concern? REFERENCES	No			
			10 Man 09-1 975-20-	dd4c8/21 Mercury EQSdatasheet 150105.pdf
EU EQS dossier (2005) ECHA C&L database	http://echa.europa.eu	u/information-on-cher	nicals/cl-inventory-data	abase
ELLEOS doresier (2005)	http://echa.europa.er	u/information-on-chen ilev.com/doi/10.2903/	nicals/cl-inventory-data i efsa 2012 2985/endf	abase

		Moly	bdenum as the Me	olybdate anion ([MoO,] <sup>2</sup> ), covering (CAS Number: 32534-81-9):
			Disod	um Molybdate (CaMoO <sub>4</sub> ) (CAS No: 7789-82-4); lium molybdate (NaMoO <sub>4</sub> ) (CAS No: 7631-95-0)
	valency states 0, +IV a	ind +VI transform in	to the hexavalent m	salls. It has been demonstrated that upon dissolution in aquatic media, molybdenum substances of the obybdate anion (OECD SIDS). Although dissolution and transformation of metallic molybdenum will be The molybdate anion is considered the relevant form for groundwater.
	Yes / No / Insufficent data / Borderline / assume yes or	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence Passes ready biodegradation test	Test not applicable			
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent	See above			
If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days Other relevant lifomation (eg. dissolution/transformation for	Test not applicable (see comment) See above See above See above See above			Degradation testing not applicable for metal inorganic
metals/inroanics) If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			The persistence orderia are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as molybdenum are inherently persistent and subject to handmittation can here hand degradation. Molybdenum will therefore not degrade but will be transformed depending on the local conditions.
Bioaccumulation				Reported whole-body bioaccumulation factors for fish vary by more than 2 orders of magnitude
Bioconcentration factor (BCF) for aquatic species (wet weight) $\gtrsim 2000$	No	0.05 - 71.6	OECD SIDS	(a,0.05,-715) bub, as thereotically vesticate for essential elements, there is a dation close relationship between exposure concentration on d APF, i.e. devesting IAPA with increasing Moheness in the water column, showing homestatic control of Mo h 180, however, the water column, along the method are gooder. The homestatic control of Mo h 180, however, Binacconnulation concerns the binaction up to and within the millioptim range of exposure. Binacconnulation interfeticate gooders are to be forward or good the set of the
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No data			
If no BCF data, is log Kow ≥ 4.5? If answer is VES, a thetered is biogenerative	Test not applicable (see comment)			Log Kow are not considered reliable estimates of the potential for bioaccumulation of inorganic substances such as molybdenum.
If answer is YES, substance is bioaccumulative Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size 2 4.3mm Molecular size 2 4.3mm	Not considered due to data above			
Octanol solubility 51.0022mm0/I I weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulation unlikely (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.010 mg/l	No	8 mg/l	OECD SIDS	NOEC (20 day) Acarita tonsa (invertebrate)
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	No harmonised CEL desailsation for molybide on or molybide compounds, eg disodum and colouran molybide. Includiny automismo is the CEL desailsate suggest nither of these molybides compounds meet the ortheria OECD SDS assessment suggests loss toxicity for the molybide ion. Some reflects following repeat dose oral exposure in the rat on sexual function, but effects only accurrent at high dose.
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	No hemorised C&L dassification for molybate inor molybate compounds, so discolum and cadium molybate, housing submissions to the C&L database suggest nether of these molybate compounds meet the criteria. GECD SIDS assessment suggests low toxicly for the molybate inc. No effects in in vites sub-assessment in vite subder subsidior or ascringeroly (b) initiation, nanchon, but effects only appendix alt high dose.
If answer to any question is YES, substance is toxic If answer to all ouestions is NO. substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B or T
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 davs	Test not applicable (see comment) See above			The persistence orderia are not directly applicable to metashinorganics and were developed principally for organic substances. Weaks and inorganics such as molyberum are inherently persistent and subject to transformation rather than degradation. Molybdenum will therefore not degrade but will be transformed depending on the local conditions.
Half life in soil ≥ 180 davs If answer to any question is YES, substance is very persistent	See above Yes			
Is bioconcentration factor 2 5000	No	0.05 - 71.6	OECD SIDS	Reported whole-body bioaccumulation factors for fash vary more than 2 orders of magnitude (i.e., 0.6 – 71.6) but, as theoretically precided for essential elements, there is a distinct close relationship between exposure concentration and BAF. Le, decreasing BAFs with increasing Moreira are observed for expation investmentale sportes. The homestatic control of No by these optimises. Small fordings is observed for expation investmentale sportes. The homestatic control of No by these optimises in the more state of the space of the sportes. The homestatic control of No by these optimises is observed for expation investmentale sportes. The homestatic control of No by these optimises is observed to reperted in compatibilities and the sport of the space of the sportes of the sport of the spore
If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative?	No	not vB		
Does substance pose a specific risk to groundwater?		10170		
Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance	Not assessed			
greater than the LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database	No hermonised C&L classification for molyholdie ion or molyholdie compounds, eg disclam and calcium molyholdie. Industry publications to the C&L disabilities augest nother of these molyholdie compounds, met the clarities. DECO SOE assessment augester into socially for the molyholdie ion. No effects in vitro studies on multiagencity (no is vito autosia) servalitatio (or carcincepent) by initiation, no oral siday available). Some effects biolowing repeat dose onal exposure in the rat on sexual function, but effects only apparent at high dose.
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is verv toxic) Is substance very toxic?	Yes No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet criteria for P, B and T , nor vPvB or Very Toxic
Does substance have breakdown products of concern?	No			
REFERENCES ECHA C&L database	http://echa.europa.eu/	information-on-cher	nicals/cl-inventorv-r	1stabase
OECD HPV SIDS assessment (2013)	http://webnet.oecd.org	/hpv/ui/SIDS Detai	Is.aspx?id=ea0df38	38-a79d-4751-a6c1-d5cde948e7b0

	Yes / No / Insufficent data / Borderline / assume yes or	Value	Reference	Naphthalene (CAS: 91-20-3) Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence Passes ready biodegradation test				
Passes inherent biodegradation test	No		ESR (2003)	The ESR notes that it doesn't pass the reported inherent biodegradation study but that the available degradation studies (see below) indicate that it is quite degradable in aerobic environments.
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days				
Half life fresh or estuarine water ≥ 40 days	No	2days - 30days	ESR (2003)	A range of studies were reported in the ESR which indicated relatively rapid biodegradation in aerobic environments with degradation rates in the order of 2 - 30days. Slower rates were indicated for some anaerobic studies. Reports for groundvater degradation were variable with some reporting degradation in the order of about 15days and others indicating no degradation.
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	No data No No	1- 70days 2 -<60days	ESR (2003) ESR (2003)	
If answer to any question is YES. substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	No			Overall the available data indicates it does not meet the persistence criteria. It may be more persistent in some conditions eg anaerobic
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No	2.3-427	ESR (2003)	BCF values for fish (whole body). For individual tissues noted higher BCFs eg 1158 but still below the criterion
If no BCF data, is log Kow ≥ 4.5?	No	3 - 3.73	ESR (2003)	
If no BCF data, is log Row 2 4.3? If answer is YES, substance is bioaccumulative		0.10	2011(2000)	
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely? Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol Octanci solubility ≤ 0.002mmol/i	Not considered due to above info			
Il weight of evidence indicates bicaccumulation unlikely (i.e. YES answers) substance is not bicaccumulative Il weight of evidence indicates bicaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No	0.12	ESR (2003)	A range of chronic data is included in the ESR with the lowest value being 0.12mg/l which related to a 400 NOEC for Coho salmon
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RF2)	No		ECHA C&L database	Harmonised C&L classification. The classification indicates it does not meet the criteria.
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No	Carc 2	ECHA C&L database	Harmonised C&L classification. The classification indicates it does not meet the criteria
If answer to any question is YES, substance is toxic If answer to all questions is NO. substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			
	No			Doesn't meet criteria for P, B or T
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≿ 60 days	No	2days - 30days	ESR (2003)	A range of studies were reported in the ESR which indicated relatively rapid biodegradation in aerobic environments with degradation rates n the order of 2 - 30days. Slower rates were indicated for some anaerobic studies but others indicated 90-100% reduction in 50-60days
Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days	No No	1- 70days 2 -<60days	ESR (2003) ESR (2003)	
If answer to any question is YES, substance is very persistent	N	0.0.100	505	
Is bioconcentration factor ≥ 5000 If answer is ves. substance is verv bioaccumulative	No	2.3-427	ESR (2003)	
Is substance very persistent and very bioaccumulative?	No			Doesn't meet criteria for vP or vB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
$Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is	Not assessed			
detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater	NOL dSSESSED			
Is substance persistent in groundwater? If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous	Not assessed			
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic? Is substance hazardous to groundwater?	No			
Is substance hazardous, if so, state on what basis	No			
Does substance have breakdown products of concern?	No			
REFERENCES ESR (2003)	http://echa.europa.er	u/documents/10162	2/4c955673-9744-4d1c-	a812-2b/97863906a
ECHÀ C&L database WFD EQS dossier (2012)	http://echa.europa.eu	u/information-on-ch	emicals/cl-inventory-dat	abase 735ce6d/Naphthalene%20EQS%20dossier%202011.pdf

