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HAZARD EVALUATION OF SUBSTANCES TRANSPORTED BY SHIPS

Report of the thirty-ninth session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships

The report of the thirty-ninth session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships (EHS 39/11) is attached for information. The key issues referred to in this report were approved by the thirty-third session of GESAMP, which was held in Rome, from 5 to 9 May 2003.

Any comments would be welcome and should be addressed to:

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WORKING GROUP ON THE EVALUATION OF
THE HAZARDS OF HARMFUL SUBSTANCES
CARRIED BY SHIPS
39th session
Agenda item 11

EHS 39/11
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REPORT OR THE THIRTY NINTH SESSION

1 INTRODUCTION

1.1 The thirty-ninth session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships was held at IMO Headquarters, London, from 28 April to 2 May 2003 under the chairmanships of Dr C.T. Bowmer. The list of members attending this session is shown in annex 1 and the approved agenda is shown in annex 2.

1.2 It was noted that, MEPC, at its 47th session, had requested the Group to indicate the advisory work, which it might be able to perform, for IMO, in the future. A detailed report had been made by the Secretariat, to MEPC 48, addressing the specific issues proposed by the Group at its last session.. However, the Group noted that, instead of considering this report, MEPC 48 instructed the Secretariat to submit a second report, listing the options, so that the Committee could consider them one at a time at MEPC 49, which is due to meet in July 2003.

1.3 With regard to the evaluation of products subject to the IBC Code, the Group noted that it had completed its first pass through and had evaluated 731 products. Of these, 96 (13.1%) had insufficient data to allow those columns of the revised GESAMP Hazard Profile, which are needed to assign Pollution Categories and Ship Types, to be completed. Having noted this information, the Group agreed that once it had completed its first pass through the list of products, it was anticipated that some of the individual products with incomplete Hazard Profiles might be revisited with a view to amending the incomplete evaluations.

1.4 The Group agreed that it would then be necessary to consolidate the ratings by giving further consideration to fifteen previously identified chemical groups and checking those for potential errors and anomalies. In this way some of the missing data might be filled in. However, the group was convinced that it had exhausted all available data resources in the public domain and information in the IMO files and that completion of these substances would largely be a matter for industry.

2 REPORT OF THE INTERSESSIONAL *AD* HOC SUB GROUP MEETINGS

2.1 Report of the intersessional meeting of the Mammalian Toxicology Sub-Group

2.1.1 The Group noted that the intersessional meeting of the Mammalian Toxicology Sub-Group had held from 12-16 August 2002 and had been generously financed by the Netherlands. The report of this meeting was distributed as EHS S4.

2.1.2 It was noted that the Sub-Group had considered a total of 197 products of which 59 products, subject to the IBC Code but not considered previously had been assigned revised GESAMP Hazard Profiles, the results of which are included in annex 3.

2.1.3 It was also noted that the Sub-Group had recognized that the initial evaluation of products had started prior to the agreement of definitions for long term and target organ specific hazards by the UN Globally Harmonized System of Classification and Labelling. As a result, the Sub-Group had considered the carcinogenicity, mutagenicity, reprotoxicity, sensitisation and target organ specific toxicity properties of a range of products, based on proposals made by one of the members which had been developed from a literature review of:

.1 **I**nternational **A**gency for **R**esearch on **C**ancer (IARC);

.2 **E**uropean **U**nion (EU) Classifications;

.3 **O**rganisation for **E**conomic **C**o-operation and **D**evelopment (OECD) **H**igh **P**roduction **V**olume Chemicals Programme (HPV); and

.4 **I**nternational **U**niform **C**hemica**l** Information **D**atabase (IUCLID).

2.1.4 It was noted that the Sub-Group had recognized that the irritation and corrosion potential of some of the products initially evaluated had not been addressed and so rectified this situation by revisiting these products. The resultant evaluations of the long term toxicity and irritation/corrosion properties are also included in annex 3.

2.1.5 In addition, the Sub-Group had considered the following homologous series of chemicals and agreed to conduct an intensive literature search for available data for those products where columns C1-D3 were either blank or contained 'NI':

.1 Alkanes;

.2 Alkenes;

.3 Carboxylic acids;

.4 Lube-oil additive; and

.5 Triglycerides.

2.2 Report of the intersessional meeting of the Aquatic Toxicology Sub-Group

2.2.1 The Group noted that the intersessional meeting of the Aquatic Toxicology Sub-Group had been held from 25 to 29 November 2002 and had been generously financed and hosted by the European Chemicals Bureau, of the European Commission, in Ispra, Italy. The report of this meeting was distributed as EHS S5;

2.2.2 It was noted that the Group generated revised GESAMP Hazard Profiles for 108 products subject to the IBC Code, the results of which are included in annex 3.

2.2.3 In addition, it was noted that the Group had given special consideration to the bioaccumulation potential of coal tar and creosote as a result of a study which showed that at a loading rate of 52630 mg/l, only 0.365% of the components dissolved into the water phase of which 85% of the dissolved components had been identified as naphthalene, phenol, cresols and

quinolene. It was recognized that, based on these results, it could be argued that creosote and coal tar might not be described as bioaccumulating (Log Pow $\geq$4). However, it was concluded that the industry should carry out further work to show which components of these products would partition into the water phase at low loading rates as it was thought that at such levels, some of the components of these products which partition into the water phase, might have bioaccumulating potential.

2.2.4 It was also noted that the Sub-Group had considered the groups of acrylates and methacrylates and were able to generate partial Hazard Profiles for these products. However, the Sub-Group had indicated that additional data were needed to evaluate the acute aquatic toxicity for dodecyl methacrylate.

2.2.5 It was also noted that, having evaluated a range of products, the Sub-Group had recognized that certain products, such as fatty acids, had been evaluated as having bioaccumulation potential based on their log Pow values. However, it had been recognized that such products are metabolised as naturally occurring chemicals to form metabolites as part of the organisms normal system and so it might not be appropriate to describe such products as bioaccumulating.

2.3 Report of the intersessional meeting of the Physical Chemists Sub-Group

2.3.1 The Group noted that the intersessional meeting of the Physical Chemists Sub-Group had been held from 16 to 17 January 2003 and had been generously financed by Malta. The report of this meeting was distributed as EHS S6;

2.3.2 It was noted that the Group had generated revised GESAMP Hazard Profiles for 61 products subject to the IBC Code;

2.3.3 In addition, it was noted that the Sub-Group had addressed the problem of defining *Persistent Floaters* recognizing that the current definition only applied to floating, insoluble liquids which would not be expected to evaporate for several days at least. The Sub-Group had noted that some substances, defined as solids under the current system had caused considerable clean-up difficulties when washed up on beaches whilst some vegetable oils, meeting the definition of solids, were actually described by the industry as semi-solid and behaved as if they were liquids.

2.3.4 As a result, the Group considered that it might be appropriate to include solids in the definition of *Persistent Floaters* whilst differentiating between the different types of floaters in column E2 of the GHP. However, it was recognized that the Group did not have sufficient information to make a decision on this issue at this time.

2.3.5 It was recognized that, at a previous meeting, there had been a debate about whether percentage water solubility should be described in terms of:

.1 mass of solute/mass of solvent; or

.2 mass of solute/mass of solution.

2.3.6 It had also been recognized that both definitions may be used for different purposes but that the Sub-Group had agreed that, in accordance with OECD Guideline 105, solubility would

be expressed in terms of mass of solute/volume of solution for the purposes of calculating the rating in column E2 of the revised GHP.

2.4 Matters arising from the reports of the intersessional meetings of the Sub-Groups

2.4.1 Based on the reports of the intersessional meetings of the Sub-Groups, the Group considered the following issues which, because they are related to the text of GESAMP Reports and Studies Number 64 were reported under agenda item 9:

.1 bioaccumulation of food-like substances including fatty acids

.2 consideration of persistent floaters

3 REPORT OF THE SUB-COMMITTEE OF EXPERTS ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATATION AND LABELLING OF CHEMICALS

3.1 The Group noted that the Secretary attended the fourth session of the UN Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals which was held in Geneva from 9 to 11 December 2002.

3.2 It was also noted that the report of this meeting could be found in the UN Web Site (www.unece.org/trans) as ST/SG/AC.10/C.4/8, a copy of which had been distributed to the Group.

3.3 Having considered this report, the Group noted that the GHS Sub-Committee had adopted the consolidated text of the Globally Harmonized System for the Classification and Labelling of Chemicals (GHS) following some amendments, which were had been made during the meeting.

3.4 It was also noted that the GHS was reported to be available and is known as “the Purple Book”.

3.5 Having noted the future programme of work of the UN GHS Sub-Committee, the Group noted that the GHS System does not include the following aspects used by IMO in defining Pollution Categories and Carriage Requirements for products subject to the IBC Code:

.1 autoignition temperature;

.2 flammability limits; and

.3 Physical properties (floaters and persistent floaters).

3.6 The Group agreed that these differences might usefully be brought to the attention of the UN GHS Sub-Committee.

3.7 In addition, the Group noted paragraph 33 of the UN GHS Sub-Committee report, which was pertinent to the classification and labelling of packaged goods subject to Annex III of MARPOL 73/78:

The Sub-Committee also noted that, for the time being, in the UN Model Regulations on the Transport of Dangerous Goods, substances which meet the criteria for "Hazardous to the environment" need to be identified as such only when they do not meet the criteria for the other hazard classes because most of those meeting the criteria for other hazards are deemed, without additional labelling, as being environmentally hazardous. However, for sea transport, substances hazardous to the environment have to be marked as marine pollutants whatever the class of danger they belong to is. The question of whether or not the hazardous to the environment label needs to be a requirement in the UN Model Regulations on the Transport of Dangerous Goods when the substance possesses other hazards subject to transport regulations will be further discussed by the TDG Sub-Committee in the next biennium.

3.8 In this context, the Group was informed that the UN Transport of Dangerous Goods Sub-Committee were still considering whether all environmentally hazardous products should be labelled as such or whether such labelling should be limited to those products not classified as having other hazards (Classes 1-8 under the UN transport system).

3.9 In addition to these issues, it was noted that the Secretariat had raised the issue of bioaccumulation of fatty acids, discussed under agenda item 2, and was invited to make a submission to the next GHS Sub-Committee meeting.

3.10 It was also noted that, in discussions with the GHS Secretariat, the Secretary had suggested that it might be useful to submit a document to the GHS Sub-Committee along with a number of copies of R&S 64 indicating the application of the GHS System to the evaluation of products by the GESAMP/EHS Working Group.

3.11 As a result, the Group instructed the Secretariat, subject to approval by GESAMP, to submit a report to the UN GHS Sub-Committee describing the work of the EHS Working Group and including copies of Reports and Studies Number 64 together with the list of re-evaluated substances and an indication of problems that had arisen during the process of applying the GHS System.

3.12 In addition, the Group agreed that a separate submission should be made to the UN GHS Sub-Committee identifying problems encountered in applying the GHS system together with an indication of how the EHS Working Group had opted to solve such problems.

