

INTERNATIONAL MARITIME ORGANIZATION
4 ALBERT EMBANKMENT
LONDON SE1 7SR

Telephone: 020 7735 7611
Fax: 020 7587 3210



IMO

E

Ref: T5/2.01

BLG/Circ.14
29 April 2004

HAZARD EVALUATION OF SUBSTANCES TRANSPORTED BY SHIPS

Report of the fortieth session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships

The report of the fortieth session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships (EHS 40/9) is attached for information.

Any comments would be welcome and should be addressed to:

IMO Technical Secretary of the GESAMP/EHS Working Group
Marine Environment Division
4 Albert Embankment
London SE1 7SR
United Kingdom



WORKING GROUP ON THE
EVALUATION OF THE HAZARDS OF
HARMFUL SUBSTANCES CARRIED BY
SHIPS

40th session
Agenda item 9

EHS 40/9
29 April 2004
ENGLISH ONLY

REPORT OF THE FORTIETH SESSION

1 INTRODUCTION

1.1 The fortieth 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 19 to 23 April 2004 under the chairmanship 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 also noted that, at the fifty-first session of Marine Environment Protection Committee (MEPC), the Secretary-General had paid tribute to the work done by the GESAMP/EHS Working Group when he acknowledged, with appreciation, the immense amount of effort that had been put by the GESAMP/EHS Working Group into the evaluation of products subject to the IBC Code. The task, having nearly been completed, allowed the ESPH Working Group of the BLG Sub-Committee to develop meaningful criteria for defining the Pollution Categories and Ship Types associated with the carriage of these cargoes, using the revised GESAMP Hazard Profiles as a basis.

1.3 The Group were informed that IMO's MEPC, at its forty-ninth and fifty-first sessions, had considered the possible future work of the GESAMP/EHS Working Group having first requested the Evaluation of Safety and Pollution Hazards Working Group (ESPH) and the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers (DSC) for their advice. As a result, the Committee had:

- .1 agreed that the hazard evaluations, developed by the Group, should be reported directly to IMO bodies at the same time as GESAMP;
- .2 agreed that consolidation of the re-evaluation of the 800 substances in the IBC Code should continue to be given priority and was anticipated as requiring a further three meetings of GESAMP/EHS to achieve this;
- .3 recognized that the workload of both EHS and ESPH might reduce considerably once the reassignment of Pollution Categories and Ship Types as a result of the revision of Annex II to MARPOL 73/78 had been completed, but that the Group still required further meetings to complete its current task of evaluating those products subject to the IBC Code;

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

- .4 agreed, in principle, that only the Secretariat should attend the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) meetings when relevant topics of interest are to be addressed and that, where possible, guidance from the Committee on specific issues should be requested (see also paragraphs 8.10 to 8.13);
- .5 agreed that, at present, it would not be appropriate to request the GESAMP/EHS Working Group to evaluate all of the appropriate properties of products subject to the IBC Code in order to allow ESPH to translate them into Carriage Requirements. In reaching this decision, the Committee agreed that it was more appropriate for EHS to continue evaluating the health and marine environmental protection aspects whilst allowing ESPH to address other safety related aspects such as flammability and water reactivity;
- .6 agreed that it would not be appropriate to ask EHS to consider occupational health issues, related to chemical hazards as part of the evaluation of chemicals; and
- .7 agreed that, at that time, there was no role for GESAMP/EHS to act as an advisory body when disagreements arose under the Self-Classification system. In this context, it was also noted that there had been general agreement between DSC and BLG, in that there was no role for GESAMP/EHS other than the one it is presently performing at that time.

2 EVALUATION OF NEW SUBSTANCES PROPOSED FOR CARRIAGE BY SHIPS (EXISTING AND REVISED PROCEDURE)

2.1 The Group considered the following new substances, which had been submitted for evaluation by industry and governments.

- .1 Poly(iminoethylene)-graft-N-poly(ethyleneoxy) solution (90% or less);
- .2 Mighty 21ES (Methacrylic acid-alkoxypoly (alkylene oxide) methacrylate copolymer, sodium salt aqueous solution (45% or less))
- .3 N-(3-Chloro-2-hydroxypropyl)trimethyl ammonium chloride solution (75% or less)

2.2 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 4.