Name of the second se					
Name 					Nickel as Nickel (II)
NameNameNameControl111 <td></td> <td>The Nickel (II) ion will pr</td> <td>edominate in the</td> <td>freshwater environment.</td> <td>There are a number of soluble Ni (II) compounds including nickel hydroxide, sulphate and carbonate.</td>		The Nickel (II) ion will pr	edominate in the	freshwater environment.	There are a number of soluble Ni (II) compounds including nickel hydroxide, sulphate and carbonate.
Image: Add to the second sec					
		Borderline / assume	Value	Reference	Comments
Name of the second se	Is substance persistent, bioaccumulative and toxic?	yes of nor			
Name of the second se	Persistence				
With the set of the second set of the second	Passes ready biodegredation test	metals/inorganics			
Mathema and the second secon	If answer to either question is YES, substance is not persistent	See above			
Note of the section		Degradation testing not	applicable for		
NameNameResource of the second secon	Half life fresh or estuarine water ≥ 40 days				
and a control       A control         Second and a control of a contr	Half life marine sediment ≥ 180 days	See above			
	Half life fresh or estuarine sediment ≥ 120 days	See above			
Weight automation with the second sec	Half life in soil ≥ 120 days	See above			
Automata       Souther state sta	If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
sindian punitaria in a serie of the series o	Is sufficient data available? (if not assume substance is persistent)				
No     40     B1200     Insum 2014 of the SUM OF THE SU	Is substance persistent?	Yes			principally for organic substances. Metals and inorganics such as nickel are inherently persistent and subject to transformation rather than degradation. Nickel will therefore not
No     40     B1200     Insum 2014 of the SUM OF THE SU					
Non-ordering the spectra desired of spectra desired of a general spectra d	Bioaccumulation				
Table of the stands	Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	<340	ESR (2008)	showed high bioaccumulation but this result was significantly different to the other organisms studied
Note of the second of the s	Does field data show evidence for biomagnification?	No		ESR (2008)	Assessment of the available data for the ESR indicated nickel does not biomagnify
number of the state of the	If answer to either auestion is YES, substance is bloaccumulative				
	If no BCF data, is log Kow ≥ 4.5?	Not applicable (see			Log Kow values are not considered reliable estimates of the bioaccumulation potential of inorganic substances such as nickel.
Bank and the state the the the the the second set is an all or subset of the second set is an all of the second set is an all of the second set is all of the second	If answer is YES, substance is bioaccumulative	comment)			
	Does the weight of evidence from the following criteria indicate bioaccumulation	Not considered due to			
		the above data			
	Molecular weight ≥ 1100g/mol Octanol solubility ≤ 0.002mmol/l				
	If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative				
additional backet of the standard of the standa	If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers). BCF data should be obtained				
And and any and any any and any any and any	Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Name of the Name of anyon organs a south (NTO FE or South Call Control         Yes         GD 10 regins         EAC 10 Junctions anyon in the South Control or S	Is substance bioaccumulative?	No			Based on the available BCF and biomagnification data nickel (II) is not conisdered to meet the bioaccumulation criteria
Name of the Name of anyon organs a south (NTO FE or South Call Control         Yes         GD 10 regins         EAC 10 Junctions anyon in the South Control or S					
abademotion inprovide inp	I oxicity Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	Yes	0.0014mg/l		
	Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE1	ECHA C&L database	A number of nickel (II) compounds have been classified under C&L and have been determined as STOT RE1.
	Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for rangeduction (Renr 1A, 1B, 2)	Yes	Repr 1B	ECHA C&L database	A number of nickel (II) compounds have been classified under CLP and have been determined as Renr 1B
famer 4 new for the sector of					
ka kakan keni ( ) Ka	If answer to all questions is NO, substance is not toxic				
Des subtance one an endvaluent level of concern?         Har paralities and very biosconnulative?         Hard le in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker, frein or estuarities estimative sets: 00 days       See comment         Site in marker estimative sets: 00 days       See comment         Site in marker estimative sets: 00 days       See comment         Site in marker estimative sets: 00 days       See comment         Site in marker estin set in or Site in marker estin set in or or on test in	Is sufficient data available? (If not assume substance is toxic) Is substance toxic?				
	IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B
Hard Ha manine, fresh or existance water 2 60 days Hard Ha manine, fresh or existance water 2 60 days Hard Ha manine, fresh or existance water 2 60 days Hard Ha manine, fresh or existance water 2 60 days Hard Hard Hard Hard Hard Hard Hard Hard	Does substance pose an equivalent level of concern?				
Hard Ha manine, fresh or existance water 2 60 days Hard Ha manine, fresh or existance water 2 60 days Hard Ha manine, fresh or existance water 2 60 days Hard Ha manine, fresh or existance water 2 60 days Hard Hard Hard Hard Hard Hard Hard Hard	Very persistent and very bioaccumulative?				
And the state of a state state of a st					-
depending on the local conditions. depending on the	Half life in marine, fresh or estuarine water ≥ 60 days	See comment			The persistence criteria are not directly applicable to metals/inorganics and were developed principali for organic substances. Metals and inorganics such as nickel are inherently persistent and subject to transformation rather than depradation. Nickel will therefore not deprade but will be transformed
Target or any case to any case to the YES, addition is very parallelist     No     <40	Half life in marine. fresh or estuarine sediment ≥ 180 davs	See comment			depending on the local conditions.
In boomenentation factor s 5000 No -340 ER (200) The BCF Values were noted to be below 340. One moluse Cleasaddem ended in the operation of the the origination built the was significantly different to the three organisms studied. The second method is the balance approximation built the was significantly different to the three organisms studied. The second method is the balance approximation built the was significantly different to the three organisms studied. The second method is the balance approximation is the balance approximation built the second method is a balance approximation built the second method is a balance approximation built the second method. The second method is a balance approximation built th		See comment			
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Buildname why president and way blace.cumulative?     No     Does not meet the criteria for vB       Does subtance para specific risk to groundwater?     Not assessed     Not assessed       Does subtance have it lead about half it is noroundwater?     Not assessed     Not assessed       Does subtance on any outdoor is VSS, subtance is persister in groundwater?     Not assessed     Not assessed       Does subtance on any outdoor is VSS, subtance is persister in groundwater?     Not assessed     Not assessed       Does a subtance on any outdoor is VSS, subtance is persister in groundwater?     Not assessed     Not assessed       Does a subtance on the paratiter in groundwater?     Not assessed     Not assessed       Does a subtance on the paratiter in groundwater?     Not assessed     Not assessed       Does a subtance on the paratiter in groundwater?     Not assessed     Not assessed       Does a subtance on the paratiter in groundwater?     Not assessed     Not assessed       Does a subtance way toxic?     Not assessed     Not assessed       If ubdatance in numper integration in groundwater?     Not assessed     Not assessed       If ubdatance in any outdoo is VSS. subtance is any outdoo in VSS. subtance is any outdoo in the integratic on the paratiter in groundwater?     Not assessed       If ubdatance in any outdoo in VSS. subtance is any outdoo in the integratic on the paratiter in the para	Is bioconcentration factor ≥ 5000	No	<340	ESR (2008)	ne meaning or the burn values were noted to be below 340. Une mollusc Cerastoderm edule showed high bloaccumulation but this was significantly different to the other organisms studied.
Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does groundwater amples show text of the substance grader than the Not assessed Not	If answer is ves. substance is verv bioaccumulative				
Does groundwater montoring data show shall file in groundwater 2 1 year     Not assessed       Does 5% of groundwater samples where the substance is detected     Not assessed       DOE 5% of groundwater in groundwater?     Not assessed       Does substance provide the shall not a groundwater?     Not assessed       If addatance is pensitient in ground	Is substance very persistent and very bioaccumulative?	No			Does not meet the criteria for vB
LOOP     Not assessed       LOOP     Not assessed       Not assessed     Not assessed       Subtance hazardous     persistent in groundwater       Tarser to any question is YES, ablatione is persistent in groundwater?     Not assessed       Tarser to any question is YES, ablatione is persistent in groundwater?     Not assessed       Tarser to any question is YES, ablatione is persistent in groundwater?     Not assessed       Tarser to any question is YES, ablatione is persistent in groundwater?     Not assessed       Tarser to any question is YES, ablatione is persistent in groundwater?     Not assessed       Tarser to any question is YES, ablatione is persistent in groundwater?     Not assessed       Tarser to any question is YES, ablatione is new toxic and hazardous     Yee       Tarser to any question is YES, substance is very toxic?     No (see comment)       Tarser to any question is YES, substance is very toxic?     No (see comment)       Tarser to any question is YES, substance is very toxic?     No (see comment)       Tarser to any question is YES, substance is very toxic?     No (see comment)       Substance very toxic?     No (see comment)       Substance hazardous, if so, state on what basis     No       Substance hazardous to groundwater?     No       Substance hazardous to groundwater?     No       Substance hazardous if so, state on what basis     No       Substance hazard	Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year				
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bubblance in Anzardous       Not assessed         bes sublance overy toxic?       Anumber of nickel (11) compounds have been classified under CAL and have been classified and thus does not interact directly with the DNA in human cells, and thus a threshold to analised of an adverse effects on human health.         If answer to any question is YES, substance is very toxic?       No (see comment)       Athough classified as Muta 2 under CAL it is considered that nickel heas as threshold for genotoxic effects via eral esposure and threefore not to meet the criteria for Yery Toxic         Is substance hazardous, if so, state on what basis       No       See comment)       Athough classified as Muta 2 under CAL it is considered that nickel heas as threshold for genotoxic effects via eral esposure and threefore not to meet the criteria for Yery Toxic         Is substance hazardous, if so, state on what basis       No       See comment)       Dees not meet criteria for PBT or wh& it. Is determined as Muta 2 under CAL it is considered to meet the criteria for Yery Toxic         Costatered to have bare of determined as Muta 2 under CAL it is considered to meet the criteria for Yery Toxic       See considered to have a intrashold for genotoxic effects via erat esposure and threefore no	Is substance persistent in groundwater?	Not assessed			
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substance mutagenic (Mata 1A, 1B, 2) or have no determined bet hreshold for substance mutagenic (Mata 1A, 1B, 2) or have no determined bet hreshold for substance mutagenic (Mata 1A, 1B, 2) or have no determined bet hreshold for substance determined as mutagenic (Mata 1A, 1B, 2) or have no determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have determined as mutagenic (Mata 1A, 1B, 2) or have no determined bet hreshold for substance determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have determined as mutagenic (Mata 1A, 1B, 2) or have no determined here have dete	substance is hazardous	Not second			
substance mutagenic (Mat A, 16.2) or have no determinable threshold for we what 2 concentrates (2015) con	In substance is persistent in groundwater, bioeccumulative And toxic, substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic?	Not assessed			
If answer to any question is YES, substance is very toxic)       Yes         Is substance very toxic?       No (see comment)       Athough classified as Muta 2 under C&L is considered that nickel has a threshold for genotoxic effects via oral exposure and therefore not to meet the criteria for Yery Toxic         Is substance very toxic?       No (see comment)       Athough classified as Muta 2 under C&L is considered that nickel has a threshold for genotoxic effects via oral exposure and therefore not to meet the criteria for Yery Toxic         Is substance hazardous, if so, state on what basis       No       Does not meet criteria for YBT or vPxB. Is determined as Muta 2 under C&L however is is considered to have a threshold for genotoxic effects and therefore not considered to meet the criteria for YBT or vPxB. Is determined as Muta 2 under C&L however is is considered to have a threshold for genotoxic effects and therefore not considered to neet the criteria for determination as Hazardous.         Does substance have breakdown products of concern?       No         REFERENCES       http://cha.auropa.au/information-on-chemptable/intentory-database         YMO 200001       http://cha.auropa.au/information-on-chemptable/intentory-database         More 20001       http://cha.auropa.au/information-on-chemptable/intentory-database         VMO 20001       http://cha.auropa.au/information-on-chemptable/intentory-database	substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			A number of nickel (II) compounds have been classified under C&L and have been determined as Mita 2. The weight of evidence from the European Ecol Safety Authority (2015) indicates that the
s substance very toxic? No (see comment) So (see comment)	substance is hazardous Does substance pose a specific risk to groundwater?		Muta 2	database/EFSA	Muta 2. The weight of evidence from the European Food Safety Authority (2015) indicates that the genotoxicity and mutagenicity of nickel is likely to occur via indirect mechanisms. This means that it is considered that nickel does not interact directly with the DNA in human cells, and thus a threshold can be assumed for its observed genotoxicity/mutagenicity. It is therefore considered not to meet the
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Description         Intro-link a surgea au/Information on chemical/of-intentory-database           CIA X-DL Catabase         http://inchia.auropa.au/Information-on-chemical/of-intentory-database           ESR (2005)         http://inchia.auropa.au/Information-on-chemical/of-intentory-database           VHO (2005)         http://inchia.auropa.au/Information-on-chemical/of-intentory-database	substance is hazardous Dees substance or a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	Yes	Muta 2	database/EFSA	Muta 2. The weight of evidence from the European Food Safety Authority (2015) indicates that the genotocity and mutagenicity of nickle likely to occur via midner mechanisms. This means that it is considered that nickel does not interact directly with the DNA in human cells, and thus a threshold can be assumed for its observed genotoxicity/mutagenicity. It is therefore considered not to meet the criteria for Very Toxic Although classified as Muta 2 under C&L it is considered that nickel has a threshold for
Description         Intro-link a surgea au/Information on chemical/of-intentory-database           CIA X-DL Catabase         http://inchia.auropa.au/Information-on-chemical/of-intentory-database           ESR (2005)         http://inchia.auropa.au/Information-on-chemical/of-intentory-database           VHO (2005)         http://inchia.auropa.au/Information-on-chemical/of-intentory-database	substance is hazardous Dees substance or a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic?	Yes Yes No (see comment)	Muta 2	database/EFSA	Muta 2. The weight of evidence from the European Food Safety Authority (2015) indicates that the genotocity and mutagenicity of nickle likely to occur with indicet mechanisms. This means that it is considered that nickel does not interact directly with the DNA in human cells, and thus a threshold can be assumed for its doesned genotocicly/mutagenicity. It is therefore considered not to meet the criteria for Very Toxic Although classified as Muta 2 under C&L it is considered that nickel has a threshold for genotocicl effects via oral exposure and therefore not to meet the criteria for Very Toxic Does not meet criteria for PBT or vPvB. Is determined as Muta 2 under C&L however it is considered to have a threshold for genotoxic effects and therefore not considered to have a first for genotoxic effects.
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VHO 2005) http://www.who.int/water sanilation healthiodworevision/nicke/2005.pdf EFSA (2015) http://onlinelibrary.wiley.com/doi/10.2903/jefsa.2015.4002/epdf	substance is hazardous Does substance bok a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to anv question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic) Is substance very toxic? Is substance hazardous to groundwater?	Yes Yes No (see comment) No	Muta 2	database/EFSA	Muta 2. The weight of evidence from the European Food Safety Authority (2015) indicates that the genotocity and mutagenicity of nicel is likely to court wind moter mechanisms. This means that it is considered that nickel does not interact directly with the DNA in human cells, and thus a threshold can be assumed for its doesned genotoxicity/mutagenicity. It is therefore considered not to meet the criteria for Very Toxic Although classified as Muta 2 under C&L it is considered that nickel has a threshold for genotoxic effects via oral exposure and therefore not to meet the criteria for Very Toxic Does not meet criteria for PBT or vPvB. Is determined as Muta 2 under C&L however it is considered to have a threshold for genotoxic effects and therefore no considered to have a threshold regressive.
	aubstance is hazardous Dess substance one a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 18,2) or have no determinable threshold for adverse effects on human health if answer to anv question is YES, substance is very toxic and hazardous is sufficient data available? (If not assume substance is very toxic) Is substance hazardous, if so, state on what basis Does substance hazardous, if so, state on what basis EFERENCES ECHA OLS, database ESR (2006)	Yes Yes No (see comment) No No	ormation-on-cher ourments/101822	database/EFSA (2015) vicials/d-Inventory-database refußion-2982-4011-885	Muta 2. The weight of existence from the European Food Safety Authority (2015) indicates that the genotocity and mutagenicity of noise likely to occur side indicet mechanisms. This means that it is considered that noise lose not interact directly with the DNA is human cells, and thus a threshold incriteria for Very Toxic.  Although classified as Muta 2 under C&L It is considered that nickel has a threshold for genotoxic effects via oral exposure and therefore not to meet the criteria for Very Toxic.  Does not meet criteria for PBT or vPvB. Is determined as Muta 2 under C&L however it is considered to have a threshold for genotoxic effects and therefore not considered to meet the criteria for determination as Hazardoux.