4 EVALUATION OF NEW SUBSTANCES PROPOSED FOR CARRIAGE BY SHIPS

4.1 The Group noted the data, which had been received on thirteen new substances for evaluation.

4.2 The data associated with these products was considered by each of the sub-groups along with those products, which are already classified by IMO for inclusion into the IBC Code.

4.2 The resultant current 5-Column Hazard Profiles for these products are shown below whilst the Hazard Profiles according to the revised system are shown in annex 3.

Product Name	**Column**				
	A	**B**	**C**	**D**	**E**
Alcohols (C8-C11)	-	-	0	I	X
Mixed oxygenated aliphatic hydrocarbons	0	1	0	I	X
Alkaryl phosphate mixtures (>40% diphenyl tolyl phosphate, <0.02% ortho- isomers)	+	4	0	0	0
Hydrocarbon waxes	-	-	0	I	X
Pyrolysis gasoline	(+)	(4)	-	-	-
Alkylated phenols (C_4-C_9)	-	-	1	I	X
Sodium perborate monohydrate	NI	3	1	II	XXX
Sodium carbonate perhydroxyhydrate	0	3	1	II	XXX
Glycerol, propoxylated, mwt > 1000	(0)	(1)	1	I	X
Glycerol, propoxylated, mwt $\leq$ 1000	(+)	-	1	I	X
Glycerol, propoxylated and ethoxylated	0	(3)	0	0	0
Trimethylol propane propoxylated	-	1	0	0	0
Alpha-Hydro-w-hydroxypoly([oxy(methyl-1,2-ethanediyl) Polypropylene glycol	0	1	0	0	0

4.3 The secretariat was requested by the group to correspond with the manufacturers as appropriate in order to complete these profiles at the next (sub-group) meeting.

5 CONSIDERATION OF QUERIES FROM INDUSTRY RELATED TO EVALUATIONS

5.1 The Group noted that additional data on the following products had been received from industry with a request to take them into account in evaluating the products:

Product name
Tall oil (crude and distilled)
Isobutyl methacrylate
Ethoxylated tallow alkylamine and its mixtures with glycols
2-Ethylhexyl esters of fatty acids (formerly Mobil Syndrill E51)
Fatty acids, essentially linear, (C_6-C_{18}), 2-ethylhexyl esters;
Dimethyl disulphide;
Alkyl (C_{12}-C_{17}) benzene/indene/indane mixtures; and
Polyisobutenamine in aliphatic (C_{10}-C_{14}) solvent.
Methyl *tert*-butyl ether

5.2 The Group took the additional data into account and the resultant evaluations are shown in annex 3. However, the Group deferred the evaluation of a wide range of acrylates and methacrylates to the next session as it was considered that this group of products would require more time to evaluate than was possible at this meeting.

5.3 In considering these products, the Group made the following observations:

.1 **Methyl *tertiary* butyl ether:** This product was reconsidered at the request of the Oslo and Paris Commission with an accompanying report on tainting which was used to provide a rating in column E1. In addition, column B1 was amended following a request from industry to re-examine the associated data.

.2 **Fatty acids and Fatty alcohols:** The Group noted the request from APAG to evaluate a product described as *Primary Alcohols, C8-C11* and agreed that the data provided was sufficient to make an evaluation. However, it was agreed to defer full evaluation of this product to the next session so that it could be considered in conjunction with other alcohols and fatty acids. This would allow time for the HPV documents to be completed so that they could be taken into consideration by the Group.

.3 **Isobutyl methacrylate:** The Group agreed to defer consideration of this product until the next session when all the acrylates and methacrylates could be considered as a group.

.4 **Hydrocarbon Waxes:** With regard to columns A and B, the Group requested the manufacturer to supply further details of the composition of the various types of waxes and the base oil used as an analogy in order to clarify which product had been actually tested. The Group also requested the test reports of these products.

.5 **Tall oil (crude and distilled):** The Group considered data submitted on Tall oil (distilled) and made a new entry to reflect its evaluation. The Group agreed that the entry for Tall oil (crude and distilled) could be removed if the crude tall oil was no longer transported. However, it was agreed that should this entry still be required, further data would need to be submitted if it was to be evaluated.

6 RE-EVALUATION OF PRODUCTS IN THE IBC CODE IN ACCORDANCE WITH THE CRITERIA FOR THE REVISED GESAMP HAZARD EVALUATION PROCEDURE

6.1 The Aquatic Toxicology, the Mammalian Toxicology and the Physical Chemist Sub-Groups continued to evaluate the properties of products which mainly comprised those products due to enter the IBC Code but were not currently listed there. The results of these evaluations are shown in annex 3.

6.2 In addition, the Group noted that, despite frequent requests, the vegetable oils industry had not provided all the data needed to complete the hazard profiles of those vegetable oils identified as being transported in bulk by sea. It was recognized that the most important data, which were missing were the acute aquatic toxicity data but it was also noted that some physical property data needed to complete column E2 of the GHP were also missing.

6.3 Animal/Vegetable/Fish Oils

6.3.1 It was noted that, the IMO's BLG Sub-Committee had requested the Group to provide provisional evaluations of the missing columns of the Hazard Profiles for these products in order to allow the next session of MEPC to see how these products would be classified in terms of Pollution Categories and Ship Types (ref: BLG 8/18, paragraph 5.22). It was also noted that the BLG Sub-Committee had recognized that such provisional evaluations would err on the side of caution.

6.3.2 The Group were concerned that estimating the ratings for these products, in order to provide provisional assessments, might lead to criticism if, in the event of an incident, it was demonstrated that the assessment by the Group was incorrect.

6.5 However, the Group agreed to make a provisional assessment of these products, subject to approval by GESAMP (33 Session, 5-9 May, 2003).

6.6 As a result, the Group completed the hazard profiles of the animal/vegetable oils shown below with the provisional rating shown in brackets:

	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E2	E3
Palm Oil	0	R	0	NI	0	0	0	0	0		F	2
Palm Olein	0	R	0	NI	0	(0)	(0)	(0)	0		Fp	2
Palm Stearin	0	R	0	NI	0	(0)	(0)	(0)	0		F	2
Palm kernel Oil	0	R	(2)	NI	(0)	(0)	(0)	(0)	(1)		F	2
Linseed Oil	0	R	(2)	NI	0	0	0	(0)	(1)		Fp	2
Rapeseed Oil/Canola Oil	0	R	(2)	NI	0	0	(0)	0	(1)		Fp	2
Groundnut Oil	0	R	(2)	NI	0	0	(0)	0	0		Fp	2
Soyabean Oil	0	R	0	NI	0	0	(0)	(0)	1		Fp	2
Olive Oil	0	R	(2)	NI	0	0	(0)	0	1		Fp	2
Coconut Oil	0	R	(2)	NI	0	0	(0)	0	1		Fp	2
Castor oil	0	R	(2)	NI	0	0	(0)	1	1		Fp	2
Corn oil	0	R	(2)	NI	0	(0)	(0)	0	1		Fp	2
Sunflower oil	0	R	(2)	NI	0	0	(0)	(0)	(1)		Fp	2
Cottonseed oil	0	R	(2)	NI	0	0	(0)	0	1		Fp	2
Tung oil	NI	R	(2)	NI	(0)	(0)	(0)	(0)	(1)		F	2
Tallow	0	R	0	NI	0	0	(0)	0	0		F	2
Lard	0	R	0	NI	0	0	(0)	0	1		F	2
Fish Oil	0	R	(2)	NI	0	0	0	0	(0)		Fp	2

6.7 In taking this approach, the Group noted that most of these products with missing data were produced on a large scale in North America and Europe and so questioned why the producers were not more forthcoming with the necessary test data.

6.8 It was also noted that these products are also used to produce derivatives such as coconut oil fatty acids for which test data were also needed, recognizing that such crude products may contain components other than alkyl carboxylic acids, which might affect their toxicity.

7 DISCUSSION ON THE CONSOLIDATION OF WORK CARRIED OUT UNDER AGENDA ITEM 6 SINCE 1998

7.1 The Group noted that it had completed the re-evaluation of the vast majority of the products either listed in the IBC Code or identified in list 1 of MEPC 2/Circ.8 as due to enter the Code.

7.2 In this context, the Group noted that this represented 11,895 individual ratings for which hundreds of thousands of pieces of supporting data had been collected, collated and evaluated

7.3 Notwithstanding this observation, the Group recognized that the evaluations still needed to be consolidated before they could be made publicly available. In this context, it was recognized that the most appropriate method of consolidation would be to give further consideration to groups of chemically related products and the Secretariat was instructed to produce listings of such groups.

7.4 In order to carry out this part of the exercise, the Group emphasized the need for additional data from the chemicals industry, particularly in association with those columns where 'NI' had been assigned indicating that there was not enough data to permit a meaningful evaluation to be made.

8 FUTURE WORK PROGRAMME AND DATE OF THE NEXT SESSION

8.1 In order to complete the consolidation work referred to under agenda item 7, the Group agreed that further meetings of the specialized Sub-Groups would be needed prior to the next full meeting.

8.2 As a result, the following dates were agreed for the sub-group and main meetings:

.1	Aquatic Toxicologists	17-21 November 2003;
.2	Mammalian Toxicologists	1-5 December 2003;
.3	Physical Chemists	January 2004 (exact dates to be decided later); and
.4	Full EHS meeting	19-23 April 2004.

8.3 In considering the future work programme, the Group agreed that its members would need financial support from IMO in order to carry out the necessary preparatory work, which is done in their own time. In this context, it was recognized that the time spent during meetings has been financed by the Members' governments or organizations.

8.4 In this context, the Group were informed, by the Administrative Secretary to GESAMP, that IMO would be requesting its Council to increase the budget for GESAMP activities. It was hoped that such an increase could be used to finance the preparatory work needed to complete the evaluation of products requested by IMO's MEPC Committee.

9 GESAMP REPORTS AND STUDIES NUMBER 64

9.1 Bioaccumulation of food like substances such as fatty acids

9.1.1 The Group noted the issue raised by the Sub-Group related to the bioaccumulation of food-like substances such as fatty acids reported under agenda item 2 (paragraph 2.2.5).

9.1.2 It was recognized that the log Pow value of a product only indicates its intrinsic potential to bioaccumulate and does not reflect any metabolism which might lower its actual bioaccumulation..

9.1.3 However, in the case of some food-like substances which are only sparingly soluble in water, the Group agreed that these might be metabolized faster than their absorption from water. Furthermore, it was suggested that one or more substances with accurate measured data, might be used as analogies in order to allow a reliable rating to be placed in column A1B for bioaccumulation and to allow the log Pow value in column A1A to be overridden. One member offered to make a search for suitable data to assist in this approach.

9.1.4 As a result, the Group agreed that further consideration should be given to this issue and Members were invited to investigate sources of measured BCF values on these, or similar, products in order to give credence to any estimations which might be considered in the future.

9.2 Consideration of the definition of Persistent Floaters

9.2.1 The Group recalled that the identification of the potential environmental fate of products released into the sea is recorded in column E2 of the revised GESAMP Hazard Profiles and is based on the European Behaviour Classification System (EBC), which classifies products as Sinkers (S), Dissolvers (D), Floaters (F), Evaporators (E) and combinations of these.