Product Name	Column				
	A	B	C	D	E
Poly(iminoethylene)-graft-N-poly(ethyleneoxy) solution (90% or less):	0	0	0	0	0
Mighty 21ES (Methacrylic acid-alkoxypoly (alkylene oxide) methacrylate copolymer, sodium salt aqueous solution (45% or less))	0	1	-	-	-
N-(3-Chloro-2-hydroxypropyl)trimethyl ammonium chloride solution (75% or less)	0	1	0	I	XX

2.3 In considering Mighty 21ES, the Group agreed that the submitted toxicological data on a lower concentration of the same product were insufficient to evaluate columns C1, C2, C3, D1, and D2 of the revised Hazard Profiles and, similarly, columns C, D and E of the existing ones. In this context, it was noted that the data associated with the lower concentration of the product only contained estimated dermal and inhalation data and that, whilst the irritation data showed the dilute product to be not irritating, this result could not be extrapolated to the more concentrated product.

3 CONSIDERATION OF QUERIES FROM INDUSTRY RELATED TO EVALUATIONS

3.1 List of products associated with queries from industry

3.1.1 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:

- .1 Hydrocarbon waxes;
- .2 Alcohols (C₁₂-C₁₃);
- .3 Alcohols (C₁₄-C₁₈);
- .4 Urea ammonium nitrate;
- .5 n-Heptanoic acid; and
- .6 Alcohol ethoxylates.

3.1.2 The resultant Hazard Profiles for these products are shown in annex 4.

3.2 Hydrocarbon waxes

3.2.1 In evaluating the products covered by this name, the Group recognized that this group name also covered the following three entries in the IBC Code and so instructed the Secretariat to advise IMO that these entries would become redundant:

- .1 Paraffin wax;
- .2 Petrolatum; and
- .3 Waxes

3.3 Alcohols (C₁₂-C₁₃) and Alcohols (C₁₄-C₁₈)

3.3.1 The Group noted that the name, Alcohols (C₁₂-C₁₃), was problematic in that the datasheet indicated that a wider range of products was intended for carriage and so should be reflected in the name.

3.3.2 The Group noted that the current entries in the IBC Code included dodecyl alcohol and alcohols (C₁₃₊) and that the two proposed entries from industry would, therefore, be new entries into the IBC Code. As a result, the Secretariat was instructed to inform the industry that it would have to make a submission to IMO regarding these potential entries.

3.3.3 In addition, it was noted that the datasheet for Alcohols (C₁₄-C₁₈) indicates that some lower chain lengths might also be included in this product. As C₁₃-C₁₄ is the cut-off point for toxicity, the Group agreed that this would not be appropriate.

3.3.4 The Group noted that new data on the aquatic toxicity of tridecanol and tridecanol/dodecanol (78/22) indicated that the breakpoint where toxicity ceases with increasing molecular weight in the alkanol series would shift from between C₁₂ and C₁₃ to between C₁₃ and C₁₄. As such, the proposed industry entries, for C₁₂-C₁₃ and C₁₄-C₁₈ reflect these new data correctly. It was pointed out that the existing entry of C₁₃₊ with a revised rating of 4 in Column B1 would now have no meaning as a broad grouping of non-toxic products but would be replaced by Alcohols (C₁₄-C₁₈) or preferably Alcohols (C₁₄₊).

3.3.5 The Group recalled that the acute aquatic toxicity rating (old Column B and new Column B1) had previously been 4 (toxicity < 1mg/l) for dodecanol and 0 for tridecanol (no toxicity).

3.4 Urea/ammonium nitrate (UAN)

3.4.1 In considering the data associated with UAN, the Group noted that some of the mammalian toxicity data used to evaluate this product were based on ammonium nitrate and so adjusted the previous evaluation for this component, which was listed separately, accordingly.

3.4.2 The GESAMP Hazard Profile rating was adjusted with the assurance from the manufacturers association that the product contained less than 140-240 mg/kg of free ammonia.

3.5 Heptanoic acid

3.5.1 The Group noted the additional data, submitted by industry, on heptanoic acid which enabled the Hazard Profile to be completed and was used to consolidate the chemical group of carboxylic acids.