			Pen	tachlorobenzene (CAS Number: 608-93-5)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	No		POPRC (2007)	The result from an OECD TG 301C test showed pentachlorobenzene was non-biodegradable
Passes inherent biodegradation test				
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days Half life niresh or estuarine sediment ≥ 120 days	NA Yes NA	194-1250 days	POPRC (2007)	Values recorded for surface water. Not clear if marine, estuarine or freshwaters.
Half life in soil ≥ 120 days	Yes	260-7300 days	POPRC (2007)	In a UK soil (Woburn) that received sludge applications until 1961, approximately 21% of the added pentachiorobenzene was still in the soil 30 years later.
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent) Is substance persistent?	Yes Yes			Pentachlorobenzene has been designated as a Persistent Organic Pollutant (POP)
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	Yes	577-23000	POPRC (2007)	BCF range for fish, mollusca and crustacea. Many of the results for invertebrates and fish are >2000
Does field data show evidence for biomagnification?	Insufficient data		POPRC (2007)	Potential for biomagnification is considered high. Much field biota data exist but no agreed BMF values.
If answer to either question is YES, substance is bioaccumulative If no BCF data, is log Kow ≥ 4.5?	Yes	5.17		Values range from 4.88-6.12 with recommended values of 5.17-5.18
If no BCP data, is log Now 2 4.5? If answer is YES, substance is bioaccumulative	res	0.17	POPRC (2007)	Values range from 4.66-6.12 with recommended values of 5.17-5.18
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not assessed due to the information being available			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100/mol Octanol solubility ≤ 0.002mmol/I				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes Yes			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.010$ mg/l	Yes	2 ug/L (0.002 mg/L)	POPRC (2007)	Freshwater fish species
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	EU harmonised C&L classification available. The classification indicates the criteria are not met
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	EU harmonised C&L classification available. The classification indicates the criteria are not met
If answer to any question is YES, substance is toxic If answer to all questions is NO. substance is not toxic			ualabase	
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Based on aquatic toxicity
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Yes			Meets the criteria for P, B and T. Pentachlorobenzene has been designated as a Persistent Organic Pollutant (POP)
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	194-1250 days	POPRC (2007)	Values recorded for surface water. Not clear if marine, estuarine or freshwaters.
Half life in soil ≥ 180 days	Yes	260-7300 days	POPRC (2007)	In a UK soil (Woburn) that received sludge applications until 1961, approximately 21% of the added pentachlorobenzene was still in the soil 30 years later.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	Yes	577-23000	POPRC (2007)	BCF range for fish, mollusca and crustacea. Many of the results for fish are >2000
Is substance very persistent and very bioaccumulative?	Yes			Meets the criteria for vPvB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than	Not assessed			
$Do \ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ? $Do \ge 15\%$ of sites have at least one sample where the substance is detected	NOL ASSESSED			
above the LOQ? If answer to any question is YES, substance is persistent in groundwater	Not assessed			
Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold			ECHA C&L	EU harmonised C&L classification. The classification indicates that pentachlorobenzene do not meet
for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		database	EU narmonised CoL classification. The classification indicates that pentachlorobenzene do not meet these criteria
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			Meets the criteria for P, B and T as well as for vP, vB. Pentachlorobenzene is a designated Persistent Organic Pollutant (POP)
Does substance have breakdown products of concern?	No			
REFERENCES POPRC. 2007. Draft risk profile for Pentachlorobenzene ECHA C&L database		cuments/meetings/pop information-on-chemica		IRskProfile PeCB.pdf base

Yes I vo d a d a d a d a d a d a d a d a d a d	Value	Reference OECD (2002), Environment Canada (2006)	Comments Studies on PFOS show it is not readily degraded. No degradation was observed over 28days in a MITI test The available data indicated that PFOS is not degraded via biodegradation, photodegradation or hydrokys and it is pensister in the environment. A half life of >4) years was estimated (Environment Canada 2006). It has been identified as a POP (Pensister Organic Pollutant)
Yes Yes		OECD (2002), Environment Canada (2006)	The available data indicated that PFOS is not degraded via biodegradation, photodegradation or hydrolysis and it is pensistent in the environment. A half life of >1 years was estimated (Environment
Yes Yes		OECD (2002), Environment Canada (2006)	The available data indicated that PFOS is not degraded via biodegradation, photodegradation or hydrohysis and it is pensistent in the environment. A half life of >4 tyears was estimated (Environment
Yes		(2006)	The available data indicated that PFOS is not degraded via biodegradation, photodegradation or hydrolysis and it is pensistent in the environment. A half life of >1 years was estimated (Environment
Yes			hydrolysis and it is persistent in the environment. A half life of >41years was estimated (Environment
Yes			hydrolysis and it is persistent in the environment. A half life of >41years was estimated (Environment
Yes			
Yes			Caliada 2000), in has been roomained as a FOF (relation organic Formani)
Yes			
			PFOS has been identified as a Persistent Organic Pollutant (POP)
Vec			
Tes	1124 - 4013	OECD (2002)	Range of BCF values reported for the bluegill sunfish. A range of 200 - 1500 was reported for carp
Yes		Environment Canada	A number of studies are reported which show biomagnification of PFOS in the food chain including studies of accumulation in the Arctic and Great Lakes.
		(2000)	acuires of accumulation in the Arctic and Oreat Lakes.
No data			It is noted that it is not possible to measure the Log Kow of PFOS due to its properties. It is generally present as an anion at environmental pH and determination of a Log Kow is not appropriate
assessed due above data			
Yes Yes			Based on both BCF data and reported evidence of biomagnification
No	0.25	OECD (2002)	35d NOEC of 0.25mg/l for Mysidopsis bahia
Yes	STOT RE1	ECHA C&L database	Harmonised C&L classification is available for PFOS. The classification shows it meets the criteria for STOT RE2
Yes	Repr 1B	ECHA C&L database	Harmonised C&L classification. The classification shows it meets the criteria for Repr 1B
Yes			
Yes			Meets criteria for STOT RE1 and Repr 1B
Yes			Meets criteria for P, B and T
Ves		OECD (2002), Environment Canada	Although very little specific half life data is available information located indicated PFOS does not degrade via biodegradation, photodegradation and that hydrolysis if very slow with a half life estimated
100		(2006)	organise na snoog adalant, priodoog adalant and na nyolog ad in fory dan mini a nan na calinada of >41years.
No	1124 - 4013	OECD (2002)	Whole body BCFs above 5000 are not generally reported. However the weight of evidence indicates it is highly bioaccumulative and has been found to biomagnify
No			Does not meet the threshold for BCF data although the substance has been found to biomagnify
ot assessed			
or assessed			
ot assessed			
No		ECHA C&L database	Harmonised C&L classification
Mar			
Yes No			
Yes			Meets the criteria for P, B and T. PFOS has been identified as a POP (Persistent Organic Pollutant)
No			
//www.ec.gc.ca/lo s://www.gov.uk/go //www.oecd.org/c	pe-cepa/default.a vernment/upload hemicalsafety/ris	asp?lang=En&n=98B195 s/system/uploads/attach k-assessment/2382880.p	4A-1 ment_data/file/290857/scho1009brbl-e-e.pdf
	Yes       Yes       Yes       No data       assessed due above data       assessed due due above data       Yes       <	Yes       Yes       1124 - 4013       Yes       No data       assessed due above data       Yes       Yes </td <td>Yes       1124 - 4013       OECD (2002)         Yes       Environment Canada (2006)         No data       Image: Constraint of the second data (2006)         Yes       STOT RE1       ECHA C&amp;L database         Yes       STOT RE1       ECHA C&amp;L database         Yes       Repr 1B       ECHA C&amp;L database         Yes       Repr 1B       ECHA C&amp;L database         Yes       Environment Canada (2006)         Yes       Repr 1B       ECHA C&amp;L database         Yes       Repr 1B       ECHA C&amp;L database         Yes       Environment Canada (2006)       Environment Canada (2006)         No       1124 - 4013       OECD (2002)         No       1124 - 4013       OECD (2002)         No       1124 - 4013       OECD (2002)         No       Environment Canada (2006)       Environment Canada (2006)         Xessessed       Image: Constraint of the second (2002)       Image: Constraint of the second (2002)         No       ECHA C&amp;L database       Image: Constraint of the second (2002)         No       ECHA C&amp;L database       Image: Constraint of the second (2002)         No       ECHA C&amp;L database       Image: Constraint of the second (2002)         No       ECHA C&amp;L database       Image: Cons</td>	Yes       1124 - 4013       OECD (2002)         Yes       Environment Canada (2006)         No data       Image: Constraint of the second data (2006)         Yes       STOT RE1       ECHA C&L database         Yes       STOT RE1       ECHA C&L database         Yes       Repr 1B       ECHA C&L database         Yes       Repr 1B       ECHA C&L database         Yes       Environment Canada (2006)         Yes       Repr 1B       ECHA C&L database         Yes       Repr 1B       ECHA C&L database         Yes       Environment Canada (2006)       Environment Canada (2006)         No       1124 - 4013       OECD (2002)         No       1124 - 4013       OECD (2002)         No       1124 - 4013       OECD (2002)         No       Environment Canada (2006)       Environment Canada (2006)         Xessessed       Image: Constraint of the second (2002)       Image: Constraint of the second (2002)         No       ECHA C&L database       Image: Constraint of the second (2002)         No       ECHA C&L database       Image: Constraint of the second (2002)         No       ECHA C&L database       Image: Constraint of the second (2002)         No       ECHA C&L database       Image: Cons

