European Union Risk Assessment Report

CHLOROFORM

CAS No: 67-66-3

EINECS No: 200-663-8

SUMMARY RISK ASSESSMENT

Environment

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Environment

Final report, 2007

France

The French rapporteur for the environmental risk assessment of chloroform is the Ministry of the Environment (MEDD).

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Foreword

This Draft Risk assessment Report is carried out in accordance with Council Regulation (EEC) 793/93[1] on the evaluation and control of the risks of "existing" substances. "Existing" substances are chemical substances in use within the European Community before September 1981 and listed in the European Inventory of Existing Commercial Chemical Substances. Regulation 793/93 provides a systematic framework for the evaluation of the risks to human health and the environment of these substances if they are produced or imported into the Community in volumes above 10 tonnes per year.

There are four overall stages in the Regulation for reducing the risks: data collection, priority setting, risk assessment and risk reduction. Data provided by Industry are used by Member States and the Commission services to determine the priority of the substances which need to be assessed. For each substance on a priority list, a Member State volunteers to act as "Rapporteur", undertaking the in-depth Risk Assessment and recommending a strategy to limit the risks of exposure to the substance, if necessary.

The methods for carrying out an in-depth Risk Assessment at Community level are laid down in Commission Regulation (EC) 1488/94[2], which is supported by a technical guidance document[3]. Normally, the "Rapporteur" and individual companies producing, importing and/or using the chemicals work closely together to develop a draft Risk Assessment Report, which is then presented at a Meeting of Member State technical experts for endorsement. The Risk Assessment Report is then peer-reviewed by the Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE), now renamed Scientific Committee on Health and Environmental Risks (SCHER) which gives its opinion to the European Commission on the quality of the risk assessment.

This Draft Risk Assessment Report has undergone a discussion in the Competent Group of Member State experts with the aim of reaching consensus by interpreting the underlying scientific information, or including more data. The Competent Group of Member State experts seek as wide a distribution of these drafts as possible, in order to assure as complete and accurate an information basis as possible. The information contained in this Draft Risk Assessment Report does not, therefore, necessarily provide a sufficient basis for decision making regarding the hazards, exposures or the risks associated with the priority substance.

This Draft Risk Assessment Report is the responsibility of the Member State rapporteur. In order to avoid possible misinterpretations or misuse of the findings in this draft, anyone wishing to cite or quote this report is advised to contact the Member State rapporteur beforehand.

1 O.J. No L 084, 05/04/199 p.0001 – 0075

2 O.J. No L 161, 29/06/1994 p. 0003 – 0011

3 Technical Guidance Document, Part I – V, ISBN 92-827-801 [1234]

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1. GENERAL SUBSTANCE INFORMATION

1.1. IDENTIFICATION OF THE SUBSTANCE

CAS-No.: 67-66-3

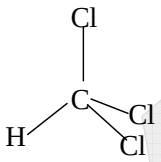
EINECS-No.: 200-663-8

Substance name (EINECS name): Chloroform

Molecular formula: $CHCl_3$

Molecular weight: 119.5 $g.mol^{-1}$

Structural formula:



1.2. PHYSICO-CHEMICAL PROPERTIES

The physical and chemical properties of chloroform used in this risk assessment are summarised in the following table:

Table 1-1 : Physical and chemical properties of the substance

Property	Value
Molecular weight	119.5 g/mol
Melting point	-63.5ºC
Boiling point	61.3ºC
Relative density	1.48 at 20ºC
Vapour Pressure	209 hPa at 20ºC
Partition coefficient	Log Kow 1.97
Henry's law constant	H = 367 Pa.m3/mol at 25°C
Water solubility	8,700 mg/L at 23ºC
Flash point	none
Flammability	no

1.3. CLASSIFICATION

According to Annex I of Directive 67/548/EEC, chloroform is not classified as dangerous to the environment, this is confirmed by the data gathered in this assessment.