9.2.2 It was also recalled that, in order to distinguish between the products which float on the surface of the water and those which both float and are expected to persist as a slick, the Group developed additional criteria to separate the EBC Floaters into Floaters (F) and Persistent Floaters (Fp).

9.2.3 In taking this approach it was recognized that solid floaters, i.e. those floaters with a melting point of $\geq$20°C, have not been defined as persistent floaters until now. This was due to the view that such products would not have the same adverse effect on seabirds as they would remain as solid lumps and so would not be able to cover the feathers of seabirds with the resultant in loss of insulation leading to hypothermia and death.

9.2.4 However, the Group were informed that some solid products meeting the definition of Floaters (F) behave more like liquids when released into the marine environment and had also been reported as causing similar clean-up difficulties as persistent liquid floaters (Fp) when washed up onto beaches.

9.2.5 In recognizing that this situation might not always be the case, for example with some products possessing a well defined, sharp melting point, it was agreed that the distinction between solid floaters and persistent liquid floaters was not always clear.

9.2.6 It was recalled that the concern related to the behaviour of chemicals in the marine environment was only due to the physical effects on wildlife and on the benthic habitats for column E2 and interference with coastal amenities, such as the use of beaches for column E3.

9.2.7 In considering the issue, the Group agreed that, before a meaningful decision could be taken on how to evaluate such products, further investigation would be required.

9.2.8 However, it was also agreed that the criteria for defining products as Persistent Floaters in GESAMP Reports and Studies 64, could include solids when it was considered appropriate to do so. In such circumstances, the Group agreed that, as laid down in GESAMP Reports & Studies 64, a rating of "(Fp)" could be used.

9.3 Definition of Water Solubility

9.3.1 Based on the report of the Physical Chemists Sub-Group, it was noted that, in order to apply the European Behaviour Classification System (EBC), which refers to solubility in terms of mass of solute/mass of solution, the Sub-Group had agreed to convert the SI units employed in the IMO/GESAMP database (mg/l)to the EBC units (%).

9.3.2 However, in reaching this conclusion, it was recognized that the following assumptions would need to be made for practical purposes:

.1 for liquids the volumes of solute and solvent are additive i.e. if 100 mls of solute are made up to 1 litre of solution, it would be assumed that 900 mls of solvent had been added. However, it was recognized that this might not always be the case due to the interactivity of the molecules concerned;

.2 for solids at low concentrations, the volume of solute could be ignored; and

.3 for solids at high concentrations, the volume of solute would be unknown.

9.3.4 In making such assumptions, it was agreed that, at low solubilities, the errors would be small. However, although the errors increase as the solubility rises above 10%, this is not an important range within the EBC system.

9.3.5 The Group noted that the Physical Chemist Sub-Group had given further consideration to the formula to be used to calculate the %Solubility from the solubility stored in the database in terms of mg/l. The revised version of the formula is shown below with an example of its application:

$$\%Solubility(m/m) = \frac{Weight\ of\ Solute}{Weight\ of\ Water + Weight\ of\ Solute} * 100 = \frac{Weight\ of\ Solute}{Weight\ of\ Solution} * 100$$

Let : the solubility of the product (solute) = x (mg/l)
: the percentage (m/m) solubility of the product (solute) = $S_{(mm)}$ (g/100g)
: the density of the product (solute) = d ($kg/m^{3)}$ (mg/l)
: the density of fresh water = d_w (kg/m^3)=1000

So : Weight of solute in 1 litre of solution = x (mg) = 10^{-3}x (g)
Volume of solute in 1 litre of solution $=10^{-3}$x/d (l) = x/d (ml)

: Weight of water in 1 litre of solution = 1000-(x/d) (g).
: Weight of solution = weight of solute + weight of water
: Weight of solution=(10^{-3})x+(1000-x/d))(g)=1000-x(1/d-1/1000) (g)

Therefore : $$\%Solubility(m/m) = \frac{10^{-3}x}{1000 - x(\frac{1}{d} - \frac{1}{1000})} * 100 = \frac{0.1x}{1000 - x(\frac{1}{d} - \frac{1}{1000)})}$$

Assume : d=800 kg/m^3
: x=10000 mg/l

Therefore : $$\%Solubility(m/m) = \frac{10000}{(1000 - 10000(\frac{1}{800} - \frac{1}{1000})} * 100$$

%Solubility(m/m) = 1.0025 g/100g=1.0025%

10 ANY OTHER BUSINESS

10.1 The relevance of aspiration hazard to marine mammals

10.1.1 The Group recognized that, following a discharge of certain chemicals or mineral oils from tankers, there is a potential hazard of swallowing or aspirating the floating liquid, when swimming in the contaminated water leading to lung damage.

10.1.2 It was agreed that this could be a serious human hazard, especially when the liquid reaches the respiratory tract by aspiration. This hazard is reflected in column D3 of the revised GESAMP Hazard Profiles.

10.1.3 It was recalled that there had been some speculation about whether aspiration could also be a hazard to some marine mammals, such as seals, and the Group recalled that one of its members had been requested to contact experts in marine pathologists in order to investigate this issue. He had been informed that amniotic fluid had been reported as causing an aspiration hazard to some marine mammals, though the experts consulted did not have first hand experience of chemical aspiration.

10.1.4 Nevertheless, in recognizing that some marine mammals were susceptible to the aspiration hazard caused by amniotic fluid, it was agreed that this might also be relevant to those chemicals identified as having the same potential effect.

10.1.5 However, it was also noted that no references to this issue had been identified in the literature and the issue would continue to be investigated and reported back to the Group.

10.2 EU Activities

10.2.1 The Group noted that, under the European Union Risk Assessment Programme on Existing Chemical and Biocides, emission scenarios were being developed for a range of uses of chemicals. It was also noted that such an approach was being taken under the auspices of the OECD.

10.2.2 It was noted that, under this programme, the European Commission had funded a project under the OECD regarding Antifouling Paints where existing methods of estimating emissions were being investigated with a view to developing a harmonized approach to the issue.

10.2.3 In addition, it was noted that new European Legislation was being developed under the title of **R**egistration, **E**valuation and **A**uthorization of **Ch**emicals (REACH) to replace existing legislation related to Existing, New and Classification and Labelling of Chemicals. It was noted that REACH is intended to put the responsibility on industry to ensure that all products can be used safely and that the draft legislation was expected to be made publicly available on the European Commission Home Page in the near future.

11 CONSIDERATION AND ADOPTION OF THE REPORT

11.1 The Group adopted the report and, having thanked members for the considerable amount of effort which they had put into, *inter alia*, the collection, collation and evaluation of data to generate *Revised Hazard Profiles*, the Chairman closed the session on Friday 2 May at 13:00 hrs.

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ANNEX 1

LIST OF MEMBERS ATTENDING THE THIRTY-SIXTH SESSION OF THE WORKING GROUP

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ANNEX 2

AGENDA FOR THE THIRTY-NINTH SESSION OF THE GESAMP/EHS WORKING GROUP

1 Adoption of the agenda

2 Report of the *ad hoc* meetings of:

.1 the Mammalian Toxicology Sub-Group (August 2002, London);

.2 the Environmental Toxicology Sub-Group (November 2002, Ispra); and

.3 the Physical Property Sub-Group (January, 2003, London).

3 Report of the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals (December 2002)

4 Evaluation of new substances proposed for carriage by ships (Existing and Revised procedure)

5 Consideration of queries from industry related to evaluations

.1 Tall oil crude and distilled;

.2 Ethoxylated Tallow alkylamine and its mixtures with glycols

6 Re-evaluation of products in the IBC Code in accordance with the criteria for the Revised GESAMP Hazard Evaluation Procedure including:

.1 the alphabetical list of substances summarised by N. Soutar

.2 substances to be included in the IBC Code

.3 Animal/Vegetable/Marine oils;

.4 Fatty acids, alcohols and derivatives;

7 Discussion on the consolidation of work carried out under agenda item 6 since 1998

8 Future work programme and date of the following sessions

.1 EHS 40;

.2 Additional meetings of the Mammalian, Ecotoxicology and Physico-chemical sub-groups if deemed necessary

9 GESAMP Reports and Studies 64

including consideration of:

.1 the use of log Pow to determine bioaccumulation for lipophylic substances which are known to be easily metabolised or form natural metabolites;

.2 definition of water solubility; and

.3 consideration of *Solid Floaters* - should they be regarded as *Persistent Floaters*?

10 Any other business

11 Consideration and adoption of the report

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Products discussed during the meeting and during

19-May-03 **intersessional sub-group meetings**

	--- Existing GHP -----						---------- Revised GESAMP Hazard Profile (GHP) system ----------													
NAME	**EHS**	**A**	**B**	**C**	**D**	**E**	**A1a**	**A1b**	**A1**	**A2**	**B1**	**B2**	**C1**	**C2**	**C3**	**D1**	**D2**	**D3**	**E1**	**E2**	**E3**
Acetic acid	13	0	1	1	II	XX	0	0	0	R	1	NI	1	1	1	3C	3		NT	D	3
Acetic anhydride	12	0	1	1	II	XXX	0	0	0	R	1	NI	1	0	2	3	3	A	NI	D	3
Acetochlor (ISO)	2047	0	4	1	II	XXX	NI	NI	NI	NI	NI	NI	1	0	(1)	0	0	S	0	S	2
Acetone	15	0	0	1	I	X	0	0	0	R	0	0	0	0	0	1	2		NT	DE	2
Acetone cyanohydrin	14	0	4	3	II	XX	0	0	0	R	4	NI	3	4	3	(3)	(3)		NI	D	3
Acetonitrile	16	0	1	2	I	X	0	0	0	R	1	NI	2	2	2	1	2		(NT)	D	2
Acid mixtures (nitrating acid)	289	0	2	2	II	X	Inorg	NI	0	Inorg	(2)	NI	3	3	4	3C	3		0	D	3
Acrylamide	23	0	2	2	II	XX	0	0	0	R	2	0	2	2	NI	1	2	CMNS	NI	D	3
Acrylic acid	24	0	4	2	II	XX	0	0	0	R	4	NI	2	2	2	3C	3		NI	D	3
Acrylonitrile	25	0	3	3	II	XXX	0	2	2	R	3	0	2	2	2	2	2	CSM	NT	DE	3
Acrylonitrile-styrene copolymer dispersion in polyether polyol (LOA)	1432	0	1	0	0	X	NI	0	0	NI	1	NI	0	(0)	(0)	0	(0)		NI	S	0
ACTACLEAR 1700 Carrier Fluid (TN)	2188	0	0	0	I	X	0	NI	0	NR	0	NI	0	0	(1)	2	2		0	FD	2
Adiponitrile	26	0	1	3	I	XX	0	0	0	R	1	NI	3	(3)	3	3	(3)		NI	FD	3
Alachlor (ISO)	1488	0	4	1	I	XX	3	3	3	NI	4	1	1	0	(1)	1	0	CS	NI	S	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Alcohol(C12-C16) poly(20 and above)ethoxylates	1482	0	2	1	I	X	4	(3)	(3)	R	2	0	(0)	(0)	(1)	2	1		NI	D	2
Alcohol(C6-C17)(secondary) poly(3-6)ethoxylate	722	0	4	1	0	0	4	3	3	R	4	2	0	(0)	(1)	3	2		NI	D	3
Alcohol(C6-C17)(secondary) poly(7-12)ethoxylate	295	0	4	1	0	0	3	3	3	R	4	1	1	0	(2)	3	3		NI	D	3
Alcohol(C8-C11) poly(2.5-9)ethoxylates	2094	0	3	1	I	X	3	3	3	R	3	NI	1	0	(2)	(2)	(2)		0	D	2
Alcohol(C12-C16) poly(1-6)ethoxylates	294	0	4	1	I	X	5	3	3	R	4	1	0	0	(1)	2	2		0	FD	2
Alcohol(C12-C16) poly(7-19)ethoxylates	1481	0	4	1	I	X	4	3	3	R	4	1	1	0	(2)	3	3		NI	D	3
Alcohols (C8-C11)	2279												(0)	(0)	(0)	(2)	(2)			Fp	
Alcohols, C13 and above as individuals and mixtures	2039	0	1	0	0	X	5	2	2	R	1	1	0	0	0	(1)	(1)		NI	F	1
n-Alkanes (C10-C20)	296	0	0	(1)	0	0	5	3	(3)	NR	0	0	0	0	0	0	0	A	NI	F	3
Alkaryl polyether (C9-C20) (LOA)	1974	0	3	1	II	XX	4	NI	4	NR	3	NI	NI	NI	NI	(2)	2		NI	S	2
Alkenylamide, long chain, more than C10	1858	0	4	0	0	XX	NI	NI	(3)	NI	4	NI	0	NI	NI	0	1		NI	F	1
Alkenyl succinic anhydride	298	0	1	0	II	XX	0	0	0	NR	1	NI	0	0	(2)	2	(2)	S	0	FD	2
Alkyl acrylate/Vinyl pyridine copolymer in toluene	299	0	2	1	II	XX	2	2	2	R	2	0	0	0	NI	2	2	RNA	NI	F/Fp	3
Alkyl amine, alkenyl acid ester, mixture	1433	0	1	1	I	XX	NI	NI	NI	NI	1	NI	(0)	(0)	NI	NI	NI		NI	Fp	2
Alkylaryl phosphate mixtures (more than 40% Diphenyl tolyl phosphate, less than 0.02% ortho-isomers)	2267						4	4	4	R	4	4	0	0	(0)	NI	NI				NI