				Propylene glycol (CAS: 57-55-6)
	Yes / No / Insufficient data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence				
Passes ready biodegradation test	Yes		OECD SIDS (2001)	A number of studies reported that propylene glycol is readily biodegradable. Two studies in sludge were noted in the SIDS report. One reported 79% after 20d and another 84-99% after 24hr. In soil a study reported 100% degradation after 12days.
Passes inherent biodegradation test				reported 79% after 20d and another 84-99% after 24hr. In soil a study reported 100% degradation after 12days.
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days				
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 days				
Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days				
If answer to any question is YES, substance is persistent				
If answer to all questions is NO, substance is not persistent Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	No			
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	1.4	OECD SIDS (2001)	A BCF of 1.4 was calculated from the log Kow
Does field data show evidence for biomagnification? If answer to either guestion is YES, substance is bioaccumulative	140	1.4	0200 3103 (2001)	A BOL OF LA Was calculated from the top Now
If no BCF data, is log Kow ≥ 4.5?	No	-1.41 and -0.3'	OECD SIDS (2001)	
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not considered due to the	above information	n	
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm				
Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) sub	stance is not bioaccumula	tive		
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers),				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	Yes No			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\leq 0.01 \text{mg/l}$	No	13020	OECD SIDS (2001)	The value noted is a 74 NOECreproduction for the invertebrate Ceriodaphina dubia. This indicates low chronic toxicity to this species. Chronic data for agial papeies also indicated that it would not meet the criteria with 144 NOECs of <33000197 reported. No chronic data was available for fish but the acute data for fish indicate low toxicity with acute effects reported in the range of 45000-51600mgH. This acute data and the chronic data available indicate progyleng dyoid does not meet the criteria for Arhonic toxicity to aquatic life.
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database/SIDS (2001)	An EU harmonised C&L classification is not available for propylene glycol. Industry data submitted to the ECHA database indicates that it does not meet these criteria. This is supported by data presented in the SIDS assessment where the data provided dd not indicate effects from induct term exposure.
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database/SIDS (2001)	An EU harmonised C&L classification is not available for propylene glycoL. Industry data submitted to the ECHA database indicates that it does not meet these criteria. This is supported by data presented in the SIDS assessment where the data provided did not indicate any evidence of carcinogenic or genotoxic effects and no evidence of reproductive or developmental toxicity.
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic			()	
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	Ne			Available data indicates it does not meet the criteria for P, B or T
Does substance pose an equivalent level of concern?	NO			
Very persistent and very bioaccumulative?	NI-			A number of studies reported that propylene glycol is readily biodegradable. Two studies in sludge were noted in the SIDS report. One
Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	No			reported 79% after 20d and another 84-99% after 24hr. In soil a study reported 100% degradation after 12days.
Half life in soil ≥ 180 days				
If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000	No	14	0500 000 (0004)	A DOP of 4 A ways reducible differentiation from the law Marco
If answer is yes, substance is very bioaccumulative	NO	1.4	OECD SIDS (2001)	A BCF of 1.4 was calculated from the log Kow
Is substance very persistent and very bioaccumulative?	No			Does not meet the criteria for either vP or vB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year	Not assessed			
Do ≥ 5% of groundwater samples show levels of the substance greater than the LOQ?	Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for	No			An EU harmonised C&L classification is not available for propylene glycol. Industry data submitted to the ECHA database indicates that it does not meet these criteria. This is supported by data presented in the SIDS assessment where the data provided did not indicate
adverse effects on human health	NO			It does not meet these criteria. This is supported by data presented in the SIUS assessment where the data provided did not indicate any evidence of genotoxic effects.
If answer to any question is YES, substance is very toxic and hazardous is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			
Does substance have breakdown products of concern?	No			
REFERENCES	-			
OECD SIDS (2001)	http://www.inchem.org/do	cuments/eide/eide	/57-55-6 pdf	
0200 000 (2001)	http://www.incitem.org/do	reaction on chomi	non roome.pdl	anda a idealización da MAD dissolización estates a liferante. Os a statemarmales a medamiques a sel ideastrum

ECHA C&L database

http://cha.auroa.au/information-on-chemicatic/-inventory-database?p.p.id=dissclinventory WAR\_dissclinventoryportiet&p.p.lifecycle=0&p.p.state=normal&p.p.mode=view&p.p.col.id=column-1&p.p.col.pos=1&p.p.col.count=2

				Selenium (CAS: 7782-49-2)
	selenates are soluble in	water, selenium i	s leached from well-aerate	emental selenium, alkaline and oxidizing conditions lawour the formation of selenates. Selenites and dialkaline solis that lawour its oxidiation. In contrast, elemental selenium and selenides are insolution in solis, the restouring conditions of which hower those forms. Thus, selenium in adaletine solis is available oxis the test to be limited by the adsorption of selenities and selenites to iron and atuminum oxide pois." (WHM 2011)
Is substance persistent, bioaccumulative and toxic?	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic? Persistence				
Passes ready biodegradation test	Test not applicable (see comment) Test not applicable			Test not applicable to metals/inorganics
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent	(see comment)			Test not applicable to metals/inorganics
If answer to both ouestions is NO. additional data on half life is required	Test not applicable			
Half life marine water 260 days Half life from to extrainine water 2.40 days Half life marine sediment 2.100 days Half life herato extrainine sediment 2.120 days Half life in sol 2.120 days Other relevant Information (e.e. discutation/transformation for metals/informatics) # answer to any question is PCS, substance is programmer a marker to any question is PCS, substance is not persistent	(see comment) See above See above See above See above See above			Degradation testing not applicable for metal/inorganic
Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes (see comment)			The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as selenium are inherently persistent and subject to transformation raher than degradation. Selenium will therefore not degrade but will be transformed depending on the local conditions.
Bioaccumulation				
Boconcentration factor (BCF) for aquatic species (wet weight) $\gtrsim 2000$	No	<2000	ECHA-CHEM	Selection is an exactle allowed and internal concentrations are regulated in many aquatio organization register accommission in regroted in hower projectives at a galaxie. Accountable in the law of other higher topolic levels manky results from dietery uptake. A range of BGF values have been reported. Some of here in hower tropic levels (eg galage) exceed the threshold of 2000, and there is some evidence for Jose dependency. The majority of BGF data for fish and investmines are below the dependency of this essential element, selenism is considered not to bioaccumulate accounting to the orderion.
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative				
If no BCF data, is log Kow ≥ 4.5?	Test not applicable (see comment)			Log Kow are not considered reliable estimates of the potential for bioaccumulation of inorganic substances such as setenium.
If answer is YES. substance is bioaccumulative Does the weight of evidence from the following criteria indicate bioaccumulation	Not considered due to			
urilikely? Substance is chronically non-taxic in mammals Midecular size 2 4.3m Mdecular size 2 4.3m Mdecular size 4.3m Mdecular	the above data on bioaccumulation			
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative? Toxicity	No			
I sate to a set of the set of th	No	0.085mg/l	Ecotox	The lowest chronic study was a 21d NOEC for Daphnia magna
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	Yes	STOT RE2		Harmonised C&L classification. The classification indicates it met the criteria for STOT RE2
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic	No		ECHA C&L database	Harmonised C&L classification. The classification indicates it does not meet the criteria
If answer to all duestions is NO. substance is not toxic is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet the criteria for bioaccumulation
Does substance pose an equivalent level of concern?				
Verv persistent and verv bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days	Test not applicable (see comment)			
Half life in marine. fresh or estuarine sediment ≿ 180 davs Half life in sol ≥ 180 days	See above			The persistence criteria are not directly applicable to metals/inorganics and were developed principally for organic substances. Metals and inorganics such as selenium are inherently persistent and subject to transformation rather than degradation. Selenium will therefore not degrade but will be transformed depending on the local conditions.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor a 5000	No	<2000	ECHA-CHEM	Selentum is an essential element and internal concentrators are regulated in many aquatic organisms . Higher accumulation is reported in lower trophic levels og algae. Accumulation in this hand other higher trophic-level and there yutakes. A range of BCP values have been reported. Some of these in lower trophic-levels (eg algae) acceed the threshold of 2000, and there is some setternal of 2000. Therefore, the setternal element of the other and monitorial transition dependency of this essential element, selentum is considered not to bloaccumulate according to the orterior.
If answer is yes, substance is very bioaccumulative				
Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for vB
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the	Not assessed Not assessed			
LOQ? $D_0 \ge 15\%$ of sites have at least one sample where the substance is detected above the LOQ?	Not assessed Not assessed			
If answer to any question is YES, substance is persistent in aroundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very (DAC): Is substance very (DAC): adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	Harmonised C&L classification. The classification indicates it does not meet the criteria for mutagenicity
Is sufficient data available? (if not assume substance is verv toxic)	Yes			Also relevant for this determination: The United Kingdom Expert Group on Vitamins and Minerals
Is substance very toxic?	No			Also relevant for this determination: The United Kingdom Expert Group on Vitamins and Minerals recommended selemin initiates of 60 gig/ds for women and 70 gig/ds for men (UK ECVM, 2002). However because of concern about the adverse effects from exposure to excessive levels of selenium, same body established upper limit of 400 ug/f for selenium. This guidance indicates that selenium does not meet the criteria for no determinable threshold.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Substance is persistent and toxic (based on STOT RE2) but is not considered bioaccumulative and does not display an equivalent level of concern according to the criteria.
Does substance have breakdown products of concern?	No			
Does substance have breakdown products of concern? REFERENCES WHO (2011) ECH4 CAL database US EPA Ecrotox database ECH4 CHEM	No http://www.who.int/water http://echa.europa.eu/infor http://cfpub.epa.gov/ecoto http://apps.echa.europa.ee	mation-on-chemi	cats/cl-inventory-	