2. GENERAL INFORMATION ON EXPOSURE

2.1. PRODUCTION, IMPORT, EXPORT AND CONSUMPTION VOLUMES

Between 1997 and 2000, nine producers and importers were listed in the IUCLID database. In 2002 the production volume of chloroform in the European Community was estimated to be 302,800 t/a. Besides this production volume, 14 out of the 15 European countries reported import and export volumes of chloroform. Taking into account imported and exported volumes, is leading to a European tonnage of 285,150 t. in 2000 and 271,000 t in 2002.

The available information regarding use pattern is listed in Table 2-1

Table 2-1 : Non-feedstock sales and feedstock sales of all European producers for the year 2000.

		Corresponding % of total chloroform sales for 2000
Feedstock sales in EU for HCFC22	243,385 t	93.8 %
Feedstock sales in EU for dyes and pesticides	2,282 t	0.9 %
Feedstock sales in EU for other applications	5,519 t	2.1 %
Total Feedstock sales in EU	251,186	96.8 %
Non feedstock sales in EU	8,277 t	3.2 %
Total Sales	259,463 t	100 %

2.2. PRODUCTION, USES AND UNINTENDED FORMATION

2.2.1. Production

Today, two industrial processes are used to produce chloroform:

1 / hydrochlorination of methanol
2 / chlorination of methane.

2.2.2. Uses

Chloroform is used mainly as a raw material in the production of hydrochlorofluorocarbon-22 (HCFC 22).

Chloroform is used in other applications including production and extraction solvent, especially in the pharmaceutical industry (for example in the extraction of penicillin and other antibiotics). It is also used as a degreasing agent and as a chemical intermediate in the production of dyes, pesticides and other substances.

In this risk assessment, the following emission scenarios will be considered :

Table 2-2 : Emission scenarios

	Industry Category	Use Category	Quantity used (tonnes/year)
Use as an intermediate (HCFC 22, dyes and pesticides production)	3 (Chemical industry : chemicals used in synthesis)	33 (intermediates)	234,600 (HCFC 22 : 226,500 dyes & pesticides : 2,400 other applications : 5,700)
Use as a solvent	2 (Chemical industry : basic chemicals)	48 (solvents)	8,700
Total uses			243,300 t/a
Stocks	-	-	27,700

2.2.3. Unintended formation

Exposure to chloroform can occur from sources not covered by the life cycle of the produced/imported chloroform. In accordance with the Technical Recommendation from the European Commission, unintended formations are listed below. The risk assessment will be performed with readily available information on these sources of chloroform.

- Losses as a by-product during chemical manufacturing
- Water chlorination
- Pulp and paper bleaching
- Formation of chloroform in groundwater
- Atmospheric reactions
- Natural sources

3. ENVIRONMENT

3.1. ENVIRONMENTAL EXPOSURE

3.1.1. Environmental fate

The level of exposure of the environment to a chemical depends on the quantities and compartments of release and subsequent degradation, distribution and accumulation in the environment. This section presents the major characteristics of chloroform relevant for the exposure assessment.

- Based on the physico-chemical properties of chloroform, the preferred target compartment in the environment at equilibrium is the air compartment.

- Based on the information available, hydrolysis is an unimportant fate process at a neutral pH value. Direct photolysis in water is not expected too.

- An estimated atmospheric half-life value of 105 days has been determined for chloroform.

- Chloroform is considered as not biodegradable in water and a first order rate constant for biodegradation in surface water of 0 d^{-1} will be used. For soil, there are some indications that degradation of chloroform occurs only under certain aerobic conditions by methane-utilising bacteria. However this behaviour cannot be used in the generic assessment. Then the first order rate constant for aerobic biodegradation in soil is set to 0 d^{-1}. Chloroform biodegradation is observed in anaerobic sediment. Based on the results available, a half-life in sediment is estimated at 15 days.

- In view of the BCF measured for fish (13) chloroform is expected to have a low bioaccumulation potential.

- A Koc has been obtained experimentally. A value of 185 L/kg is used in this assessment.