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Alkylated phenols (C4-C9)	2273	-	-	1	I	X							1	0	(1)	1	1				1
Alkyl (C12-C15) benzene/indane/indene mixture	1872	0	5	0	0	X	0	4	4	NR	0	NI	0	0	0	0	2		NI	FE	2
Alkyl benzenes, C9-C17 (straight or branched)	1783	0	1	-	-	-	0	4	4	NR	1	NI	0	(0)	NI	NI	NI		NI	F	1
Alkyl dithio thiadiazole (C6-C24) (LOA)	1981	0	1	0	0	X	5	NI	5	NR	1	NI	0	0	(0)	0	0		NI	NI	0
Alkyl(C4-C20) ester copolymer (LOA)	1986	0	0	0	II	XX	NI	0	0	NR	0	NI	0	0	(0)	0	0		0	Fp	2
Alkyl (C7-C9) nitrates	8	Z	3	0	II	XX	4	NI	3	NR	3	NI	0	0	NI	3	(3)	S	NI	F	3
Alkyl(C8-C40)phenol sulphide (LOA)	1985	0	0	0	0	XX	0	NI	0	NR	0	NI	0	0	(0)	1	1		0	FD	1
Alkyl(C8-C9)phenylamine, in aromatic solvent (LOA)	2096	T	3	2	II	XX	2	NI	2	NR	3	NI	(0)	(0)	(1)	2	2		(T)	S	2
Alkyl[(C8-C10)/(C12-C14)]:(<40%/>60%)polyglucoside mixture solution (max 55% active material)	2134	0	3	1	I	0	3	NI	3	R	3	0	0	0	(2)	2	3		0	D	3
Alkyl[(C8-C10)/(C12-C14)]:(>60%/<40%)polyglucoside mixture solution (max 55% active material)	2135	0	2	1	I	0	3	NI	3	R	2	0	0	0	(1)	2	2		0	D	2
Alkyl(C8-C10)polyglucoside solution (max 65% active material)	2136	0	2	1	I	0	1	NI	1	R	2	0	0	0	(1)	2	2		0	D	2
Alkyl (C8-C10)/(C12-C14):(50%/50%) polyglucoside solution (55% or less)	2133	0	2	1	I	0	3	NI	3	R	2	0	0	0	(2)	2	(3)		0	D	3
Alkyl(C12-C14)polyglucoside solution (max 55% active material)	2137	0	3	1	I	0	3	NI	3	R	3	0	0	0	(2)	2	3		0	D	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Alkylsulphonic acid ester of phenol (MESAMOLL)	1878	0	0	0	0	0	5	NI	5	NR	0	NI	0	(0)	(0)	0	0		0	S	0
Allyl alcohol	28	0	4	2	II	XXX	0	0	0	R	4	NI	2	3	4	2	3	A	NI	D	3
Aluminium chloride/hydrogen chloride solution	336		3				Inorg	NI	2	Inorg	3	1	1	NI	3	(3C)	3		NI	D	3
Aluminium sulphate solution	2205		3				Inorg	Inorg	2	Inorg	3	1	1	(0)	(2)	(2)	(3)		NI	D	3
2-(2-Aminoethoxy) ethanol	75	0	1	0	II	X	0	0	0	NR	1	0	0	1	NI	3	3		NI	D	3
Aminoethylethanolamine	68	0	1	1	I	0	0	0	0	NR	1	0	0	0	0	3B	2	S	NI	D	3
Aminoethylethanolamine/Aminoethyld iethanolamine solution	74	0	1	1	I	0	Inorg	0	0	NR	1	0	1	NI	NI	(3B)	(2)		NI	D	2
N-Aminoethylpiperazine	88	0	1	1	II	XX	0	0	0	NR	1	NI	0	2	NI	3	3	S	NI	D	3
2-Amino-2-(hydroxymethyl)-1,3-propanediol solution(40% or less)	89	0	0	0	0	0	0	NI	0	NI	1	NI	0	0	NI	NI	NI		0	D	NI
Ammonia (anhydrous and aqueous, 28% or less)	91	0	3	1	I	X	0	0	0	R	3	2	1	(2)	3	3	3		NI	DE	3
Ammonium bisulphite solution, greater than 15%	1730	0	1	1	0	0	NI	NI	NI	NI	NI	NI	NI	NI	NI	2	2		0	D	2
Ammonium lignosulphonate (46% solution in water)	2086	0	0	1	0	0							0	(0)	(0)	0	0		0	D	0
Ammonium nitrate solutions	1912	0	1	1	0	0	Inorg	0	0	Inorg	1	NI	0	NI	NI	0	2		NI	D	2
Ammonium polyphosphate solution	1764	0	1	0	0	0	Inorg	0	0	Inorg	1	NI	0	0	0	NI	NI		0	D	NI
Ammonium sulphate	99	0	1	1	0	0	0	0	0	Inorg	1	(0)	0	(0)	(0)	0	0		0	D	0
Ammonium sulphide soln.(45% or less)	310	0	3	2	II	XX	Inorg	0	0	Inorg	3	NI	1	0	(1)	2	2	N	NI	D	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Ammonium thiosulphate solution (60% or less)	312	0	1	1	0	0	Inorg	0	0	Inorg	1	NI	0	NI	NI	(1)	(1)		NI	D	1
Amyl acetate	255	0	2	0	0	X	2	2	2	NR	2	NI	0	(0)	0	1	1	S	NI	FED	2
tert-Amyl methyl ether	2141	0	2	1	I	XX	1	NI	1	NI	4	NI	1	0	(1)	0	1		0	ED	2
Aniline	261	0	3	2	II	XX	0	0	0	R	3	2	2	2	3	1	3	CTS	NT	FD	3
Animal oil	263	0	0	0	I	XX	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	S	0		2
Apple juice	275	0	0	0	0	0	0	NI	0	R	0	0	0	0	0	0	0		NI	D	0
Aryl polyolefin (C11-C50) (LOA)	1979	0	0	-	0	XX	NI	NI	0	NR	0	NI	0	0	0	0	0		0	Fp	2
Barium long chain alkaryl sulphonate (C11-C50) (LOA)	1978	0	3	1	0	XX	4	NI	4	NR	3	NI	2	0	(1)	0	0		0	S	2
Benzene	324	0	2	1	II	XXX	2	1	1	R	2	NI	1	0	0	2	2	CTM	NT	E	3
Benzene sulphonyl chloride	320	0	(1)	1	II	XX	1	1	1	R	(1)	NI	1	NI	NI	3	3		NI	SD	3
1,2,4-Benzene tricarboxylic acid, trioctyl ester	1733	0	0	1	I	X	0	0	0	NR	0	NI	0	(0)	2	1	1		NI	Fp	2
Benzyl chloride	352	0	3	1	II	XXX	NI	1	1	R	3	1	1	NI	3	2	3	CSA	0	S	3
N,N-Bis(2-hydroxyethyl)oleamide (LOA)	2110	Z	3	0	I	XX	5	NI	5	NR	NI	NI	0	0	(1)	2	2		0	F	2
Butanol	381	0	0	1	I	X	0	(0)	0	R	0	NI	0	0	0	2	3		NT	D	3
sec-Butanol	383	0	0	0	0	X	0	(0)	0	R	0	NI	0	0	0	0	2		0	D	2
tert-Butanol	384	0	0	1	0	0	0	0	0	NR	1	NI	0	0	0	1	3		0	D	3
2-Butanone	385	0	0	1	I	X	0	NI	0	R	1	0	0	0	1	2	2		0	DE	2
Butyl acrylate	390	0	3	1	II	XXX	2	NI	2	R	3	NI	1	1	2	1	1	SA	0	FED	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Butyl benzene	1774	T	3	0	I	X	4	NI	4	NI	4	1	0	0	(1)	2	1		Ta	F	2
Butyl benzyl phthalate	398	Z	4	1	0	X	4	4	4	R	4	1	0	0	(0)	(0)	(0)	R	0	S	3
Butylene glycol methyl ether acetate	953	0	1	1	I	X	1	1	1	R	3	NI	0	(0)	(0)	1	1		0	FED	1
Butylene glycol monomethyl ether	952	0	0	1	I	X	0	NI	0	R	(1)	NI	0	0	(0)	0	1		0	D	1
1,2-Butylene oxide	403	0	2	1	I	X	0	NI	0	NR	2	NI	1	1	2	1	1	C	0	DE	3
Butyl methacrylate	409	0	1	0	I	XX	(5)	NI	(5)	(NR)	(3)	NI	0	0	0	1	1	S	0	FE	2
Calcium long chain alkyl (C5-C10) phenate (LOA)	2106	0	2	0	I	XX	0	NI	0	NR	2	NI	0	0	(0)	0	0		0	FD	NI
Calcium long chain alkyl (C11-C40) phenate (LOA)	2097	0	0	0	0	XX	0	NI	0	NR	0	NI	0	0	(1)	1	1		0		1
Calcium long chain alkyl phenate sulphide (C8-C40) (LOA)	1756	0	1	0	I	XXX	0	NI	0	NR	0	NI	0	0	3	NI	NI		0	Fp	2