				Tetrachloroethylene (CAS: 127-18-4)
	Yes / No / Insufficent			
	data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	No	11% degradation after	ECHA (2014)	The ECHA (2014) report noted that based on consideration of the available studies tetrachloroethylene is not
Passes inherent biodegradation test If answer to either question is YES, substance is not	110	28days	20131(2014)	considered to be readily biodegradable
persistent If answer to both questions is NO, additional data on half life				
is required				
Half life marine water ≿ 60 days	Yes		ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very solve however no specific half lives are not given. Degradation is reported under amaerobic conditions however again specific half lives are not given. Based on the available data tetrachicoethylene is considend to be gensitiant. This is supported in the ECH42014 which notes that based on the available information tetrachicroethylene meets the criteria for P and vP
Half life fresh or estuarine water ≥ 40 days Half life marine sediment ≥ 180 davs Half life fresh or estuarine sediment ≥ 120 days Half life in sül ≥ 120 davs				
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is	Yes			
persistent)				The available data indicate that tetrachloroethylene meets the criteria for persistence. This is supported
Is substance persistent?	Yes			by the ECHA (2014) document which notes the available data support tetrachloroethylene meeting the P and vP data.
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) 2 2000 Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No	40-50	ESR (2005)	The data in the ESR is supported by that in the Canadian risk assessment report which noted BCFs for fish ranging from 40 - 400.
If no BCF data, is log Kow ≥ 4.5?	No	2.53	ESR (2005)	The value in the ESR report is supported by a value of 3.4 reported in the NICNAS report. The available data indicates it does not meet the criteria.
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumalizion unikely? Substance is chronically non-toxic in mammals Molecular weight > 1100g/mol Octamol sobubility \$ 0.002mmol/ If weight of evidence indicates bioaccumulation unikely (i.e. VES answers) substance is not bioaccumulative	Not assessed due to above information			
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers). BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	No			
Toxicity Is the lowest chronic NOEC for freshwater or marine	м.	0.54	505 (0005)	
organisms ≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1	No	0.51mg/l	ESR (2005)	Lowest reliable chronic study was noted to be a 28d NOEC for Daphnia magna of 0.51mg/l
or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A,	No	Carc 2		Harmonised C&L classification. The classification indicates it does not meet the criteria Harmonised C&L classification. The classification indicates it does not meet the criteria
1B) or toxic for reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic	NU	Galc 2	ECHA Cal Ualabase	namonised Cat classification. The classification molicates it does not meet the chiena
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	No			
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B or T
TOXIC? Does substance pose an equivalent level of concern?	No			Does not meet criteria for B or T
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days	No Yes		ESR (2005)	Does not meet criteria for B or T The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but votalitisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very slow however no specific half lives are given. Degradation is reported under anaerobic conditions however again specific half lives are not given. Based on the available data tetrachiorethylene is considered to be persistent
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in soil 2 180 days	Yes		ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very slow however no specific half lives were given. Degradation is reported under anaerobic conditions however again specific half lives are not given. Based on the available data tetrachicorebriene is
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days	Yes		ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very slow however no specific half lives were given. Degradation is reported under anaerobic conditions however again specific half lives are not given. Based on the available data tetrachicorebriene is
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in soil 2 180 days	Yes	40-50	ESR (2005) ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very slow however no specific half lives were given. Degradation is reported under anaerobic conditions however again specific half lives are not given. Based on the available data tetrachicorebriene is
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days If answer to any question is YES, substance is very persistent le bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative	Yes	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradiation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be pensistent.
TOXIC?           Does substance pose an equivalent level of concern?           Very persistent and very bioaccumulative?           Half life in marine, fresh or estuarine water ≥ 60 days           Half life in marine, fresh or estuarine sediment ≥ 180 days           Half life in soil ≥ 180 days           If answer to any question is YES, substance is very persistent           Is bioconcentration factor ≥ 5000           If answer is yes, substance is very bioaccumulative           Is ubstance very persistent and very bioaccumulative?	Yes	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very slow however no specific half lives were given. Degradation is reported under anaerobic conditions however again specific half lives are not given. Based on the available data tetrachicorebriene is
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in soil 2 180 days If answer to any question is YES, substance is very persistent Is bioconcentration factor 2 5000 If answer is substance severy bioaccumulative Is substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater 4 year	Yes No No Notassessed	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be persistent
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine water 2 60 days Half life in soil a 180 days If answer to any question is YES, substance is very persistent is bioconcentration factor 2 5000 If answer is yes, substance is very bioaccumulative Is substance very persistent and very bioaccumulative Does groundwater monitoring data show half life in Doe S() of groundwater samples show levels of the substance Doe S() of groundwater samples show levels of the substance	Yes No No Not assessed Not assessed	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be persistent
TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water ≥ 60 days  Half life in marine, fresh or estuarine sediment ≥ 180 days  Half life in soil ≈ 180 days  I answer for any question is YES, substance is very persistent  is bioconcentration factor ≥ 5000  # answer is yes, substance is very bioaccumulative?  Does substance pose a specific risk to groundwater?	Yes No No Not assessed	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be persistent
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine water 2 60 days Half life in soil a 180 days If answer to any question is YES, substance is very persistent is bioconcentration factor 2 5000 If answer is ves, substance is very bioaccumulative Is substance orey persistent and very bioaccumulative? Does groundwater monitoring data show half life in Does for the LOP? Doe 150% of alies have al least one sample where the substance in deced above the LOP?	Yes No No Not assessed Not assessed	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be persistent
TOXIC?  Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days I answer is any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 I answer is yes, substance is very bioaccumulative? Does substance pose a specific risk to groundwater from the substance Doe S (15% of grain LOO? Does substance pose a specific risk to groundwater from the substance Doe 15% of grains and the Question is YES, substance is detected above the LOO? Doe Stance is detected above the LOO? I substance is persistent in groundwater? If substance is generative the groundwater? If substance is persistent in groundwater? If substance is	Yes No No Not assessed Not assessed	40-50		The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be persistent
TOXIC?  Does substance pose an equivalent level of concern? Very persistent and very bloaccumulative?  Half life in marine, fresh or estuarine water ≥ 60 days  Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in soil ≥ 180 days  I answer to any question in YES, substance is very persistent is bloconcentration factor ≥ 6000 I answer is yea, substance is very bloaccumulative?  Does substance pose a specific fisk to groundwater Pose substance pose a specific fisk to groundwater Pose substance or sample show half life in argundwater and sueston is YES, substance is very braistent is substance pose a specific fisk to groundwater? Does groundwater and uses no sample where the substance is detected above the LOQ? Doe 15% of sites have al least one sample where the substance is persistent in groundwater? I substance pose a specific fisk to groundwater? I substance very toxic? I substance very toxic? I substance very toxic?	Yes No No Not assessed Not assessed Not assessed	40-50	ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitallisation is with half lines reported in the range of Shrs - 14 days. Aerobic biodegradation is controllors however again specific half lives are not given. Based on the available data tetrachloroethylene is considered to be persistent
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in agrice, fresh or estuarine sediment 2 180 days Half life in agrice, fresh or estuarine sediment 2 180 days Half life in agrice, fresh or estuarine sediment 2 180 days Half life in agrice, fresh or estuarine sediment 2 180 days Half life in agrice, fresh or estuarine sediment 2 180 days I answer is yes, substance is very braccumulative Is substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does Sty of groundwater monitoring data show half life in Doe 5% of groundwater monitoring data show half life in Doe 5% of groundwater monitoring data show half life in Doe 5% of groundwater samples show levels of the substance reater than the LOQ? Do 5% of groundwater samples show levels of the substance reater than the LOQ? Do 5% of groundwater in groundwater / Busbatance pose a specific risk to groundwater? Is substance is parsistent in groundwater? Is substance pose a specific risk to groundwater? Is substance	Yes No No Not assessed Not assessed Not assessed	40-50	ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vidalisation is noted to be very sub-notewer on specific half lives are vidan. Degradation is reported under anarobic conditions however again specific half lives are not given. Beaded on the available data tetrachboroethylene is considered to be pensition!
TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water ≥ 60 days  Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in marine, fresh or estuarine sediment ≥ 180 days Half life in sol ≥ 180 days I answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000 If answer is yes, substance is very bioaccumulative Is substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwate Y wear Doe S (5% of groundwate monitoring data show half life in groundwater V ear Doe S (5% of groundwate the LOO? If answer to a greation is YES, substance is persistent in groundwater? If substance present in groundwater? If substance is persistent in groundwater? If substance present in groundwater? If substance is persistent in groundwater? If substance very toxic? Is	Yes No No Not assessed Not assessed Not assessed Not assessed	40-50	ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lines reported in the range of 3hs - 14 days. Aerobic biodegradation is considered to be pensistent.           Does not meet criteria for vB         Hamonised C&L dassification. The classification indicates it does not meet the oriteria for mutagenicity. WHO
TOXIC? Does substance pose an equivalent level of concern? Very persistent and very bloaccumulative? Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in soil 2 180 days I answer to any question is YES, substance is very persistent Is bioconcentration factor 2 5000 I answer is yes, substance is very bloaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater in the LOQ? Doe 5% of groundwater samples show levels of the substance reater than the LOQ? Doe 15% of site have at least one sample where the substance is detected above the LOQ? Doe 35% of groundwater in groundwater? Haubtance is persistent in groundwater? Haubtance is persistent in groundwater? Is substance pose a specific risk to groundwater Boes substance pose a specific risk to groundwater? Boes substance pose a specific risk to groundwater? Is substance pose a specific risk to groundwater? Boes substance pose a specific risk to groundwater? Boes substance pose a specific risk to groundwater? Boes substance is parsistent in groundwater? Boes substance pose a specific risk to groundwater pose and base to sample where he Boes substance pose a specific risk to groundwater? Boes substance pose a specific risk to groundwater? Boes substance pose a specific risk to groundwater? Boes substance pose a specific risk to groundwater pose and and base to sample pose pose pose pose pose pose pose pos	Yes No No Not assessed Not assessed Not assessed	40-50	ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lines reported in the range of 3hs - 14 days. Aerobic biodegradation is considered to be pensistent.           Does not meet criteria for vB         Hamonised C&L dassification. The classification indicates it does not meet the oriteria for mutagenicity. WHO
TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water ≥ 60 days  Half life in marine, fresh or estuarine sediment ≥ 180 days  Half life in marine, fresh or estuarine sediment ≥ 180 days  Half life in marine, fresh or estuarine sediment ≥ 180 days  Half life in soil ≈ 180 days  I answer is yes, substance is very bioaccumulative  I substance very persistent and very bioaccumulative  I substance opse a specific risk to groundwater?  Does substance pose a specific risk to groundwater the substance is detected above the LOO?  I answer is persistent in groundwater?  Does substance is persistent in groundwater?  I substance pose a specific risk to groundwater?  I substance to persistent in groundwater?  I substance very toxic?  I substance ve	Yes No No Not assessed Not assessed Not assessed Not assessed	40-50	ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lines reported in the range of 3hs - 14 days. Aerobic biodegradation is considered to be pensistent.           Does not meet criteria for vB         Hamonised C&L dassification. The classification indicates it does not meet the oriteria for mutagenicity. WHO
TOXIC?  Does substance pose an equivalent level of concern?  Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water ≥ 60 days  Half life in marine, fresh or estuarine water ≥ 60 days  Half life in marine, fresh or estuarine sediment ≥ 180 days  Half life in soil ≈ 180 days  If answer is yes, substance is very bioaccumulative  If answer is yes, substance is very bioaccumulative  Is substance pose a specific risk to groundwater?  Does substance preseitent and very bioaccumulative  Is substance present the LOC?  If answer is yes a substance is very base mole where the  pose substance is generated the substance groundwater  If substance present in groundwater, bioaccumulative  A/D loce, substance is groundwater?  If substance present in groundwater?  If substance wery toxic?  Is substance wery toxic?  Is substance wery toxic?  Is substance very toxic?	Yes No No Not assessed Not assessed Not assessed Not assessed	40-50	ESR (2005)	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lines reported in the range of 3hrs - 14 days. Aerobic biodegradation is considered to be pensistent. Based on the available data letrachicroethylene is considered to be pensistent.
TOXIC?  Toxes substance pose an equivalent level of concern? Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water 2:60 days Half life in marine, fresh or estuarine water 2:60 days Half life in marine, fresh or estuarine sediment 2:180 days If answer is yes, substance is very persistent as bioconcentration factor 2:5000 If answer is yes, substance is very persistent is bioconcentration factor 2:5000 If answer is yes, substance is very persistent substance very persistent and very bioaccumulative If answer is yes, substance is very persistent as ubstance opea a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance persistent and very bioaccumulative Doe S (of groundwater amplies show levels of the substance rater than the LO?? Doe 15% of also There at lease 1:00?? If substance persistent in groundwater? If substance persistent in groundwater? If substance margenic (Mal 14, 18, 18, 2) or have no determinable thread for a some as asubstance is very toxic and haraver to any question is YES, substance is very toxic is substance that available? (If not assume substance is very toxic) Is substance hazardous to groundwater? Is substance ha	Yes No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed No No No		ESR (2005) ECHA C&L database/WHO	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vicialisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is conducted to be persistent and the set of the available data tetrachionoethylene is considered to be pensitent.           Does not meet criteria for vB           Harmonised C&L classification. The classification indicates it does not meet the criteria for mutagenicity. WHO report notes that evidence indicates that although carcinogenic it is not genotoxic and therefore does not meet the 'no determinable effects' criteria           Tetrachioroethylene does not meet the criteria for determination as Hazardous.           NR. Korum brakedown jourdure is following anaerobic degradation include trichioroethylene (determined as Hazardous).
TOXIC?  Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water 2:60 days Half life in marine, fresh or estuarine sediment 2:180 days Half life in soil 1:100 days If answer to any question is YES, substance is very persistent is bioconcentration factor 2:5000 If answer to any question is YES, substance is very persistent is bioconcentration factor 2:5000 If answer to se, substance is very bioaccumulative Is substance opes a specific risk to groundwater Does substance pose a specific risk to groundwater monitoring data show half life in aroundwate 2:41 ver Doe Stoff of groundwater amplies show levels of the substance areater than the LOO? Do 2:15% of sites have al least one samples they substance is devised above the LOO? Do 3:15% of sites have al least one substance factor and the substance is substance is detected above the LOO? Doe substance persistent in groundwater? If ausater to any question is YES, substance housdwater? Is substance marging life to groundwater? Is substance to any question is YES, substance is very toxic and hazardous is sufficient data available? (If not assume substance is very toxic and hazardous Is substance hazardous to groundwater? Is substance leave every toxic? Is substance to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic?	Yes No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed No No No		ESR (2005) ECHA C&L database/WHO	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but volatilisation is with half lives reported in the range of 2 hrs. 144ays. Aerobic biodegradation is noted to be very shown however on space of the lives are not given. Beaked on the available data tetrachicroethylene is considered to be pensition:           Does not meet criteria for vB           Harmonised C&L classification. The classification indicates it does not meet the criteria for mutagenicity. WHO report house that evidence indicates that although carcinogenic it is not gendow and therefore does not meet the 'ro determinative effects' criteria           Harmonised C&L classification. The classification indicates it does not meet the criteria for mutagenicity. WHO report notes that evidence indicates that although carcinogenic it is not gendow and therefore does not meet the 'ro determinative effects' criteria           Tetrachioroethyleme does not meet the criteria for determination as Hazardous.           Mark Konow herekown products following anaerobic degradation include trichbroethylene (determined)
TOXIC?  Toxes substance pose an equivalent level of concern? Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water 2:60 days Half life in marine, fresh or estuarine water 2:60 days Half life in marine, fresh or estuarine sediment 2:180 days If answer is yes, substance is very persistent as bioconcentration factor 2:5000 If answer is yes, substance is very persistent is bioconcentration factor 2:5000 If answer is yes, substance is very persistent substance very persistent and very bioaccumulative If answer is yes, substance is very persistent as ubstance opea a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance persistent and very bioaccumulative Doe S (of groundwater amplies show levels of the substance rater than the LO?? Doe 15% of also There at lease 1:00?? If substance persistent in groundwater? If substance persistent in groundwater? If substance margenic (Mal 14, 18, 18, 2) or have no determinable thread for a some as asubstance is very toxic and haraver to any question is YES, substance is very toxic is substance that available? (If not assume substance is very toxic) Is substance hazardous to groundwater? Is substance ha	Yes No No Not assessed Not assessed Not assessed Not assessed Not assessed Not assessed No No No		ESR (2005) ECHA C&L database/WHO	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vitalisation is with half lives reported in the range of 3hrs. 14days. Aerobic biodegradation is noted to be very also however on specific half lives are ond given. Begadation is reported under anaeobic conditions however again specific half lives are not given. Begadation is noted to be very also however on specific half lives are not given. Begadation is considered to be pensistent. Does not meet criteria for vB Harmonised C&L classification. The classification indicates it does not meet the criteria for mutagenicity. WHO report notes that evidence indicates that although carcinogenic it is not genotoxic and therefore does not meet the 'no determinable effects' criteria. Tetrachloroethylene does not meet the criteria for determination as Hazardous. MB. Known breakdown products following anaerobic degradation include trichforcethylene (determined as Hazardous) and vinyl chicride (determined as Hazardous).
TOXIC?  Toxic substance pose an equivalent level of concern? Very persistent and very bioaccumulative?  Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine water 2 60 days Half life in marine, fresh or estuarine sediment 2 180 days Half life in soil 2 180 days I answer is all 2 180 days I answer is all 2 180 days I answer is up, question is YES, substance is very persistent Is bioconcentruition factor 2 6000 I answer is yes, substance is very bioaccumulative? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater? Does substance pose a specific risk to groundwater the substance is detected above the LOQ? I answer is up existent in groundwater, locaccumulative Doe 3 15% of all she was all east one sample where the substance is persistent in groundwater? Is substance upsistent in groundwater, locaccumulative DOD 2 15% of all she was all satione is persistent in and/ordwater Is substance upsistent in groundwater? Is substance very toxic? Is substance very toxic? Is substance wave toxic? Is substance hazardous to groundwater? Is substance hazard	Ves No No No No Ves No Ves	(determined as Hazardou maniferio (1012)/1010-12-0 maniferio and America Alexia	ESR (2005) ESR (2005) ECHA C&L database/WHO stabase/WHO stabase/WH	The summary information provided in the EU risk assessment indicates hydrolysis and photolysis are not key processes but vidalisation sum half rives reported in the range of Shrs - Kadys. Aerobic biodegradation is considered to be pensistent.