- Based on the SIMPLETREAT model, it is anticipated that, after a sewage treatment plant, chloroform will not be degraded, 14.4% of chloroform will remain in water whereas the major part of the substance will be volatilised (83.9%). The remaining fraction of chloroform will be adsorbed to sludge.

3.1.2. Releases estimate

The environmental exposure assessment of chloroform will be based on the expected releases of the substance during the following life cycle stages:

I Production

IIa. Use as an intermediate

- HCFC 22 production
- dyes and pesticides production
- other applications

IIb. Use as a solvent

- extraction solvent in chemical and pharmaceutical industry

IIIa Unintended formation

- losses as a by product during chemical and VC/PVC products manufacturing

IIIb

- Water chlorination
  - drinking water
  - municipal wastewater
  - swimming pools
  - cooling water
- pulp and paper bleaching
- atmospheric reaction of high tonnage chlorinated solvents
- vehicle emissions
- landfills
- incineration processes
- natural sources

For life cycle stages I, IIa and IIb both site-specific and generic emission scenarios are used for calculating the Predicted Environmental Concentrations (PEC) values in the various compartments.
Stage III can be regarded as a diffuse source of chloroform. Except for the losses during chemical and VC/PVC products manufacturing where site-specific information might be found, all the other emissions will be considered in PECregional calculations only.
The releases due to uses in household products will not be considered as a proposal has already been made within the European Community to limit the chloroform concentration to < 0.1 % by weight in substances placed on the market for sale to the general public.

In the following table, all releases based on the considerations above are presented.

Table 3-1 : Summary of environmental release estimates for chloroform

Life cycle stage	Comment	Estimated local release	Estimated regional release	Estimated continental release
Production	**Site A**	0.052 kg/d to wastewater [4] 83.7 kg/d to air 365 d/a	5.1 t/a to wastewater 30.5 t/a to air	7.74 t/a to wastewater 29.7 t/a to air
	Site B	0.014 kg/d to wastewater 0.036 kg/d to air 365 d/a		
	Site C	2.5 kg/d to wastewater 7.2 kg/d to air 300 d/a		
	Site D[5]	0.32 kg/d to wastewater 45.3 kg/d to air 365 d/a		
	Site E[6]	35.3 kg/d to wastewater 31.9 kg/d to air 365 d/a		
	Site F	0.98 kg/d to wastewater 21.6 kg/d to air 365 d/a		

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4 Releases to wastewater are calculated using 85.6% removal

5 Releases of chloroform considering a simultaneous production of chloroform and HCFC 22 at the local scale

6 Releases of chloroform considering a simultaneous production of chloroform, HCFC 22 and dyes / pesticides at the local scale

Life cycle stage	Comment	Estimated local release	Estimated regional release	Estimated continental release
	Site G	7.53 kg/d to wastewater 3.7 kg/d to air 365 d/a		
	Site H	10.1 kg/d to wastewater[7] 0.14 kg/d to air 365 d/a		
	Site I	0.074 kg/d to wastewater[10] 2.44 kg/d to air 365 d/a		
	Site J	0.28 kg/d to wastewater 63.6 kg/d to air 365 d/a		

Releases from uses

Use as an intermediate	**Use for HCFC 22 production**	7 kg/d to wastewater 81.7 kg/d to air 300 d/a	2.1 t/a to wastewater 24.5 t/a to air	6.9 t/a to wastewater 80.5 t/a to air
	Use for dyes and pesticide production	35 kg/d to wastewater 25kg/d to air 144 d/a	16.8 t/a to wastewater 12 t/a to air	
	Other applications	33.2 kg/d to wastewater 23.7 kg/d to air 300 d/a	39.8 t/a to wastewater 28.4 t/a to air	

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[7] Releases to wastewater are calculated using 85.6% removal