3.6 Alcohol ethoxylates

3.6.1 The Group acknowledged the information, received from industry, regarding the nomenclature and properties. However, due to lack of time and, recognizing that the issue had complicated ramifications, the Group agreed to discuss these products at the next session.

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

4.1 Products identified by IMO as not transported on their own but as components of mixtures

4.1.1 The Group noted that the following products were not transported on their own but were components of mixtures that were subject to the IBC Code:

- .1 Methylene bridged isobutenylated phenols;
- .2 Borax;
- .3 Chlorinated paraffins (C₁₈₊) with any level of chlorine;
- .4 Diphenylol propane;
- .5 Nalco 5740S Antifoam;
- .6 Poly (17+) olefin amine;

- .7 Polyether, borated;
- .8 Sodium nitrate;
- .9 Sodium nitrite (solid);
- .10 Toly triazole; and
- .11 Boric acid.

4.1.2 It was also noted that these products were included in annex 7 of IMO's MEPC.2/Circulars, which are issued annually so that the Pollution Categories and Ship Types of mixtures containing these products could be calculated but that some of them had not been evaluated by the Group in the past.

4.1.3 In order to facilitate this process, the Group evaluated the properties of these products where data were available, the results of which are shown in annex 4.

4.2 Animal/Vegetable oils

4.2.1 The Group considered the additional information, provided by FOSFA, related to the acute aquatic toxicity of some vegetable oils, which permitted the previously assigned Column B of the Hazard Profiles to be amended. In addition, the discussions related to Floaters and Persistent Floaters (see section 7) enabled the Group to make amendments to Column E2 of the Hazard Profiles.

The Hazard Profiles subject to the current system and the changes to the Hazard Profiles under the revised system for these products are shown in annex 3.

5 CONSOLIDATION OF ALL THE EVALUATIONS MADE TO DATE

5.1 General observations

5.1.1 The Group noted that those chemicals, subject to the IBC Code, had been assigned to one or more of nineteen groups, which were either chemically related or had similar use patterns.

5.1.2 The Group considered the homologous series and related products contained in the following groups, which enabled toxicity and physical property trends to be assessed. This approach allowed some evaluations to be made for some products e.g. alkanes C₆-C₉, which were missing experimental data and apparent anomalies to be double-checked and refined where it was considered appropriate to do so. The Group noted that this was an essential but time consuming process.

5.1.3 Changes made to the hazard profiles of those products shown in the groups below are shown in annex 4.

Chemical Group	Status of Review		
	Aquatic Toxicology	Mammalian Toxicology	Physical Properties
Alcohols	Complete	Complete	Complete
Alkanes	Complete	Complete	Complete
Alkenes	Partial	Complete	Complete
Alkyl benzenes	Not started	Complete	Not started
Carboxylic acids	Not started	Complete	Not started
Phthalates	Complete	Complete	Not started

Chemical Group	Status of Review		
	Aquatic Toxicology	Mammalian Toxicology	Physical Properties
Lube-oil additives	Not started	Not started	Not started
Glycols	Not started	Not started	Not started
Halogenated cpds	Not started	Not started	Not started
Esters	Not started	Not started	Not started
Ketones	Not started	Not started	Not started
Phenols	Not started	Not started	Not started
Amines	Not started	Not started	Not started
Aldehydes	Not started	Not started	Not started
Acrylates/Methacrylates	Not started	Not started	Not started
Adipates	Not started	Not started	Not started
Triglycerides	Complete	Complete	Complete
Inorganic compounds	Not started	Not started	Not started

5.2 Alkanes and Environmental Properties

5.2.1 The Group noted that the Column B1 ratings for acute aquatic toxicity had been adjusted on the basis of data on the file with analytical verification. The C₆ and C₇ homologues and normal, iso and cyclo isomers were adjusted to a rating of 4 with one or two exceptions. For Column B2 (biodegradation), the majority of normal and iso alkanes were rated as R, whilst the cyclo-alkanes were rated as NR mainly based on some new reports from the Japan (CERIJ).

6 DISCUSSION ON THE CONSOLIDATION OF WORK CARRIED OUT, THE FUTURE WORK PROGRAMME AND DATE OF THE FOLLOWING SESSIONS

6.1 Consideration of the long-term health effects reflected in Column D3

6.1.1 The Group recognized that the evaluation of properties to be reflected in Column D3 (long-term health effects) was a complex issue, which represented more than fifty percent of the mammalian toxicological properties associated with the GHS.