Calcium nitrate	1803	0	0	1	I	X	Inorg	0	0	Inorg	0	NI	0	NI	NI	1	1		0	D	1
Camphor oil, white	1897	T	(3)	2	0	XX	NI	NI	NI	NI	NI	NI	2	NI	NI	1	NI		Ta	FE	2
Carbolic oil	437	T	3	2	II	XX	3	NI	3	NI	3	NI	2	2	4	3	3		Ta	S	3
Carbon disulphide	439	0	2	3	II	XXX	2	1	1	NR	3	NI	2	NI	4	3A	2	RN	NT	SD	3
Cashew nut shell oil	443	0	0	0	I	XX	0	NI	0	NI	NI	NI	NI	NI	NI	2	(1)	S	0	F	3
Castor oil	442	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	1	1		0	Fp	2
Cetyl/Eicosyl methacrylate (mixture)	445	0	0	0	I	X	0	NI	0	(NR)	(0)	NI							0	Fp	2
Chlorinated paraffins (C10-C13) with 60% chlorine or more	2021	+	4	0	II	XX	5	5	5	NR	5	2	0	0	(0)	1	1	C	0	S	3
Chlorinated paraffins (C14-C17) with less than 1% shorter chain length	2112	0	0	0	0	XX	0		0				0	0	(1)	2	2		0	S	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Chlorohydrins	463	0	(2)	2	II	XX	0	NI	0	R	0	NI	(2)	(2)	(3)	(3A)	3	CS	0	D	3
1-(4-Chlorophenyl)-4,4-dimethyl-3-pentanone	1772	0	3	1	0	XX	3	3	3	NR	3	NI	0	0	(1)	1	0		0	S	1
3-Chloropropylene	478	0	3	2	II	XX	1	1	1	R	3	NI	1	0	2	1	3	T	NI	E	3
p-Chlorotoluene	482	Z	3	1	I	X	3	3	3	NR	3	0	0	0	2	1	1		0	S	2
Citric juices	494	0	0	0	0	0	0	0	0	Inorg	0	0	0	0	0	0	0		0	D	0
Coal tar	499	T	3	-	II	XXX	NI	NI	NI	NR	3	NI	0	0	0	1	NI	C	Ta	SD	3
Coal tar naphtha	500	T	2	1	II	XXX	NI	NI	NI	NR	3	NI	0	0	(1)	1	1	C	Ta	FE	3
Coal tar pitch (molten)	491	0	1	-	II	XXX	NI	NI	NI	NR	NI	NI	0	0	NI	1	0	C	0	S	3
Coconut oil	503	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	1		0	Fp	2
Coconut oil fatty acid	505	0	2	-	-	-	4	0	0	NI	0	NI	NI	NI	NI	NI	NI		0	F/Fp	NI
Coconut oil fatty acid methyl ester	506	0	0	-	-	-	5	0	0	NI	0	NI							0	F	1
Copper salt of long chain(>C17) alkanoic acid (LOA)	2111	0	1	1	I	XX	NI	NI	NI	NI	NI	NI	0	0	(0)	0	0		0	Fp	2
Corn oil	521	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	(0)	(0)	0	1		0	Fp	2
Cotton seed oil	523	0	0	(1)	I	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	1		0	Fp	2
Creosote (coal tar)	524	T	3	1	II	XXX	NI	NI	NI	NR	5	NI	1	0	NI	2	1	C	Ta	S	3
Cycloheptane	535	0	3	(1)	II	X	4	NI	4	NI	3	NI	(0)	(0)	(1)	(0)	(1)		0	FE	2
Cyclohexane	536	0	3	1	II	X	3	3	3	NR	3	NI	0	0	1	0	1	1	0	E	2
Cyclopentane	546	0	3	(1)	I	X	3	NI	3	NR	3	NI	(0)	(0)	(1)	(0)	(1)		0	E	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Decahydronaphthalene	551	0	(1)	1	0	X	4	4	4	NR	3	NI	0	0	2	1	1		0	F	2
Decane	554	0	0	(1)	0	0					0				0				0	F	0
Decyl acetate	1767	0	(3)	0	I	X	4	NI	4	NI	NI	NI	0	0	NI	(1)	(1)		0	F	1
Dextrose solution	562	0	0	0	0	0	0	0	0	R	0	NI	0	0	0	0	(0)		0	D	0
Dialkyldiphenylamines (LOA)	1852	0	1	0	I	XX	5	NI	5	NR	1	NI	0	0	(0)	0	0		0	FD	NI
Diammonium hydrogen phosphate	98	0	2	0	0	0	0	0	0	Inorg	1	NI	0	0	0	(1)	(1)		NI	D	1
2,4-Di-tert-butyl phenol	2083	-	4	-	-	-	5	4	4	NR	4	NI							NI		NI
Dichlorobenzene (all isomers)	333	Z	3	1	I	X	3	4	4	NR	3	1	1	0	1	(2)	2	CMR	0	S	3
1,2-Dichloroethane	591	0	1	2	II	XX	1	1	1	NR	2	0	1	0	2	1	2	C	0	SD	3
Dichloromethane	594	0	1	1	II	XX	1	2	2	NR	1	0	1	NI	0	2	2	CM	0	SD	3
1,3-Dichloropropene	612	0	3	2	II	X	1	NI	1	NR	4	1	2	1	2	3	3	CS	0	SD	3
Diethanolamine	620	0	1	1	II	XX	0	NI	0	R	1	0	1	0	0	1	2	T	0	D	2
Diethylene triamine	638	0	1	1	II	XX	0	1	1	(R)	2	NI	1	3	3	3A	3	S	0	FD	3
Diethyl sulphate	649	0	(2)	1	II	XXX	1	NI	1	(NR)	(2)	NI	1	2	3	2	3	CM	0	SD	3
Diglycidyl ether of Bisphenol A	653	0	3	0	II	XX	3	NI	3	NR	4	NI	0	0	NI	1	2	S	0	S	2
1,4-Dihydro-9,10-dihydroxy anthracene disodium salt (soln.)	657	0	1	0	0	0	1	NI	1	NI	1	NI	0	NI	NI	NI	NI		0	D	NI
Diisobutene	575	0	3	(1)	0	0	4	4	4	NR	3	NI	0	0	0	1	0		0	E	2
Diisobutyl ketone	579	0	2	1	I	X	3	NI	3	R	2	NI	0	0	2	2	2		0	F	2
Diisopropyl benzene (mixed isomers)	2220						5	4	4	NR	4	NI	0	0	(2)	2	1			F	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Diisopropyl ether	711	0	2	0	0	0	1	NI	1	NR	2	NI	0	0	0	1	1		0	E	2
N,N-Dimethyl cyclohexylamine	665	0	2	2	II	XX	2	NI	2	NR	2	NI	1	2	3	3C	3		0	FD	3
Dimethyl disulphide	1616	T	-	-	II	XX	1	NI	1	NR	3	2	2	0	2	1	1		Ta		2
N,N-Dimethyldodecylamine	2126	+	4	2	II	XXX	5	NI	5	R	4	NI	1	(1)	(2)	3	3		0	F	3
Dimethyl formamide	676	0	0	0	II	XX	0	0	0	R	1	0	0	1	2	1	2	R	0	D	3
2,2-Dimethyloctanoic acid	675	0	2	1	II	XX	3	NI	3	R	4	1	0	0	(1)	2	2		0	F	2
2,2-Dimethylpropane-1,3-diol	679	0	(1)	0	0	0	0	0	0	NR	0	0	0	0	0	2	2		0	F	2
Dinitrotoluene	688	0	4	2	II	XXX	2	2	2	NR	4	2	2	(2)	(2)	1	0	CMR	0	S	3
Di-n-octyl phthalate	692	0	0	0	I	XX							0	0	(0)	1	(1)	R	0	Fp	3
1,4-Dioxane	682	0	0	1	II	XXX	0	0	0	NR	0	0	0	0	0	0	2	C	0	D	3
Diphenylol propane-epichlorohydrin resins	2237						3	NI	3	NR	4	NI	0	0	(1)	1	2			S	2
Dipropylene glycol dibenzoate	708	0	-	0	0	0	4	NI	4	R	NI	NI	0	(0)	NI	NI	NI		0		NI
Dithocarbamate ester (C7-C35)	2185	0	4	0	I	XX	NI	2	2	NR	4	NI	0	0	(0)	1	1		0	S	1
Dodecane	718	0	0	(1)	0	0	5	NI	5	NR	0	NI	0	0	(0)	(1)	(0)		0	Fp	2
1-Dodecanol	719	0	3	0	0	X	5	NI	5	R	4	1	0	0	(0)	2	(1)		0	F	2
Dodecene (all isomers)	720	0	(3)	(1)	I	0	5	NI	5	NR	4	NI	0	0	(0)	1	0		0	F	1
Dodecyl hydroxypropyl sulphide (LOA)	1861	+	4	0	0	X	5	NI	5	NI	4	NI	0	0	(0)	0	0		0	FD	NI
Dodecyl/octadecyl methacrylate (mixtures)	2116	0	0	0	I	XX	(5)	NI	(5)	(NR)	(0)	NI							0		NI