Life cycle stage	Comment	Estimated local release	Estimated regional release	Estimated continental release
Use as a solvent	**Extraction solvent in chemical and pharmaceutical industry**	278 kg/d to wastewater 2,000 kg/d to air 87 d/a	346 t/a to wastewater 433 t/a to air	3,120 t/a to wastewater 3,900 t/a to air
Unintended formation				
Losses as a by-product during chemical manufacturing	**Industry specific release estimation**	18.5 kg/d to wastewater 257 kg/d to air 300 d/a	9.62 t/a to wastewater 79.2 t/a to air	73.1 t/a to wastewater 37.8 t/a to air
Water chlorination	**Drinking water**		negligible to wastewater 59.9 t/a to air	Negligible to wastewater 1,029 t/a to air
	Municipal wastewater		20.4 t/a to surface water negligible to air	352 t/a to surface water negligible to air
	Swimming pools		1.7 t/a to wastewater 0.23 t/a to air	15.3 t/a to wastewater 2,1 t/a to air
	Cooling water		84.7 t/a to wastewater 41.9 t/a to air	1,458 t/a to wastewater 720 t/a to air
	Other releases		5.58 t/a to wastewater negligible to air	41.9 t/a to wastewater negligible to air
Pulp and paper bleaching			7.54 t/a to wastewater 282 t/a to air	67.9 t/a to wastewater 2,542 t/a to air
Total emissions[8]			**1.14 t/d to wastewater** **340 kg/d to surface water** **2.72 t/d to air**	**10.5 t/d to wastewater** **3.59 t/d to surface water** **22.8 t/d to air**

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8 Total emissions reported by EUSES.

3.1.3. Environmental concentrations

The Predicted Environmental Concentration (PEC) estimated for the aquatic environment are presented hereafter for the different stages of the life cycle of chloroform.

3.1.3.1 Aquatic compartment (including sediment)

Table 3-2 : Local water and sediment concentrations at each chloroform production site

	A	B	C	D	E	F	G	H	I	J
$PEClocal_{water}$ (µg/L)	0.96	1.52	1.27	0.89	1.99	5.74	0.88	2.18	0.85	2.39
$PEClocal_{sed}$ dry weight [µg/kg]	21.3	33.7	28	19.7	44.1	127	19.5	48.7	18.9	52.8

Table 3-3 : Local water concentrations during uses of chloroform

	HCFC 22 production	Dyes and pesticide production	Other applications	Use as a solvent	Losses as a by product during chemical manufacturing
$PEClocal_{water}$ (µg/L)	3.36	13.4	12.8	2001.9	7.5
$PEClocal_{sed}$ dry weight [µg/kg]	73.9	297	282	44200	165

Regional and continental concentrations

The EUSES model 2.0.3 has been used to predict regional and continental concentrations of chloroform in water and sediments.

PEC regional $_{water}$ = 0.828 µg/L (in surface water)
PEC regional $_{sed}$ = 5.35 µg/kg (dry weight)

PEC continental $_{water}$ = 0.109 µg/L (in surface water)
PEC continental $_{sed}$ = 0.153 µg/kg (wet weight)

Comparison of measured and predicted concentrations

As the estimated concentrations are tentatively confirmed by the monitoring data, the estimated PECs will be used in the risk characterisation.
The database from monitoring in sediment is not very extensive and the few available data are mostly higher than the estimated regional concentration. However, measured concentrations might be representative of local situations.

3.1.3.2 Atmosphere

Table 3-4 : Local concentration in air at each production site during chloroform production periods and emission

	A	B	C	D	E	F	G	H	I	J
PEClocal $_{air,ann}$	23.4	0.15	1.8	11.8	1.3	6.2	1.9	2.5	0.8	17.8

Table 3-5: Local air concentrations during uses of chloroform

	HCFC 22 production	Dyes and pesticide production	Other applications	Use as a solvent	Losses as a by product during chemical manufacturing
PEClocal $_{air, ann}$	18.8	3.4	6.5	132.7	58.9

Regional and continental concentrations

The EUSES model has been used to predict regional and continental concentrations of chloroform in air.

$$PEC\ regional_{air} = 0.145\ \mu g.m^{-3}$$

$$PEC\ continental_{air} = 0.0746\ \mu g.m^{-3}$$

Comparison of measured and predicted concentrations

Concentrations in remote and rural areas are usually between 0.05 and 0.2 µg/m3. In urban or suburban areas, recent measured chloroform concentrations are usually below 5 µg/m3, while concentrations measured recently in the vicinity of industrial areas reached up to 95 µg/m3. The estimated regional concentration is coherent with many urban concentrations. However, it may underestimate the actual concentrations of highly industrialised areas where concentration far above 1 µg/m^3 were measured at many locations.