6.1.2 As the revised GESAMP Hazard Evaluation Procedure was the first international application of the GHS, it was recognized that it was likely to attract interest from other bodies and so it was agreed that it was important:

- .1 to ensure that the evidence associated with the ratings assigned to Column D3 was sound;
- .2 to delete those ratings, which had been transferred from the Old Hazard Evaluation System, where they could not be substantiated; and
- .3 to give further consideration to products which might be defined as having an aspiration hazard, recognizing that the criteria for the definition of this hazard was being developed within the UN/GHS system.

6.2 Publication of the revised GESAMP Hazard Profiles and related issues

6.2.1 The Group recognized that, despite IMO's requests for industry to provide the missing data needed to complete the revised GESAMP Hazard Profiles for those products subject to the IBC Code, more information was required if the evaluation process was to be completed for a remaining group of products.

6.2.2 The Group agreed that it would be useful to publish the evaluations already made as a GESAMP report. It was also agreed that such a report should also include information related to the application of the GHS criteria in the hazard evaluation process and problems or issues which have arisen from it.

6.2.3 However, recognizing that this approach would require peer review and approval by GESAMP, it might not be possible to publish such a report until the end of 2005. As a result, it was agreed that, in addition to taking this course of action, the list of evaluations would be made available on the internet to make interested parties aware of it. This might encourage industry to submit the additional data required to complete the process of evaluation.

6.2.4 In addition, it was agreed that it would be useful to make a scientific publication of the evaluation of those chemical groups completed by the Group, which would include the processes applied in completing this task. The Chairman informed the Group that he had already started to prepare such a document.

6.3 Future work programme

6.3.1 The Group agreed that, in order to complete the consolidation of the evaluation of chemicals by the end of 2006, it would be necessary to hold two intersessional meetings of the aquatic toxicologists, one intersessional meeting of the mammalian toxicologists and possibly one intersessional meeting of the physical chemists.

6.3.2 The aquatic toxicologists agreed that priority would be given to consolidation of the methacrylates, acrylates, alkyl benzenes and lube-oil additives during the first intersessional meeting.

6.3.3 The mammalian toxicologists agreed that priority would be given to validating the guidelines for estimating inhalation toxicity (Column C3), validating long-term health effects (Column D3) and consolidating the remaining chemical groups with the exception of lube-oil additives which would be considered at the next full session of EHS.

6.3.4 The physical chemists agreed that they would give priority to consolidating lube-oil additives, halogenated organic compounds, carboxylic acids and phthalates as well as checking the F vs Fp ratings in Column E2.

6.4 Date of next meeting

6.4.1 It was agreed that the date of the next full meeting of the Group would be 9 to 13 May 2005 whilst the intersessional meetings would be arranged by the sub-groups subject to obtaining financial support for holding such meetings.

7 GESAMP REPORTS AND STUDIES 64

7.1 The use of log *Pow* to determine bioaccumulation for lipophylic substances which are known to be easily metabolised or form natural metabolites

7.1.1 The Group agreed that, whilst this was an important topic, as it was being discussed in other fora, it would be prudent to consider it at some future meeting of the Group.

7.1.2 In addition, the Group noted that the new data, received from industry, indicated that, while some substances are easily metabolised by mammals, the metabolism rate appeared to be lower in aquatic organisms. However, it was recognized that further information would be needed in order to make a thorough assessment.

7.2 Consideration of the criteria for defining *Persistent Floaters*

7.2.1 The Group recalled that Column E2 of the revised GESAMP Hazard Profiles contained an indication of a product's potential physical behaviour when released into the marine environment. It was also recalled that the entries in Column E2 were based on the *European Behaviour Classification System* (EBC) which uses the physical properties of a product to categorize it into Gas (G), Evaporator (E), Floater (F), Dissolver (D), Sinker (S) or combinations of these.

7.2.2 However, the Group also recalled that it had previously agreed that, in order to identify products which would be expected to float on the surface of the water for a long time, it would be necessary to extend the EBC System by separating Floaters (F) into Floaters and Persistent Floaters using a viscosity of >10c St to identify the latter.