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Dodecyl/pentadecyl methacrylate (mixture)	724	0	0	0	0	X	(5)	NI	(5)	(NR)	(0)	NI	0	NI	NI	(2)	(2)		0	Fp	2
Drilling Brines	2238						Inorg	0	0	Inorg	1	0	(0)	(0)	(1)	(1)	(2)			D	
Drilling Brines (containing zinc)	2239						Inorg	4	4	Inorg	3	NI	(1)	(1)	(3)	(3)	(3)			D	3
Epichlorohydrin	731	0	4	2	II	XXX	0	NI	0	R	3	1	2	2	3	3a	3	CS	0		3
EPTC (ISO)	2081	T	2	1	I	XX	3	2	2	NI	3	NI	1	1	2	2	(2)	N	Ta	F	3
Ethoxylated long chain (>C16)alkyloxyalkanamine (LOA)	2103	0	1	1	II	XX	5	NI	5	NR	1	NI	0	0	(2)	3	(3)		0	F	3
Ethoxylated tallowamine	2182	NI	NI	1	1	XX	NI	NI	NI	NI	NI	NI	1	0	NI	1	2		0	SD	2
Ethoxylated tallow amine, glycol mixture	2252	-	-	1	II	XX	4	NI	4	NR	4	NI	1	0	3	1	3				3
Ethyl acrylate	734	T	3	2	I	X	1	NI	1	R	3	1	1	2	2	2	2	SC	Tt	ED	3
Ethylbenzene	740	0	3	1	I	XX	3	2	2	R	3	1	0	0	0	2	2	C	0	FE	3
Ethyl tert-butyl ether	2085	0	2	0	I	X	1	NI	1	NI	2	NI	0	0	2	2	2		0	E	2
Ethyl cyclohexane	751	0	(3)	1	0	0	4	NI	4	NI	3	NI	NI	NI	NI	NI	NI		0	FE	2
Ethylene diamine	758	0	2	2	II	XX	0	1	1	R	3	1	1	2	1	3	3	S	0	D	3
Ethylene dibromide	760	0	3	2	II	XXX	1	2	2	NR	3	NI	2	2	2	3	3	CRT	0	SD	3
Ethylene glycol acrylate	869	0	3	1	II	XX	0	NI	0	R	4	NI	1	3	3	3	3	SM	0	D	3
Ethylene glycol butyl ether acetate	764	0	(2)	1	I	X	1	NI	1	R	2	NI	0	1	(1)	1	1		0	FD	1
Ethylene glycol ethyl ether acetate	767	0	2	1	II	XX	0	NI	0	R	2	0	1	0	1	1	2	R	0	D	3
Ethylene glycol methyl ether acetate	773	0	2	1	II	XXX	0	NI	0	R	2	NI	1	0	NI	NI	1	R	0	D	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Ethylene glycol monoethyl ether	766	0	0	1	II	XX	0	NI	0	R	0	0	0	0	1	2	2	R	0		3
Ethylene-propylene copolymer	1508	-	-	-	-	-	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI		NI	NI	NI
2-Ethylhexanoic acid	776	0	1	1	I	0	2	NI	2	R	2	NI	0	0	(1)	2	2	R	0	FD	3
2-Ethylhexyl acrylate	782	0	(3)	0	I	X	3	NI	3	R	2	NI	0	0	(1)	2	2	S	0	F	3
2-Ethyl-2-(hydroxymethyl)propane-1,3-diol C8-C10 ester (LOA)	2054	0	0	0	0	XX	0	NI	0	R	0	NI	0	(0)	(0)	0	(0)		0	Fp	2
Ethyl methacrylate	785	0	(1)	1	I	XX	1	NI	1	R	2	NI	0	0	0	(2)	(2)	S	0	FE	2
Fatty acids, essentially linear, C6-C18, 2-ethylhexyl ester	2253	0	1	0	0	XX	0	NI	0	R	1	NI	0	0	(0)	1	0			Fp	2
Fatty acids, saturated, linear, C12+	2258						NI	NI	NI	NI	NI	NI	0	(0)	(0)	(1)	(1)			F	
Fish oil	801	0	0	0	I	XX	0	NI	0	R	(2)	NI	0	0	0	0	(0)		0	Fp	2
Fluorosilicic acid (20-30%) in water solution	2240						Inorg	NI	Inorg	Inorg	NI	NI	(1)	(1)	4	3	3			D	3
Formaldehyde (37%-50% solution)	807	0	2	2	II	XX	0	NI	0	R	2	NI	2	2	3	3	3	CSM	NT	D	3
Furfural	812	0	2	2	II	XX	0	NI	0	R	2	NI	2	(2)	3	2	2	C	0	D	3
Glycerol monooleate	1898	0	(1)	0	0	XX	0	0	0	R	0	NI	0	0	(0)	1	1		0	F	1
Glycerol, propoxylated and ethoxylated	2276	0	(3)	0	0	0	NI	0	0	NR	(3)	0	0	0	0	0	0				
Glycerol, propoxylated, mwt <1000	2282	(+)	-	1	I	X	(4)	NI	(4)	(NR)	NI	NI	1	0	(1)	1	(1)				
Glycerol, propoxylated, mwt >1000	2275	(0)	(1)	1	I	X	NI	(0)	(0)	(NR)	(1)	NI	1	0	(1)	1	(1)				
Glyoxal solutions (40% or less)	84	0	1	1	I	X	0	NI	0	R	1	NI	0	0	2	2	3	MS	0	D	3
Glyoxylic acid	1535	0	1	2	II	X	0	NI	0	R	2	0	0	0	NI	0	3	S	0	D	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Glyphosate solution, without surfactant	1765	0	1	1	I	X	0	0	0	NR	3	0	0	0	(1)	0	3		0	D	3
Groundnut oil	820	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	0		0	Fp	2
HEAVY OXO FRACTION	2266						5	2	(2)	NR	1	NI	0	0	(0)	1	2				
Heptane	827	0	3	0	0	0	3	NI	3	R	3	NI	0	0	0	(1)	(1)	A	0	E	2
Heptanoic acid	831	0	1	0	I	X	2	NI	2	R	NI	NI	0	(0)	NI	2	(3)		0	FD	3
Heptanol (all isomers)	2223						2	NI	2	R	3	NI	(0)	(0)	(0)	(1)	(2)			F	2
Hexadecyl naphthalene/dihexadecyl naphthalene mixture	2159	0	0	0	0	0	0	NI	0	NR	0	NI	0	0	(0)	1	1		0	Fp	2
Hexamethylene diisocyanate	2142	0	2	1	II	XXX	3	0	0	NR	2	NI	1	2	4	3	3	S	0	S	3
Hexamethylene tetramine (40% solution)	849	0	0	1	II	XX	0	NI	0	R	0	NI	0	0	(0)	0	1	S	0	D	2
Hexane	850	0	3	0	II	X	3	NI	3	NI	3	NI	0	0	0	2	2	NA	0	E	2
Hexanoic acid	853	0	1	1	I	X	2	NI	2	R	2	NI	0	0	(2)	1	3		0	FD	3
Hexyl acetate	857	0	3	0	0	0	2	NI	2	NI	3	NI	0	0	(0)	1	1		0	FE	2
Hydrocarbon waxes	2278												0	0	2	1	1				2
Isobutyl methacrylate	408	0	1	0	I	XX	2	NI	2	NR	1	NI							0		NI
Isobutyric acid	419	0	1	2	II	XX	0	NI	0	R	2								NT		NI
Isodecanol	557	T	3	0	II	X	3	NI	3	R	3	NI	0	0	0	2	1		Ta	Fp	2
Isononanol	1059	T	3	1	II	XX	3	NI	3	NR	3	1	(0)	(0)	(0)	(2)	(2)		Ta	Fp	2
Isooctaldehyde	1071	T	3	1	I	X	2	NI	2	NI	3	NI	0	0	(0)	1	1		Ta	NI	1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Isophorone	879	0	2	1	II	XX	1	1	1	R	2	0	1	1	(1)	1	2		0	FD	2
Isophorone diamine	880	0	1	1	II	XXX	0	0	0	NR	2	0	1	(1)	(2)	3	3	S	0	D	3
Isophorone diisocyanate	881	-	3	1	II	XXX	1	NI	1	NR	4	NI	0	0	4	3	3	SA	NI	S	3
Isoprene	882	0	2	0	I	0	2	2	2	NR	2	NI	0	0	0	1	2	CM	0	E	3
Isopropyl acetate	1192	0	(1)	1	I	X	1	NI	1	R	1	NI	0	0	0	1	2		0	ED	2
Isopropyl cyclohexane	1199	0	(3)	0	0	0	4	NI	4	(NR)	(3)	NI	NI	NI	NI	NI	NI		0	FE	2
Isovaleraldehyde	1390	T	2	1	II	XX	1	NI	1	R	3	NI	0	0	0	2	2		Ta	D	2
Lard	888	0	0	0	0	X	0	NI	0	R	0	NI	0	0	(0)	0	1		0	F	1
Lauryl methacrylate	893	0	0	0	I	X	5	NI	5	NR	0	NI	0	NI	NI	2	2		0	F	2
Lecithin (soybeans)	2146	0	0	0	0	0	0	NI	0	R	NI	NI	(0)	(0)	(0)	0	(0)		0	SD	0
Linseed oil	905	0	0	0	I	XX	0	NI	0	R	(2)	NI	0	0	0	0	(1)		0	Fp	2
Lubrizol polyolefin anhydride	1865	0	0	0	0	XX	0	NI	0	NR	1	NI	0	0	(0)	1	2		0	Fp	2
Maleic anhydride	921	0	1	2	II	XX	1	NI	1	R	2	0	1	2	(2)	3	3	S	0	D	3
MCP 121 (polycarboxylic ester)	2000	0	0	0	I	X	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI		0	Fp	2
2-Mercaptobenzothiazol	925	0	3	2	II	XX	2	1	1	NR	4	2	0	0	(0)	0	0	S	0	S	2
Metam-sodium (ISO)	202	0	4	2	II	XX	0	NI	0	NR	5	NI	1	2	(2)	2	1	S	0	D	2
Methacrylic acid, inhibited	948	0	(1)	1	II	XX	0	NI	0	R	2	0	1	2	2	3	3		0	D	3
Methacrylic resin in 1,2 Dichloroethane soln.	2046						1	1	1	NR	2	0							?	SD	2
Methacrylonitrile	949	0	1	2	I	X	0	NI	0	R	2	0	3	2	4	1	1	S	NT	ED	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Methanol	951	0	0	3	II	XX	0	NI	0	R	0	0	3	(3)	(3)	2	2	T	0	DE	2
Methyl acrylate	955	0	3	2	II	XXX	0	NI	0	R	3	NI	2	1	2	2	2	MS	0	D	3
Methyl amyl ketone	959	T	2	1	I	X	1	NI	1	NI	1	NI	1	0	0	1	1		Ta	FED	2
2-Methyl-2-butanol	964	0	0	1	0	0	1	1	1	R	1	0	1	1	1	3	2		0	D	3
3-Methyl-1-butanol	965	0	1	1	0	0	1	1	1	R	1	0	1	0	(1)	2	2		NI	FED	2
Methyl tert-butyl ether	969	0	1	1	I	XX	1	NI	1	NR	1	0	0	0	0	2	1		NI	ED	2
Methyl butyl ketone	970	0	1	1	II	XXX	1	NI	1	R	1	0	0	0	0	1	1	RN	0	FED	3
Methylbutynol	968	0	1	1	I	0	0	NI	0	NR	1	NI	1	1	3	0	2		0	D	2
Methyl methacrylate	995	0	1	1	II	XXX	1	NI	1	R	2	NI	0	0	0	2	2	S	0	ED	2
2-Methyl pentane	1000	0	3	(0)	0	0	3	NI	3	NI	3	NI							0	E	0