3.1.3.3 Terrestrial compartment

Table 3-6 : Local concentration in soil at each production site during emission period and chloroform production

	A	B	C	D	E	F	G	H	I	J
PEClocal $_{soil}$ [µg/kg] (ww)	1.16	0.01	0.12	0.64	0.85	0.31	0.15	0.13	0.05	0.89

Table 3-7: Local soil concentrations during uses of chloroform

	HCFC 22 production	Dyes and pesticide production	Other applications	Use as a solvent	Losses as a by product during chemical manufacturing
PEClocal $_{soil}$ [µg/kg] (ww)	**0.995**	**0.30**	**0.59**	**7.26**	**3.08**

Regional and continental concentrations

The EUSES model 2.0.3 has been used to predict regional and continental concentrations of chloroform in soil.

PEC regional $_{soil}$ = 1.86 µg.kg^{-1} (ww)

PEC regional $_{natural\ soil}$ = 11.5 ng.kg^{-1} (ww)

PEC regional $_{soil\ pore\ water}$ = 549 ng.L^{-1}

PEC continental soil = 0.202 µg.kg-1 (ww)

PEC continental natural soil = 5.22 ng.kg-1 (ww)

PEC continental soil pore water = 59.6 ng.L-1

Comparison of measured and predicted concentrations

There are not sufficient measured concentrations in soil available for a meaningful comparison.

3.1.3.4 Non compartment specific exposure relevant to the food chain

Because of the low bioaccumulation potential of chloroform (BCF = 13), the potential for secondary poisoning can be considered to be negligible. This is furthermore confirmed by the monitoring data available from marine aquatic biota as well as in birds.

3.2.EFFECTS ASSESSMENT: HAZARD IDENTIFICATION AND DOSE (CONCENTRATION) - RESPONSE (EFFECT) ASSESSMENT

3.2.1. Determination of PNECaqua

The following valid test results have been selected for the determination of a PNEC for freshwater.

- Fish: NOEC-6/9 months = 1.463 mg/L (*Oryzias latipes*)
- Invertebrate: NOEC-21d = 6.3 mg/L (*Daphnia magna*)
- Algae: 72h-EC 10 = 3.61 mg/L (*Chlamydomonas reinhardii)*

There are three long-term NOECs from species representing three trophic levels.
Therefore, the PNEC is derived using an assessment factor of 10 to the lowest NOEC.

PNECaqua = 1.463 / 10 = 146 µg/L

3.2.2. Determination of $PNEC_{micro\text{-}organisms}$

The lower EC 50 was found with Nitrosomonas bacteria, which convert ammonia nitrogen to nitrite as the first step of oxidation. The result to be considered for the toxicity to micro-organisms is therefore : EC 50 = 0.48 $mg.L^{-1}$. An assessment factor of 10 being applied to such results, the PNECmicro-organisms is therefore :

$$PNEC_{micro-organisms} = \frac{0.48\ mg/L}{10} = 48\ \mu g/L$$

3.2.3. Determination of PNECsed

There are two methods of determination of PNECsed :

1) Determination of the PNECsed using the sediment toxicity test

As three long-term ecotoxicity tests with benthic species representing different living and feeding conditions are available, an assessment factor of 10 should be applied to the lowest NOEC, which is the one from the test on the midge *Chironomus riparius*:

PNECsed (1) = 4.5 mg/kg / 10 = 450 µg/kg (dw)

2) Determination of the PNECsed using the Equilibrium partitioning method

According to the TGD, $PNECsed(ww) = \frac{Ksusp-water}{RHOsusp} \cdot PNECaquatic * 1000$