7.2.3 This approach had initially only been applied to liquids (products with a melting point of <20°C) which had resulted in floating liquids meeting this criterion being classified as a Persistent Floater (Fp) whilst all floating solids were classified as Floaters (F) although the viscosity of such products is >10 cSt.

7.2.4 As a result of the concerns regarding the true hazards of floating solids, members of the Group had reconsidered, in detail, whether this 'F' rating adequately reflected these hazards and had undertaken a review which considered a wide range of published accidental spill reports concerning lipophylic and solidifying substances (largely excluding mineral oils) from tankers at sea, as well as their physical-chemical properties and behaviour in seawater. A summary of the hazards associated with these properties had been prepared by the Chairman which indicated that comprehensive accident reports dealing in detail with the environmental consequences of solidifying, floating IBC Code substances were rather sparse, though there were many anecdotal reports of small to large scale spillages and operational discharges occurring.

7.2.5 Based on these reports, the Group noted that, in respect of solid floaters:

- .1 the vegetable oils were the most important among these substances in terms of quantities transported by ships (approximately 40 m.t. per year) of which a large proportion are solidifying;
- .2 sizeable slicks of solidified or solidifying oil had been observed following spillages and operational discharges, which had occasionally travelled long distances before breaking up or stranding on shore;

- .3 the formation of fine particulates, which behaved similarly to liquids, had been reported in spillage and operational discharge situations involving solidifying floaters;
- .4 deaths of seabirds and marine organisms had been reported in association with such spillages;
- .5 some solidifying floating solids e.g. vegetable oils had been shown to smother benthic flora and fauna; and
- .6 some vegetable oils had been shown to polymerise in seawater causing persistent lumps and subsequent coating of the shoreline.

7.2.6 Notwithstanding these observations, the Group recognized that the European Behaviour Classification System (EBC), as shown in annex 6 of GESAMP Reports and Studies 64, was the basis of the criteria for assigning ratings to Column E2, and was intended for information only.

7.2.7 The Group also recognized that the behaviour of chemicals released into the sea would be affected by the nature of the chemical composition and the environmental conditions at the time.

7.2.8 The Group agreed that more detailed information related to actual spillages of such products would be needed in order to make a definitive prediction on the fate of solid and liquid floating substances.

7.2.9 Having taken all these views into account, the Group agreed that an Fp rating would reflect the reported hazards of solidifying, floating substances more appropriately than the previous rating of F, whilst erring on the side of caution. Furthermore, it was recognized that a change of F to Fp in Column E2 could influence the rating in Column E3.

7.2.10 The Group also agreed that, should more detailed evidence from actual releases into the sea or scientific studies come to light in the future, then this decision could be reviewed by the Group.

8 ANY OTHER BUSINESS

8.1 Tainting

8.1.1 The Group recalled that the property of Seafood Tainting used to be reflected in the Old Hazard Profiles and was considered to be an important aspect in terms of marine pollution. Whilst a test procedure had been developed it had only been used to a very limited extent over the years and the database for tainting had remained small. A full discussion of this is contained in section 4.5.1 of GESAMP Reports and Studies 64.

8.1.2 The Group also recalled that IMO had removed the tainting property from the criteria used to define Marine Pollutants and Pollution Categories for those products transported subject to the IMDG Code and IBC Code respectively.

8.1.3 It was noted that, in the past, more data had been available on more chemicals but many of those were not associated with products subject to the IBC Code.

8.1.4 The Group recalled that, for GESAMP Reports and Studies 64, it had been decided to review all existing knowledge of tainters under column E1. It had been agreed to only identify products as tainters with T, non-tainters with NT and potential tainters, identified by analogy, with (T) in column E1, where such a rating could be re-substantiated with the appropriate documentation. All other products would be rated as NI (No Information).

8.2 Criteria for estimating inhalation toxicity ratings (Column C3)

8.2.1 The Group noted that the majority of chemicals (ca. 75%) being evaluated did not have any inhalation toxicity data. In such cases the Group had made a provisional rating, which were indicated in brackets, in order to advise relevant bodies as to the hazards believed to be presented by inhaling the chemical. The Mammalian Toxicology Sub-Group had been estimating the ratings for Column C3 based on the oral toxicity, dermal toxicity, skin irritation and eye irritation and expert judgement (see section 4.3.4 of GESAMP Reports and Studies 64). In cases where such a provisional rating could not be made, it was agreed that NI would be indicated in the column.