				Thallium (as Thallium I)
	Thallium is most comm	only found in th	e freshwater aquatic erw	ironment as Thallium (I) and the thallium compounds used are predominantly in the Thallium (I) form.
	This assessment has been	n based on data	a for Thallium (I) forms or	f thallium including thallium sulphate, thallium oxide, thallium hydroxide, thallium chloride. Many thallium ery soluble in water, eg thallium (I) hydroxide, sulphate and carbonate.
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	assume yes of no?			
Persistence Passes ready biodegredation test	Test not applicable			
Passes inherent biodegredation test	for See above			
If answer to either question is YES, substance is not persistent If answer to both auestions is NO. additional data on half life is required				
Half life marine water ≥ 60 days	Degradation testing n/a for metals/inorganics	¢		
Half life fresh or estuarine water ≥ 40 days	See above			
Half life marine sediment ≿ 180 days Half life fresh or estuarine sediment ≳ 120 days	See above			
Half life in soil ≥ 120 days	See above			
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)				
Is substance persistent?	Yes			Thallium is a metal. Metals do not degrade but transform into various species of varying toxicity, dependent upon environmental conditions (e.g. pri, redox, temperature). The persistence criteria were develope for organism. Metals and integranica are interently persistent and are subject to transformation rather than degradation.
Bioaccumulation				Limited information is available on the bioaccumulation potential of thallium. Data reported by CCME
Bioconcentration factor (BCF) for aquatic species (wet weight) $\gtrsim 2000$	No	27-235	CCME (1999)	provides BCF data for fab. This data does not meet the criteria. BCFs reported for duckweed are much higher but are not considered appropriate for consideration against the criteria due to the uptake of thalium by plants. The EHC report (1969) indicates higher levels of thalium are found in fab from contaminated areas than in uncontaminated but this does not provide robust evidence of bioaccumidation.
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	Insufficient data		INRS (2011)	The INRS report indicates that prey may be an important source of thallium and can be efficiently transferred from orev to oredator but no specific evidence is provided re: biomagnification.
If answer to either question is 1755, substance is bioaccumulative If no BCF data, is log Kow ≥ 4.5?	NA (see comment)			Log Kow are not considered reliable estimates of the potential for bioaccumulation of inorganic
If answer is YES, substance is bioaccumulative				substances such as thallium
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?	Not considered due to the above information			
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3mn Molecular wideh ≥ 1100µmol Octanol solubility 5 0.002mmol/ I weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)	Transfit town			
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates) Is substance bioaccumulative?	No			The available data do not provide sufficient evidence that thallium meets the criteria for bioaccumulation
Toxicity				
is the lowest chronic NOEC for freshwater or marine organisms $\pm 0.01 \text{mg/l}$	Borderline	0.014mg/l	EHC (1996) and CCME (1999)	Study on Lemna minor - Although one study documented in both the EHC and CCME report indicated a loadity endpoint below the ortenia of 0.01mg/ for Lemna minor the majority of the loadity results were above the 0.01mg/ intrendud. Studies on final and aquitic partisbagies abouted effects in the 10s ug/i is close to the threshold but only one study noted a chronic endpoint below the threshold
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	Yes	STOT RE2	ECHA C&L database	A number of Thallium (I) compounds have been classified under C&L and have been determined as STOT RE2. Thallium (I) sulphate was determined STOT RE1
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		ECHA C&L database	A number of Thallium (I) compounds have been classified under C&L. None were classified as CMR
If answer to any question is YES, substance is toxic If answer to all questions is NO. substance is not toxic				
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Based on STOT RE2
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet the criteria for bioaccumulation
Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative?				
Very persistent and very bioaccumulative? Half life in marine, fresh or estuarine water ≿ 60 days	(See comment)			Thallium is a metal. Metals do not degrade but transform into various species of varying toxicity, dependent upon environmental conditions (e.g. pi <sup>+</sup> , redox, temperature). The persistence criteria were developed for organics. Metals and inorganics are inherently persistent and are subject to transformation rather than degradation.
Half life in marine, fresh or estuarine sediment ≥ 180 days	(See comment)			transformation rather than degradation. Degradation testing n/a for metals/inorganics
Half life in soil ≥ 180 days If answer to anv question is YES, substance is verv persistent	(See comment)			Degradation testing n/a for metals/inorganics
Is bioconcentration factor ± 5000	No	27-235	CCME (1999)	Limited information is available on the bioaccumulation potential of ballium. Data reported by COBLE provides BCF data for thm. This data social common interest the oritism. DCFs reported for dottweed are much higher but are not considered appropriate bit consideration against the chierin due to the update contaminated areas that in uncontaminated but this does not provide indust evidence of bioaccumulation.
If answer is ves. substance is verv bioaccumulative Is substance very persistent and very bioaccumulative?	No			Does not meet the criteria for bioaccumulation
Is substance very persistent and very bioaccumulative? Does substance pose a specific risk to groundwater?	NO			
Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than the	Not assessed Not assessed			
LOQ? Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to anv question is YES, substance is persistent in aroundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Does substance pose a specific risk to groundwater? Is substance very toxic?	Not dssessed			
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		ECHA C&L database	A number of Thallium (I) compounds have been classified under C&L. None were classified as mutagenic
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet the criteria for PBT, vPvB or Very Toxic
Does substance have breakdown products of concern?	No			
REFERENCES				
CCME (1990) Canadian Environmental Quality Guidelines for the Protection of a INRS (2011) Critical Review of Thallium in Aquatic Ecosystems ECHA C&L database EHC (1996)	A http://cegg.rcop.come.ca/dov http://espace.inrs.ca/830/1/R http://echa.europa.eu/informa http://www.inchem.org/docum	tion-on-chemicals	u/cl-inventory-database 182.htm	