Ksusp_water = suspended matter_water partition coefficient = 5.53 $m^3.m^{-3}$

Therefore: PNECsed = 702 $\mu g.kg^{-1}$ (ww)
PNECsed = 3230 $\mu g.kg^{-1}$ (dw)

The result with the Equilibrium partitioning method is much higher than the result based on the toxicity to *Chironomus riparius*. The value based on experimental results will be preferred:

PNECsed = 450 µg/kg (dw) and PNECsed = 97.8 µg/kg (ww)

3.2.4. Atmosphere

The lowest test concentration at which effects were observed for visible symptoms and photosynthesis was 100 g/m^3. The test was however very short (3 hours) and this result could even not be used to assess an acute toxicity and derive a PNECair.

Furthermore the potential contribution of chloroform to climate change, stratospheric ozone depletion, ground-level ozone formation and acidification processes can be considered as negligible.

3.2.5. Terrestrial compartment

A $PNEC_{soil}$ has been derived using the equilibrium partitioning method. As micro-organisms are particularly sensitive to chloroform and represent a relevant taxa for the soil compartment, the $PNEC_{STP}$ has been used instead of the $PNEC_{aqua}$. The PNECmicro-organisms is based on very short term tests relevant for the WWTP assessment but not for the soil compartment, consequently an additional factor of 10 has been used.

$$PNECsoil(ww) = \frac{Ksoil-water}{RHOsoil} \cdot \frac{PNECmicro-organisms \cdot 1000}{10}$$

Ksoil_water = soil _water partition coefficient = 5.77 m^3.m^{-3}

Therefore: PNECsoil = 16.3 µg.kg^{-1} (ww)

PNEC soil = 18.4 µg.kg^{-1} (dw)

3.2.6. Non compartment specific effects relevant to the food chain

Because of the low bioaccumulation potential of chloroform (BCF = 13), the potential for secondary poisoning can be considered to be negligible.

3.3. RISK CHARACTERISATION

3.3.1. Aquatic compartment

The resulting PEC/PNEC ratios for the various scenarios considered in this assessment are presented below.

Table 3-8 : Estimated PEC/PNEC ratios for the aquatic compartment

Scenario	Step	PEC/PNEC (surface water)	PEC/PNEC (STP)	PEC/PNEC (sediment)
Production	Site A	0.007	**2.60**	0.047
	Site B	0.010	-	0.075
	Site C	0.009	**8.88**	0.062
	Site D	0.006	**0.42**	0.044
	Site E	0.014	**24.21**	0.098
	Site F[1]	0.039	**-**	0.28
	Site G	0.006	0.24	0.043
	Site H	0.015	0.59	0.108
	Site I	0.006	0.33	0.042
	Site J	0.017	**1.30**	0.117
Uses	HCFC Production	0.023	**2.1**	0.164
	Dyes and Pesticide Production	0.092	**10.5**	0.660
	Other applications	0.088	**10**	0.628
	Uses as a solvent	**13.71**	**417**	**98.2**
Unintended releases	Losses as a by-product during chemical manufacturing	0.051	**5.6**	0.368
Regional scale		0.0057		0.012

[1] Site F had stopped manufacturing chloroform in 2004 and is being dismantled

Surface water

The PEC/PNEC ratios obtained for surface water for chloroform are below 1.0 for all production sites. It can be concluded that there is no risk to aquatic organisms through production of chloroform (conclusion ii).

Only the use of chloroform as a solvent has a PEC/PNEC ratio above 1. Therefore, it can be concluded that there is a need for limiting the risks for this application (conclusion iii).

Sediment

For all production sites, PEC/PNEC-ratios are below 1. It can be concluded that there is no risk to sediment organisms through production of chloroform (conclusion (ii)).

For all uses except the use of chloroform as a solvent, PEC/PNEC ratios are below 1 and a conclusion (ii) can be derived.

Concerning the use of chloroform as a solvent, there is a need for limiting the risks for this application (conclusion (iii)).

Sewage treatment process

A conclusion (iii) has to be derived for production sites A, C, E and J, for all uses and for unintended releases.