alpha-Methylstyrene	1010	T	3	1	0	X	3	3	3	NR	3	NI	0	0	0	2	1	M	Ta	FE	3
3-(Methylthio) propionaldehyde	993	T	2	2	II	XXX	0	NI	0	NR	3	1	1	1	2	2	3	NS	Ta	D	3
Metolachlor (ISO)	113	0	3	1	I	X	2	2	2	NR	5	1	1	0	(0)	1	0	S	0	S	2
Mobil syndril E51	2221	0	1	0	0	XX	0	NI	0	R	1	NI	0	(0)	(0)	1	0			F	1
Mononitrobenzene	1017	(T)	2	2	II	XXX	1	1	1	R	3	(4)	(2)	2	2	1	1	CRT	Ta	SD	3
Morpholine	1018	0	2	1	I	0	0	0	0	R	2	NI	1	2	2	3	3		0	D	3
Naphthenic acids	1021	(T)	3	1	0	X	NI	NI	NI	NI	3	NI	1	NI	NI	NI	NI		Ta	FD	1
Nitroethane (80%)/Nitropropane (20%)	2245						0	1	1	NR	2	NI	1	1	2	0	1				2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Nitroethane, 1-Nitropropane (each 15% or more) mixture	2270												1	1	2	0	1				2
Nonane	1054	0	3	(0)	0	0	4	NI	4	R	3	NI	0	0	1	(0)	(0)	A			2
Nonyl methacrylate monomer	1061	0	0	-	-	-	5	NI	5	R	3	NI	NI	NI	NI	NI	NI		0	F	1
Nonyl phenol	1062	Z	4	1	II	XX	5	4	4	NR	5	3	1	0	(1)	3	3		0	FD	3
Octane	1072	0	3	(1)	0	0	5	NI	5	(R)	4	NI	(0)	(0)	0	0	0	A	0	FE	2
1-Octanol	1075	T	2	1	0	X	3	NI	3	NI	2	0	0	0	(0)	2	2		Ta	Fp	2
Olefin mixtures (C5-C7)	2243												0	0	1	2	0		1		2
Olefins C13 and above, all isomers	2028	0	0	0	0	0	5	NI	5	NR	0	NI	0	0	(0)	0	0		0	F	1
alpha-Olefins (C6-C18),mixture	2030	0	3	0	0	0							(0)	(0)	(1)	(2)	(0)		0	FE	2
Olive oil	1090	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	1		0	Fp	2
Palm nut oil	1094	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(0)	(0)	(1)		0	F	2
Palm nut oil fatty acid	1095	0	2	-	-	-													0	F	1
Palm oil	2249						0	NI	0	R	0	NI	0	(0)	(0)	(0)	0			F	0
Palm oil fatty acid methyl ester	1097	0	0	0	0	XX													0	NI	NI
Palm olein	2250						0	NI	0	R	0	NI	0	(0)	(0)	(0)	0			F/Fp	0
Palm stearin	2251						0	NI	0	R	0	NI	0	(0)	(0)	(0)	0			F	1
Pentachloroethane	1099	Z	3	2	0	X	3	2	2	NI	3	1	1	(1)	1	(1)	(1)	CT	0	S	3
Pentaethylene hexamine	1103	0	(1)	1	II	XX	0	NI	0	NI	NI	NI	1	NI	NI	3	NI	S	0	D	3
Pentane	1105	0	3	0	0	0	3	NI	3	R	3	NI	1	0	0	0	NI		0	E	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
1,5-Pentanedial solution, (5-50%)	1107	0	1	2	II	XX	0	NI	0	R	3	0	1	0	4	3	3	S	0	D	3
Pentanoic acid (64%)/2-methyl butyric acid (36%) mixture	2144	0	1	1	II	XXX	1	NI	1	NI	2	NI	1	2	(2)	3	3		0	FD	3
1-Pentanol	1110	0	1/BOD	2	II	X	1	1	1	R	1	0	0	0	(2)	2	3		NI	FED	3
2-Pentanol	1111	0	1	1	0	0	1	1	1	R	1	0	0	(0)	(1)	2	2		NI	D	2
Petrolatum	2244						0	NI	0	NR	0	NI	0	0	2	1	1			F	2
Petroleum wax	1122	0	0	0	0	X	0	NI	0	NR	0	NI	0	0	(0)	0	0		0	F	1
Phenol	1124	0	2	2	II	XX	1	2	2	R	3	0	2	2	(4)	3	3		NT	S	3
Phosphate esters, alkyl(C12-C14)amine (LOA)	1854	0	3	0	0	XX	NI	NI	NI	NI	3	NI	0	(0)	(1)	1	2		0		2
Phthalic anhydride (molten)	1146	0	2	1	II	XX	1	NI	1	R	2	0	1	0	(2)	1	3	S	0	S	3
Pine oil	1148	0	2	1	I	X	4	NI	4	NR	4	NI	0	0	(0)	(1)	(1)	S	0	NI	2
Poly(C18-C22)alkyl acrylate in xylene	1151	0	2	1	I	X	(3)	NI	(3)	NR	2	NI	0	0	(0)	2	1		0	F	2
Poly(2-8)alkylene glycol monoalkyl (C1-C6) ether acetate	2254						NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI			NI	NI
Polyalkylene oxide polyol	1441	0	2	0	0	0	NI	NI	NI	NI	NI	NI	0	0	(0)	(1)	(1)		0	Fp	2
Poly alkyl methacrylate (C1-C20) (LOA)	1984	-	-	-	-	-	(5)	NI	(5)	NR	0	NI							NI	Fp	2
Polyether (molecular weight 2000+) (LOA)	1975	0	1	-	-	-	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)		0	Fp	2
Polyethylene amines	1991	0	(2)	1	0	0	NI	NI	NI	NI	NI	NI	0	0	0	0	0		0	D	0
Polyisobutenamine in aliphatic (C10-C14) solvent	2192	0	2	1	-	XX	0	0	0	NR	2	NI	0	(0)	(1)	2	1		0	FED	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Polyisobutenyl anhydride adduct	2127	0	0	0	I	X	0	NI	0	NR	0	NI	0	0	(0)	0	1		0	FD	1
Poly(4+)isobutylene	2264						0	NI	0	NR	0	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Polyolefin acid, potassium salt	1895	0	0	1	I	X	NI	NI	NI	NR	0	NI	0	0	(0)	0	0		0		0
Polyolefinamide alkene(C16+)amine (LOA)	2104	0	0	1	I	XX	5	NI	5	NR	0	NI	0	0	(0)	1	(1)		0	Fp	2
Polyolefin amide alkeneamine (C28+) (LOA)	1971	0	0	0	0	XXX	0	NI	0	NR	0	NI	0	0	(0)	1	(1)		0		1
Polyolefin amide alkeneamine/molybden oxysulphide mi	2256						NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI			Fp	2
Polyolefinamine (C28-C250) (LOA)	2107	0	2	0	I	XX	0	NI	0	NR	2	NI	0	(0)	(1)	2	(1)		0	Fp	2
Polyolefin (molecular weight 300+) (LOA)	1968	0	0	0	0	0	NI	NI	NI	NI	0	NI	0	0	0	0	0		0	Fp	2
Polypropylene glycol	1159	0	1	0	0	0	(1)	NI	(1)	(R)	1	NI	0	0	(0)	1	1		0	D	1
Potassium formate solution (75% or more)	2121	0	0	0	I	X	0	NI	0	R	0	NI	0	(0)	(1)	2	2		0	D	2
Potassium thiosulphate solution (50% or less)	2152	0	2	0	I	X	Inorg	0	0	Inorg	2	NI	0	0	(1)	2	(2)		0	D	2
beta-Propiolactone	1184	0	1	2	II	XXX	0	NI	0	R	(2)	NI	2	(2)	4	3B	3	CM	0	D	3
Propylene carbonate	2056	0	0	0	I	0	0	NI	0	R	0	NI	0	0	(2)	2	3		0	D	3
Propylene glycol monoalkyl ether	1958						0	NI	0	NR	0	NI	0	1	0	2	3		?	D	3
Propylene glycol phenyl ether	2057	0	1	1	I	X	1	NI	1	NI	1	NI	0	0	(0)	(1)	(1)		0	SD	1
Propylene oxide	76	0	2	1	II	XX	0	NI	0	R	2	NI	1	1	2	2	3	CMR	0	DE	3
Propylene oxide/Ethylene oxide mixture	78	0	2	2	II	XX	0	NI	0	R	1	NI	1	1	3	3	3	CMR	3	DE	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Propylene tetramer	2255						4	NI	4	NR	(4)	NI	(0)	(0)	(0)	(1)	(0)			F	1
Pyridine bases	2131	0	2	2	II	xxx	1	NI	1	R	2	NI	2	1	(2)	3B	3		0	FED	3
Pyrolysis gasoline	2271	+	4	-	-	-	(4)	(3)	(4)	(NR)	(4)	(1)	NI	NI	NI	NI	NI				2
Rape seed oil	1217	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	NI	NI		0	Fp	2
Rosin	1219	0	3	0	II	XX	3	NI	3	NR	3	NI	0	0	2	(1)	1	S	0	S	2
Saturated and unsaturated alkyl (C10-C20) phosphite (LOA)	2108	0	2	0	0	XX	0	NI	0	R	1	NI	0	0	(1)	0	0		0	Fp	2
Silica slurry	1514	-	-	-	-	-	Inorg	0	0	Inorg	0	0	(0)	(0)	NI	(0)	(0)		NI		NI
Sodium borohydride/sodium hydroxide mixture (soln.)	1239	0	1	2	II	X	Inorg	0	0	Inorg	2	NI	(2)	(1)	(4)	(3)	(3)		0	D	3
Sodium dichromate solution	487	0	2	2	II	XX	Inorg	0	0	Inorg	2	1	2	2	4	2	3	CMS	0	D	3
Sodium hydrogen sulphide (6% or less)/sodium carbonate (3% or less)	2262						Inorg	NI	Inorg	Inorg	1	NI	0	0	0	0	1				1
Sodium hydrogen sulphide,solutions	1252	0	3	2	II	XX	Inorg	0	0	Inorg	1	NI	1	1	1	2	2		0	D	2
Sodium silicate (solution)	1262	0	2	1	II	X	Inorg	0	0	Inorg	2	NI	1	0	(2)	3	3		0	D	3
Soya bean oil	1267	0	0	0	0	XX	0	NI	0	R	0	NI	0	0	(0)	(0)	1		0	Fp	2
Styrene (monomer)	1273	T	3	2	II	XXX	3	NI	3	R	3	NI	1	NI	2	2	2	C	Tt	FE	3
Sulfurized fat(C14-C20) (LOA)	1853	0	1	0	0	XX	0	NI	0	NR	1	NI	0	(0)	(0)	(0)	(1)		0	FD	1
Sulfurized polyolefinamide alkene(C28-C250)amine (LOA)	1855	0	0	0	0	XX	NI	NI	NI	NR	0	NI	0	(0)	(0)	0	0		0	FD	NI
Sulphonated polyacrylate solution	1760	0	1	0	0	0	NI	0	0	NI	0	NI	(0)	(0)	(0)	(0)	(0)		0		NI