		Tributyl tin	as TBT ion and (soluble)	hydroxide complex, covering Tributyltin (CAS: 36643-28-4);	
	bis(tributyltin) oxide (CAS: 56-35-9)				
	TBT molety most relevant for groundwater assessment. Exchangable ligands on the tin atom - TBT chloride etc - will form the hydroxide in solution, so assessmen the TBT molety of concern. (ECHA, CICAD 14)				
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments	
Is substance persistent. bioaccumulative and toxic?	-30000 908 01 110 1				
Persistence					
Passes ready biodegredation test Passes inherent biodegredation test					
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required					
Half life marine water ≥ 60 days					
Half life fresh or estuarine water ≥ 40 days	Yes	70days	ECHA (2008)	The degradation of TBTO involves the splitting of the carbon-in bond. This can result from various processes – both physicochemical (hydrolysis and photodegradation) and biological (degradation by microorganisms and metabolism by higher organisms) – occurring similarineously in the environment. Although the hydrolysis of organolitic compounds occurs under conditions of extreme pH, it is barely when under normal environmental conditions (CICAD 14).	
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days	Yes	>1-15years	ECHA (2008)		
Half life in soil ≥ 120 days If answer to any question is YES, substance is persistent	Yes	323days	ECHA (2008)	Half life at 12oC. Half life of 114days reported at 25oC	
If answer to all questions is NO, substance is not persistent					
Is sufficient data available? (if not assume substance is persistent)	Yes			The available data indicates it meets the criteria for persistence and the ECHA SVHC report	
Is substance persistent?	Yes			concluded it met the criteria for persistence.	
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) 2 2000	Yes	>2000 in fish	ECHA (2008)	Bioconcentration of TBT expected to increase with increasing pH in the range 6-8 (increasing dominance of non-ionic complexes). Eg BCF in freshwater carp (Cyprinus carpio) increased from 1190 at pH 6.0 to 2250 at pH 7.8.	
Does field data show evidence for biomagnification? If answer to either question is YES, substance is					
bioaccumulative If no BCF data, is log Kow ≥ 4.5?	No	3.2 - 4.05	ECHA (2008)		
If answer is YES, substance is bioaccumulative		0.2 4.00	20101(2000)		
Does the weight of exidence from the following criteria indicate bioaccumulation unlikelv? Substance is chronically non-toxic in mammals Molecular size 2.4.3mm Molecular weight 2.1100/mol Octanol solubility 5.0002mmol/l	Not assessed due to above data				
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers). BCF data should be obtained Is sufficient data available? (if not assume substance					
Is summer data available? (In for assume substance bioaccumulates) Is substance bioaccumulative?	Yes Yes			The available data indicates it meets the criteria for bioaccumulation. The ECHA SVHC document concluded that is met the criteria for R.	
Toxicity Is the lowest chronic NOEC for freshwater or marine organisms	Yes	0.00015mg/l	ECHA (2008)	Daphnia magna chronic NOEC	
≤ 0.01mg/l Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A,	Insufficient data	0.000 ronigr	ECHA C&L database	No EU harmonised C&L classification. Industry submissions to the ECHA C&L database for bis(trbutyftin)oxide indicates STOT RE1 and RE2 No EU harmonised C&L classification. Industry submissions to the ECHA C&L database for	
1B) or toxic for reproduction (Repr 1A. 1B. 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				bis(tribut\tin\oxide do not indicate it meets these criteria	
Is sufficient data available? (if not assume substance is toxic)	Yes				
Is substance toxic?	Yes			High chronic aquatic toxicity. The ECHA SVHC report concluded it met the criteria for T. It meets the criteria for P, B and T. TBTO has been classified as a PBT compound under REACH	
TOXIC?	Yes			If meets the criteria for P, B and I. TBTO has been classified as a PBT compound under REACH and has been designated an SVHC (EHCA 2008)	
Does substance pose an equivalent level of concern? Very persistent and very bioaccumulative?					
Half life in marine, fresh or estuarine water ≥ 60 days Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes Yes	70days >1-15years	ECHA (2008) ECHA (2008)		
Half life in soil ≥ 180 days	Yes	323days	ECHA (2008)	Half life at 12oC. Half life of 114days reported at 25oC	
If answer to any question is YES, substance is very persistent Is bioconcentration factor ≥ 5000	No	<5000	ECHA (2008)	Weight of evidence approach. BCFs likely between 2000 and 5000 at relevant pH values	
If answer is ves. substance is verv bioaccumulative Is substance very persistent and very bioaccumulative?	No				
Does substance pose a specific risk to groundwater?					
Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance	Not assessed				
greater than the LOQ? Do ≥ 15% of sites have at least one sample where the	Not assessed				
substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater					
Is substance persistent in groundwater?	Not assessed				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed				
Does substance pose a specific risk to groundwater?	NUL ASSESSED				
Is substance very toxic / Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		ECHA C&L database; CICAD	No harmonised C&L classification. Industry submissions to the ECHA C&L database do not indicate Muta 1A, 1B or 2. Conclusion in the CICAD review was that TBT is not gentoxic	
If answer to any question is YES, substance is very toxic and					
hazardous Is sufficient data available? (if not assume substance is very					
is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	No				
Is substance hazardous to groundwater?					
Is substance hazardous, if so, state on what basis	Yes			Has been classified as a Substance of Very High Concern in REACH as it has been determined to be a PBT substance.	
Does substance have breakdown products of concern?	No				
REFERENCES			Ter 1997 99		
ECHA SVHC support document - TBTO (2008) WHO CICAD no. 14 (TBTO) (1999) ECHA C&L database	https://echa.europa.eu/docu http://www.inchem.org/docu http://echa.europa.eu/inform	ments/cicads/cicads/c	icad14.htm	<u>ava</u>	

			Based	Trichlorobenzenes (CAS: 12002-48-1); j on 1,2,4-Trichlorobenzene (CAS: 120-82-1)
	Yes / No / Insufficent data / Borderline / assume yes or no?	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?				
Persistence Passes ready biodegradation test	Borderline	50 N (5 doub)		Weight of evidence indicates not readily biodegradable
Passes inherent biodegradation test If answer to either question is YES, substance is not persistent If answer to both questions is NO. additional data on half life is required	Bordenine	56 % (5 days)	EU RAR (2003)	Based on BOD 5.
Half life marine water ≿ 60 days	Yes (see comment)		EU RAR (2003)	No experimental half life data was available. However a half life of 150days has been estimated.
Half life fresh or estuarine water ≿ 40 days	Yes (see comment)		EU RAR (2003)	A study was reported in seawater which showed a half life of 22days however the route of removal was reported to evalitisation rather than biodgradation therefore no degradation half lives were available. Vidalitisation risk evy removal process for trichloroberizene however this is not relevant for an assessment in relation to groundwater.
Half life marine sediment ≥ 180 days	Yes	202 - 212 days	EU RAR (2003)	Measured value from an anaerobic sediment-water test system
Half life fresh or estuarine sediment ≥ 120 days	Yes (see comment)		EU RAR (2003)	No experimental half life data was available. However a half life of 300days has been estimated.
Half life in scil ≥ 120 days	Yes (see comment)		EU RAR (2003)	No experimental half life data was available. However a half life of 300days has been estimated.
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
				As weight of evidence indicated not readily biodegraded and estimated data indicated half lives which
is sufficient data available? (if not assume substance is persistent)	Yes			meet the criteria, trichlorobenzene is noted to be meet the criteria for persistence
Is substance persistent?	Yes			Although limited measured degradation half life data was available the weight of evidence indicates it meets the persistence criteria.
Bioaccumulation				
Bioconcentration factor (BCF) for aquatic species (wet weight) $\ge 2000$	Yes	120 - 3200	EU RAR (2003)	Several studies in fish available; upper bound value taken as worst case. Majority of the results were <2000 though.
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No	<1	EU RAR (2003)	Low potential for biomagnification for mammals
				Available Log Kow values ranged from 2.33 - 4.8. A value of 4.05 was chosen for use in the risk
lf no BCF data, is log Kow ≥ 4.5? If answer is YES. substance is bioaccumulative	No	4.05	EU RAR (2003)	Available Log Row Values ranged rom 2.35 - 4.6. A value of 4.0.6 was chosen for use in the risk assessment as greater weight was given to direct measurement rather than HLPC method and the 'slow stirring' method preferred in this case.
Does the weight of evidence from the following criteria indicate bioaccumulation				
unlikely? Substance is chronically non-toxic in mammals Molecular size > 4.3nm Molecular weight > 1100g/mol Octanol solubillis > 0.002nmol/	available			
If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers) substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers),				
BCF data should be obtained Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	Yes			This is based on the BCF data. It is noted that the majority of the BCF values available are <2000 however the upper BCF value has been used for the assessment.
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01 mg/l Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No	0.04 mg/L	EU RAR / ECHA	Lowest NOEC (21d) for Brachydario rerio (fish). EU harmonised C&L classification for 1,2,4-trichlorobenzene available. The classification indicates it
Is substance carcinogenic (Carc 1A, 1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	No		C&L EU RAR / ECHA	does not meet the criteria EU harmonised C&L classification for 1,2,4-trichlorobenzene available. The classification indicates it
reproduction (Rep 1 A, 15, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic			CâL	does not meet the criteria
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic? IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for T
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, firesh or estuarine water $\gtrsim 80 \mbox{ days}$	Yes (see comment)		EU RAR (2003)	A study was reported in seawater which indicated a half life of 22 days. However the main roote of removal was reported to be violatiliaation rather than degradation and therefore the half life reported them as a representation of a degradation rath the "violationation is a per removal process but in rol data was available. However a half life of 1503ays has been estimated.
Half life in marine, fresh or estuarine sediment ≥ 180 days	Yes	202 - 212 days	EU RAR (2003)	Measured value fron an anaerobic sediment-water test system
Half life in soil ≥ 180 days	Yes (see comment)		EU RAR (2003)	No experimental half life data was available. However a half life of 300days has been estimated.
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000 If answer is ves. substance is verv bioaccumulative	No	120 - 3200	EU RAR (2003)	Several studies in fish available; upper bound value taken as worst case
Is substance very persistent and very bioaccumulative?	No	Only vP		
Does substance pose a specific risk to groundwater? Does aroundwater monitorino data show half life in aroundwater ≥ 1 year Do ≥ 5% of groundwater samples show tevels of the substance greater than the LOQ?	Not assessed Not assessed			
Do ≥ 15% of siles have at least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater is substance persistent in groundwater?	Not assessed Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous				
Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health	No		EU RAR / ECHA C&L	EU harmonised C&L classification for 1.2.4-trichlorobenzene available. The classification indicates it does not meet the offieling for mutagenicity. WHO (2004) noted that none of the isomers were considered genotoxic
If answer to any question is YES, substance is very toxic and hazardous				
Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	Yes No			
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	No			Does not meet criteria for persistence, bioaccumulation or toxicity nor the criteria for equivalent concern
Does substance have breakdown products of concern?	No			
REFERENCES EU Risk Assessment Report (2003) 1,2,4-trichlorobenzene.	http://echa.europa.eu/	documents/10162/4	4180838-c246-4d42-t hicals/cl-inventorv-da	9732-45e2a#11e52
ECHA C&L database WHO (2004)	http://echa.europa.eu/ http://www.who.int/wa	ter sanitation healt		