3.3.2. Atmosphere

In the only experimental result available, the lowest test concentration at which effects were observed for visible symptoms and photosynthesis was 100 g/m^3. The test duration was too short to consider the result for a PNEC derivation. However, this concentration is much higher (more than 5 orders of magnitude) than local concentrations that were calculated at each production site and for every use.

In addition the potential contribution of chloroform to climate change, stratospheric ozone depletion, ground-level ozone formation and acidification processes could be considered as negligible.

Therefore, although air is the main final receptive compartment for chloroform, no further work is recommended at present: conclusion (ii).

3.3.3. Terrestrial compartment

The resulting PEC/PNEC ratios for the various scenarios considered in this assessment are presented below.

Table 3-9 : Estimated PEC/PNEC ratios for agricultural soil

Scenario	Step	PEC/PNEC
Production	Site A	0.07
	Site B	< 0.001
	Site C	0.007
	Site D	0.039
	Site E	0.052
	Site F[1]	0.019
	Site G	0.009
	Site H	0.008
	Site I	0.003
	Site J	0.055
Uses	HCFC Production	0.06
	Dyes and Pesticide Production	0.018
	Other applications	0.036
	Uses as a solvent	0.45
Unintended releases	Losses as a by-product during chemical manufacturing	0.19
Regional scale		< 0.001

[1] Site F had stopped manufacturing chloroform in 2004 and is being dismantled

For the terrestrial compartment, the deposition of chloroform due to application of sludges from wastewater treatment plants was assumed to be negligible because sludges from chemical producing industries are not supposed to be applied on agricultural soils. The resulting PEC/PNEC ratios are below 1 for all production or uses scenarios. It could be concluded that there is at present no need for further information and/or testing and no need for risk reduction measures beyond those that are being already applied (**conclusion (ii**)).

3.3.4. Non compartment specific effects relevant to the food chain

Because of the low bioaccumulation potential of chloroform (BCF = 13), the potential for secondary poisoning can be considered to be negligible: c**onclusion (ii)**.

4. HUMAN HEALTH

See the human health risk assessment report.

5. RESULTS [9]

5.1. ENVIRONMENT

Conclusion (iii) There is a need for limiting the risks; risk reduction measures which are already being applied shall be taken into account

Conclusion (iii) is applied to the use of chloroform as a solvent for the aquatic compartment (including sediment).
Conclusion (iii) is also applied to production sites A, C, E and J, to all uses and to unintended releases for the sewage compartment.

Conclusion (ii) There is at present no need for further information and/or testing and no need for risk reduction measures beyond those which are being applied already.

Conclusion (ii) is applied to all levels of the life cycle of chloroform (except the use as a solvent) for the following compartments: aquatic, sediment, atmosphere, terrestrial and non-compartment specific effects relevant to the food chain.

5.2. HUMAN HEALTH

See the human health risk assessment report.

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9 Conclusion (i) There is a need for further information and/or testing.

Conclusion (ii) There is at present no need for further information and/or testing and no need for risk reduction measures beyond those which are being applied already.

Conclusion (iii) There is a need for limiting the risks; risk reduction measures which are already being applied shall be taken into account.

European Commission

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The report provides the comprehensive risk assessment of the substance Chloroform. It has been prepared by France in the frame of Council Regulation (EEC) No. 793/93 on the evaluation and control of the risks of existing substances, following the principles for assessment of the risks to man and the environment, laid down in Commission Regulation (EC) No. 1488/94.

The evaluation considers the emissions and the resulting exposure to the environment and the human populations in all life cycle steps. Following the exposure assessment, the environmental risk characterisation for each protection goal in the aquatic, terrestrial and atmospheric compartment has been determined.

The environmental risk assessment concludes that there is concern for the aquatic compartment (including sediment) and waste water treatment plants due to the use as a solvent. There is also concern for the functioning of waste water treatment plants due to production and all identified uses.

The human health assessment has not yet been finalised, but indicates concern for all human compartments.