Sunflower oil	1283	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	(0)	(1)		0	Fp	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
sym-Dichlorodiethyl ether	588	T	2	2	I	XX	1	1	1	NR	1	0	2	3	4	1	3	M	Tt	SD	3
Tall oil, crude and distilled	1285	0	3	0	I	XX	0	NI	0	R	3	NI	0	NI	NI	1	1		0	Fp	2
Tall oil, distilled	2283						0	NI	0	R	0	NI									
Tall oil fatty acid, barium salt	1864	0	3	1	I	XX							(1)	(0)	(1)	1	2		0	S	2
Tall oil soap (disproportionated solution)	1286	0	3	1	0	X	NI	NI	NI	NI	NI	NI	(1)	(0)	(1)	1	2		0	D	2
Tallow	1288	0	0/BOD	0	0	XX	0	NI	0	R	0	NI	0	0	(0)	(0)	(0)		0	F	1
Tallow fatty acid	1289	0	(0)	0	0	XX							0	0	(0)	(0)	(0)		0	Fp	2
1,1,2,2-Tetrachloroethane	53	Z	2	2	II	X	2	2	2	NR	3	0	2	0	2	2	2	MN	0	SD	3
1,1,2,2-Tetrachloroethylene	1295	Z	2	0	0	X	3	2	2	NR	(3)	2	0	0	0	2	1	C	0	S	3
Tetrachloromethane	1296	Z	2	1	II	XX	2	2	2	NR	3	0	0	0	0	1	1	CT	0	S	3
Tetraethylene glycol	1301	0	(0)	0	0	0	0	NI	0	NR	0	NI	0	0	0	1	1		0	D	1
Tetraethylene pentamine	1302	0	1	1	I	X	0	NI	0	NR	3	NI	0	2	(3)	3	3	S	0	D	3
Tetraethyl lead	1303	+	4	3	II	XXX	4	5	5	NR	5	NI	3	2	4	2	2	NR	0	S	3
Tetrahydronaphthalene	1305	0	2	1	I	X	3	3	3	NR	3	NI	0	0	(1)	2	0		0	F	2
1,2,3,4-Tetramethylbenzene	1307	T	3	0	0	0	4	NI	4	NI	4	NI	0	(0)	(0)	1	(1)		Ta	F	1
Titanium dioxide (64 - 77% solution in water)	2080	0	0	0	0	0	Inorg	1	1	Inorg	1	NI	0	0	0	1	1		0		1
Toluene	330	0	2	1	II	XXX	2	2	2	R	3	0	0	0	0	2	2	ANR	NT	E	3
Toluene diisocyanate	1315	0	2	0	II	XXX	(3)	1	1	NR	2	NI	0	(0)	4	3	3	SCL	0	S	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Toluidines	1316	0	2	2	II	XX	1	1	1	R	4	2	1	0	(2)	2	2	CM	0	FD	3
2,4-Tolylenediamine	1317	0	2	2	II	XX	0	2	2	NR	3	0	2	2	4	1	2	CMS	0	F	3
Tributyl phosphate	1319	0	3	1	II	XX	4	2	2	R	3	0	1	0	2	2	2	S	0	F	3
1,2,3-Trichlorobenzene	2191	+	4	1	I	X	4	4	4	NR	4	2	1	0	(1)	2	2		0	S	2
1,2,4-Trichlorobenzene	1323	Z	3	1	I	X	4	5	5	NR	4	1	1	0	(1)	2	2	M	0	S	3
1,1,1-Trichloroethane	1326	0	2	1	0	0	2	NI	2	R	2	NI	0	0	0	2	2		0	SD	2
1,1,2-Trichloroethane	1327	0	2	1	0	0	2	1	1	NR	2	0	1	0	1	2	1		0	SD	2
1,1,2-Trichloro-ethylene	329	0	2	1	II	XX	2	2	2	NR	3	NI	0	0	0	2	2	CM	0	SD	3
Trichloromethane	1328	0	2	2	II	XX	1	1	1	NR	2	0	2	0	2	1	1	CT	0	SD	3
1,2,3-Trichloropropane	1329	0	(2)	2	II	X	2	2	2	NR	2	0	2	2	3	2	2	C	0	SD	3
1,1,2-Trichloro-1,2,2-trifluoroethane	1330	0	2	0	I	X	3	2	2	NR	3	0	0	0	0	1	1		0	S	1
Tricresyl phosphate (less than 1% ortho-isomers)	1331	+	3	1	II	XX							0	1	0	1	1		0	S	1
Tricresyl phosphate (more than 1% ortho-isomers)	1332	+	4	1	II	XXX	3	3	3	R	4	4	0	1	0	1	1	N	0	S	2
Tridecane	1333	0	0	-	-	-	0	NI	0	NI	0	NI	0	0	(0)	1	0		0	Fp	2
Tridecanoic acid	1334	0	3	(1)	0	X	5	NI	5	R	3	NI	NI	NI	NI	NI	NI		0	F	NI
Tridecyl acetate	1768	0	0	0	I	X	5	NI	5	NI	0	NI	0	(0)	(1)	2	2		0	F	2
Triethanolamine	1338	0	1	0	I	0	0	0	0	R	1	NI	0	0	(1)	1	2		0	D	2
Triethylamine	1339	0	2	3	II	XXX	1	0	0	R	3	0	1	2	2	2	3	A	0	D	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
1,3,5-Triethylbenzene	1340	T	4	0	0	0	5	NI	5	NI	4	NI	0	NI	NI	NI	NI		Tt	F	1
Triethylene glycol	1341	0	0	0	0	0	0	NI	0	R	0	0	0	0	(0)	1	1		0	D	1
Triethylenetetramine	1346	0	1	1	II	XXX	0	NI	0	NR	3	NI	0	2	(2)	3	3	S	0	D	3
Triethyl phosphate	1348	0	1	1	II	XX	0	0	0	NR	1	0	1	0	0	(2)	(2)		0	D	2
Triethyl phosphite	1349	0	(3)	1	I	X	0	NI	0	R	1	NI	1	0	2	1	2	S	0	FE	2
Triisopropanolamine	1370	0	0	1	II	X	0	0	0	NR	1	0	1	0	0	(2)	3		0	FD	3
Triisopropylated phenyl phosphates	1375	+	3	0	I	X	5	5	5	R	4	NI	0	0	0	0	0		0	S	0
Trimethylacetic acid	1350	0	1	1	I	X	1	1	1	R	2	NI	1	1	(2)	2	2		0	F	2
Trimethylamine	1353	0	2	2	II	XXX	0	NI	0	R	1	NI	1	0	2	3	3	A	0	DE	3
1,2,3-Trimethyl benzene	1354	T	3	0	I	X	3	3	3	NR	4	0	0	0	1	2	1		Ta	FE	2
2,4,4-Trimethyl hexamethylene diamine	1359	0	(1)	(1)	I	XX	1	NI	1	NI	NI	NI	1	0	(2)	2	3	S	0	D	3
Trimethyl hexamethylene diisocyanate	1360	0	3	-	I	X	0	NI	0	NI	3	NI	0	NI	NI	NI	NI	S	0	NI	2
Trimethylol propane polyethoxylate	1362	0	1	0	0	0	NI	NI	NI	NR	1	NI	0	0	NI	NI	NI		0	NI	NI
Trimethylol propane, propoxylated	2274						Ni	Ni	Ni	(NR)	1	NI	0	0	(0)	0	1				
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	1845	0	0	1	I	X	4	NI	4	NI	0	NI	0	0	(0)	1	0		0	F	1
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate	1364	0	2	1	0	0	3	NI	3	NI	2	NI	0	0	(0)	1	1		0	Fp	2
Trimethyl phosphite	1365	0	-	1	0	0	0	NI	0	R	NI	NI	NI	NI	NI	NI	NI		0	S	NI
1,3,5-Trioxane	1844	0	0	0	II	XX	0	NI	0	NI	0	NI	0	0	0	0	1	R	0	SD	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Tripropylene glycol	1372	0	0	0	0	0	0	0	0	NR	0	NI	0	0	(0)	0	0		0	D	0
Trixylenyl phosphate	1377	+	3	(1)	II	XXX	5	4	4	NR	4	1	(0)	(1)	(0)	(1)	(1)		0	S	1
Tung oil	1378	0	0	0	0	XX			NI	NI	(2)	NI	(0)	(0)	(0)	(0)	(1)		0	F	2
Turpentine (wood)	1379	T	2	1	II	XX	4	NI	4	NI	4	NI	0	(0)	1	(2)	2	AS	Ta	D	2
Undecanoic acid	1381	0	3	(1)	I	XX	4	NI	4	R	3	NI	(0)	(0)	(1)	1	(2)		0	F	2
1-Undecanol	1382	T	3	1	I	X	4	NI	4	R	4	NI	0	0	(0)	2	(1)		Ta	Fp	2
1-Undecene	1383	0	3	(1)	0	0	5	NI	5	NR	4	NI	NI	NI	NI	NI	NI		0	F	1
Urea/Ammonium mono and dihydrogen phosphate/ Potassium chloride solution	1386	0	1	0	0	0	0	0	0	R	3	2	NI	NI	NI	NI	NI		0	NI	NI
Urea-ammonium nitrate solutions	1387	0	1	1	0	0	0	0	0	R	3	2	(0)	(0)	(2)	(2)	(2)		0	D	2
Urea-ammonium phosphate solutions	2179	0	1	0	0	0	0	0	0	R	3	2	(0)	(0)	(2)	(2)	(2)		0	NI	2
Urea-formaldehyde resin solution	1388	0	0	1	0	0	NI	NI	NI	NI	1	NI	1	1	NI	NI	NI	S	0	NI	2
Urea, solution containing aqueous ammonia	1385	0	2	1	I	X	0	0	0	R	3	2	0	0	(2)	1	2		NI	D	2
Vegetable oil N.O.S.	1397	0	0	(1)	I	XX	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI		0	F/Fp	NI
Vegetable protein solution,hydrolyzed	1398	0	0	0	0	0	0	NI	0	NI	0	NI	(0)	(0)	(0)	(0)	(0)		0		NI
Vinyl acetate	1400	0	2	1	0	0	0	NI	0	R	2	NI	1	0	2	1	1	C	0	ED	3
Vinyl ethyl ether	1405	0	2	0	0	XX	1	NI	1	NR	1	NI	0	0	0	1	1		0	E	2
Vinylidene chloride	1406	0	1	2	II	XX	2	1	1	NR	2	NI	2	0	(2)	2	2	M	0	SD	3
Vinyl neodecanoate	1404	0	3	0	II	X	5	NI	5	NR	3	NI	0	0	(1)	3	3		0	F	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Vinyl toluenes	1409	T	3	1	I	X	3	3	3	NR	3	NI	0	0	0	2	1	N	Ta	F	3
White spirit, low (15-20%)aromatic	1411	Z	3	1	II	X							(0)	(0)	(1)	(1)	(2)	A	0	F	3
Xylene (mixed isomers)	1408	0	3	1	II	XX	3	2	3	NR	3	0	0	0	0	2	2		NT	FE	2
Xylenes/Ethyl benzene (10% or more) mixture	2269						3	2	2	NR	3	1	(0)	(0)	(0)	(2)	(2)				2
Xylenols (mixtures)	1422	T	2	2	II	XX	2	NI	2	R	3	NI	1	2	(3)	3	3		Ta	F	3
Zinc alkaryl dithiophosphate (C7-C16) (LOA)	1977	+	(2)	1	II	XX	0	NI	0	NR	3	NI	0	0	(0)	(0)	(0)		0	Fp	2
Zinc alkenylcarboxamide (LOA)	2053	0	0	0	0	XX	NI	0	0	NR	0	NI	0	0	(0)	1	(1)		0	Fp	2
Zinc alkyl dithiophosphate	1428	0	3	1	II	XX	5	NI	5	NR	3	NI	0	0	0	2	2		0	S	2