				Trichloroethylene (CAS: 79-01-6)
	Yes / No / Insufficent data / Borderline / assume yes or	Value	Reference	Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence				
Passes ready biodegradation test Passes inherent biodegradation test	No		ESR (2004)	Available studies indicate that trichloroethylene is not readily biodegradable
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 davs	Yes		ESR (2004)	ESR noted available studies showed no degradation in seawater
				ESR noted that degradation in aerobic conditions was very slow unless in the presence of acclimated
Half life fresh or estuarine water ≿ 40 days	Yes	>8weeks	ESR (2004)	microbes or another substrate. Some degradation in anaerobic conditions has been reported however studies suggest the degradation rate is still slow. Volailisation is thought to be the main route of removal from surface water rather than degradation. Based on the available data the ESR concluded that thichloroethylene is persistent.
Half life marine sediment ≥ 180 days Half life fresh or estuarine sediment ≥ 120 days				
Half life in soil ≥ 120 davs If answer to any question is YES, substance is persistent				
If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000 Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No	17-90	ESR (2004)	Range of BCF values reported for whole fish in the ESR. All below the threshold of 2000.
If no BCF data, is log Kow ≥ 4.5?	No	2.29	ESR (2004)	A number of similar values have been reported. This value has been used as it is the study chosen
If answer is YES, substance is bioaccumulative			,	for use in the ESR. It is a measured value
Does the weight of evidence from the following criteria indicate bioaccumulation unitiety? Substance is chronically non-toxic in mammals Molecular size 4.3mm Molecular weight 2.1100pmol/ Octanol solubility 5.002mmol/ <i>Il weight of evidence indicates bioaccumulation unitikely (i.e.</i> YES answers) aubstance is not bioaccumulation	to above data			
If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes No			
Is substance bioaccumulative?	NO			
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms $\pm 0.01\text{mg/}$	No	5.76mg/l	ESR (2004)	Lowest reliable chronic value included in the ESR. This is for a chronic study on the fish Jordanella floridae. Some invertebrate data showed slightly lower effect concentrations but the studies were not considered reliable. These lower values however were still above the threshold of 0.01mg/l
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2)	No		ECHA C&L database	Harmonised C&L classification for trichloroethylene. The classification indicates it does not meet the criteria
Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for reproduction (Repr 1A, 1B, 2)	Yes	Carc 1B	ECHA C&L database	Harmonised C&L classification for trichloroethylene. The classification indicates it does meet the criteria
If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				unene
Is sufficient data available? (if not assume substance is toxic)	Yes			
Is substance toxic?	Yes			Based on Carc 1B
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet the criteria for B although does for persistence and toxicity
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≿ 60 days	Yes		ESR (2004)	ESR noted that degradation in aerobic conditions was very slow unless in the presence of acclimated microtes or anothers substrate. Some degradation in anotherobic conditions howere studies suggest the degradation rate is still slow. Volatilisation is thought to be the main route of removal from surface water rather than degradation. Based on the available data the ESR concluded that trichloroethylene is persistent.
Half life in marine. fresh or estuarine sediment ≥ 180 davs Half life in soil ≥ 180 days				
If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000 If answer is ves. substance is verv bioaccumulative	No	17-90	ESR (2004)	Rance of BCF values reported in the ESR however all indicated BCFs below the criterion
Is substance very persistent and very bioaccumulative?	No			Doesn't meet criteria for bioaccumulation
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater $\ge 1$ year Do $\ge 5\%$ of groundwater samples show levels of the substance greater than the LOQ?	Not assessed Not assessed			
Do ≥ 15% of sites have at least one sample where the substance is detected above the LOQ?	Not assessed			
If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic,				
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed			
Is substance very toxic?				
Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	Yes	Muta 2	ECHA C&L database	Harmonised C&L classification for trichloroethylene
Is sufficient data available? (if not assume substance is very toxic)	Yes			
Is substance very toxic?	Yes			Very Toxic due to Muta 2.
Is substance hazardous to groundwater?				
Is substance hazardous, if so, state on what basis	Yes			Hazardous based on Muta 2 which results in Very Toxic classification. NB: Available information indicates it can degrade in groundwater to form vinyl chloride (determined as Hazardous).
Does substance have breakdown products of concern?	Yes - Vinyl chloride (	which has beer	n determined as Hazard	lous)
REFERENCES EU ESR 2004 - Risk Assessment for Trichloroethylene	http://echa.europa.eu/	documents/1016	2/83f0c99f-f687-4cdf-a6	4b-514f1e26fdc0
ECHA C&L database	http://echa.europa.eu/i	information-on-cl	hemicals/cl-inventory-dat	abase

				Vinul Chlorida (CAS: 75.04.4)
	Yes / No / Insufficent data / Borderline / assume yes or	Value	Reference	Vinyl Chloride (CAS: 75-01-4) Comments
Is substance persistent, bioaccumulative and toxic?	no?			
Persistence				
Passes ready biodegradation test Passes inherent biodegradation test	No data No data			
If answer to either question is YES, substance is not persistent If answer to both questions is NO, additional data on half life is required				
Half life marine water ≥ 60 days	No data			Limited data was available on the degradation of vinyl chloride in water. A half life of 60days was reported in
Half life fresh or estuarine water ≥ 40 days	Yes	60days	SIDS (2001)	Limited data was available on the degradation of Vinyi chioride in water. A half life of oucays was reported in a soll-water microccons study. However volatilisation was noted to be the main removal process and it was reported that vinyi chioride could persist for up to a year where volatilisation could not occur.
Half life marine sediment ≥ 180 davs Half life fresh or estuarine sediment ≥ 120 days Half life in soil ≥ 120 days	No data No data No data			
If answer to any question is YES, substance is persistent If answer to all questions is NO, substance is not persistent				
Is sufficient data available? (if not assume substance is persistent)	Yes			
Is substance persistent?	Yes			
Bioaccumulation Bioconcentration factor (BCF) for aquatic species (wet weight) ≥ 2000	No	5.1	SIDS (2001)	This is an estimated value for fish based on the Log Kow
Does field data show evidence for biomagnification? If answer to either question is YES, substance is bioaccumulative	No data located			
If no BCF data, is log Kow ≥ 4.5?	No	1.58	SIDS (2001)	
If answer is YES, substance is bioaccumulative				
Does the weight of evidence from the following criteria indicate bioaccumulation unlikely?				
Substance is chronically non-toxic in mammals Molecular size ≥ 4.3nm Molecular weight ≥ 1100g/mol				
Octanol solubility ≤ 0.002mmol/l If weight of evidence indicates bioaccumulation unlikely (i.e. YES answers)				
substance is not bioaccumulative If weight of evidence indicates bioaccumulation a possibility (i.e. NO answers), BCF data should be obtained				
Is sufficient data available? (if not assume substance bioaccumulates)	Yes			
Is substance bioaccumulative?	No			Limited data is available on bioaccumulation with no experimental BCF values located however based on the data available indicates it does not meet the criteria for bioaccumulation.
Toxicity				
Is the lowest chronic NOEC for freshwater or marine organisms ≤ 0.01mg/l	No data			No chronic data available. The acute data available indicates low acute toxicity with data for algae, invertebrates and fish reported at concentrations >100mg/I (SIDS, IUCLID)
Is there substantial evidence of long term toxicity (STOT RE1 or STOT RE2) Is substance carcinogenic (Carc 1A,1B), mutagenic (Muta 1A, 1B) or toxic for	No Yes	Carc 1A		Harmonised EU C&L classification Harmonised EU C&L classification
reproduction (Repr 1A, 1B, 2) If answer to any question is YES, substance is toxic If answer to all questions is NO, substance is not toxic				
Is sufficient data available? (if not assume substance is toxic) Is substance toxic?	Yes Yes			Based on Carc 1A
IS SUBSTANCE PERSISTENT, BIOACCUMULATIVE AND TOXIC?	No			Does not meet criteria for B
Does substance pose an equivalent level of concern?				
Very persistent and very bioaccumulative?				
Half life in marine, fresh or estuarine water ≥ 60 days	Yes	60days	SIDS (2001)	Limited data was available on the degradation of vinyl chloride in water. A half life of 60days was reported in a soil-water microcosm study. However volatilisation was noted to be the main removal process and it was reported that vinyl chloride could persist for up to a year where volatilisation could not occur.
Half life in marine, fresh or estuarine sediment ≥ 180 davs Half life in soil ≥ 180 davs If answer to any question is YES, substance is very persistent				
Is bioconcentration factor ≥ 5000	No	5.1	SIDS (2001)	This is an estimated value for fish based on the Log Kow
If answer is yes, substance is very bioaccumulative		0.1	0.00 (2001)	
Is substance very persistent and very bioaccumulative?	No			Does not meet criteria for bioaccumulation
Does substance pose a specific risk to groundwater? Does groundwater monitoring data show half life in groundwater ≥ 1 year Do ≥ 5% of groundwater samples show levels of the substance greater than the	Not assessed			
LOQ? Do $\ge$ 15% of sites have at least one sample where the substance is detected	Not assessed			
Do 2 15% of sites have a least one sample where the substance is detected above the LOQ? If answer to any question is YES, substance is persistent in groundwater Is substance persistent in groundwater?	Not assessed			
If substance is persistent in groundwater, bioaccumulative AND toxic,				
If substance is persistent in groundwater, bioaccumulative AND toxic, substance is hazardous Dees substance pose a specific risk to groundwater?	Not assessed			
substance is hazardous	Not assessed			
substance is hazardous Does substance pose a specific risk to groundwater?	Not assessed		WHO (2004)	Harmonised C&L classification. It has not been classified as Muta 1A, 1B or 2 but the World Health Organisation (WHO) noted when deriving a threshold for vinyl chloride in drinking water that exposure should be avoided as far as practical and should be kept as low as technically feasible due to its
substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for			WHO (2004)	Organisation (WHO) noted when deriving a threshold for vinyl chloride in drinking water that exposure
substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health			WHO (2004)	Organisation (WHO) noted when deriving a threshold for vinyl chloride in drinking water that exposure should be avided as far as practical and should be kept as low as technically feasible due to its carcinogenic properties.
Substance is hazardous Dees substance pose a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous	No		WHO (2004)	Organisation (WHO) noted when deriving a threshold for vinyl chloride in drinking water that exposure should be avided as far as practical and should be kept as low as technically feasible due to its carcinogenic properties. WHO have noted in deriving their drinking water standard that exposure to vinyl chloride should be avoided as far as practical and should be kept as low as technically feasible due to the carcinogenic properties. Therefore determined as Hazardous as Very Toxic due to the fact no determinable
Substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (If not assume substance is very toxic)	No Yes		WHO (2004)	Organisation (WHO) noted when deriving a threshold for vinyl chloride in drinking water that exposure should be avided as far as practical and should be kept as low as technically feasible due to its carcinogenic properties. WHO have noted in deriving their drinking water standard that exposure to vinyl chloride should be avoided as far as practical and should be kept as low as technically feasible due to the carcinogenic
substance is hazardous Does substance pose a specific risk to groundwater? Is substance very toxic? Is substance mutagenic (Muta 1A, 1B,2) or have no determinable threshold for adverse effects on human health If answer to any question is YES, substance is very toxic and hazardous Is sufficient data available? (if not assume substance is very toxic) Is substance very toxic?	No Yes		WHO (2004)	Organisation (WHO) noted when deriving a threshold for vinyl chloride in drinking water that exposure should be avided as far as practical and should be kept as low as technically feasible due to its carcinogenic properties. WHO have noted in deriving their drinking water standard that exposure to vinyl chloride should be avoided as far as practical and should be kept as low as technically feasible due to the carcinogenic properties. Therefore determined as Hazardous as Very Toxic due to the fact no determinable

Does substance have breakdown products of concern?

REFERENCES SIDS (2001) WHO (2004) ECHA C&L database

http://www.who.int/water\_sanitation\_health/dwg/chemicals/vinylchloride.pdf http://echa.europa.eu/information-on-chemicals/cl-inventory-database

No