8.2.2 The Group were informed that, in taking this approach, the Mammalian Toxicology Sub-Group had been developing guidelines for using these other toxicological properties to develop provisional ratings for column C3 and that they had reached the point where these guidelines could be tested against real inhalation toxicity ratings.

8.2.3 These draft guidelines are given in the table below. The Group agreed that, in the intersessional period, these guidelines would be applied to chemicals which do have ratings based on proper inhalation studies. The Group indicated that it intended to publish these guidelines at the next meeting together with the appropriate verification.

Draft Guidelines for the extrapolation of Column C3 from Columns C1, C2, D1 and D2

It should be noted that in some cases with highly reactive molecules, this table may not give the appropriate inhalation toxicity rating.

Highest Oral and Dermal Ratings for Columns C1 and C2	Highest Skin and Eye Irritation Ratings for Columns D1 and D2	Estimated Inhalation Ratings for Column C3
0	0	0
	1	1
	2	2
	3	3
1	0	1
	1	2
	2	
	3	3
2	0	2
	1	
	2	
	3	3
3	0	3
	1	4
	2	
	3	
4	0	4
	1	
	2	
	3	

8.3 Report from GESAMP

8.3.1 The IMO Technical Secretary of GESAMP informed the Group of the latest developments concerning the re-structuring of GESAMP. The Strategic Plan for the New GESAMP, “Science to support ocean sustainability”, would be presented in May/June 2004, together with a Memorandum of Understanding detailing the new organizational arrangements for GESAMP to the Sponsoring Organizations for their endorsement.

8.3.2 The Sponsoring Organizations agreed that GESAMP should only continue along its current lines if it remained involved in the conduct of marine environmental assessments. In 2003, GESAMP had offered to play a leadership role in the Global Scientific Panel for the “regular process for the global reporting and assessment of the state of the marine environment”, in short the “GMA-process” which is being developed in the UN system. Much of the future of GESAMP would thus depend on the establishment of the GMA-process, which is to be decided at an intergovernmental meeting in Reykjavik (Iceland) in October 2004.

8.4 Chronic aquatic toxicity

8.4.1 The Group was informed that an OECD task force would be meeting with a view to defining the criteria for chronic aquatic toxicity and that the outcome of this meeting was expected to be reported to the UN/GHS Sub-Committee and that proposals had been made to OECD to introduce a fixed acute/chronic aquatic toxicity ratio of 20 as a means of estimating the chronic aquatic toxicity in cases of missing data.

8.4.2 The Group was also informed that its acute and chronic columns had been compared by several outside agencies which had apparently concluded that it has used an acute/chronic toxicity ratio of 1000. This is not the case as acute/chronic ratios are not used in the revised GESAMP Hazard Evaluation Procedure.

8.4.3 As a peer review group, evaluating the hazards of a fixed set of circa 800 chemicals, concern was expressed that the EHS Working Group procedure of using actual chronic data would be undermined. In particular, any change to the cut-off bands, already established in the GHS, and the revised MARPOL Annex II would, at this stage, lead to disharmonization.

8.4.4 As a result, one of the members who expected to attend this OECD meeting was requested to convey these concerns of the Group.

9 CONSIDERATION AND ADOPTION OF THE REPORT

9.1 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 23 April at 13:00 hrs.

ANNEX 1

**LIST OF MEMBERS ATTENDING THE FORTIETH SESSION
OF THE WORKING GROUP**

Dr. C.T. Bowmer (Chairman)

TNO Chemistry
Utrechtseweg 48
PostBox 360
3700 AJ Zeist
The Netherlands

E-mail: bowmer@voeding.tno.nl
Tel: +31 30 6944645
Fax: +31 30 6944099

Dr. F. Pedersen
DHI Water & Environment
Agern Alle 5
DK-2970
Denmark

E-mail: fip@dhi.dk
Tel: +45 4516 9321
Fax: +45 4516 9292

Dr. T. Höfer
Federal Institute for Risk Assessment
Thielallee 88-92
D-14195 Berlin
Germany

E-mail: thomas.hoefer@bfr.bund.de
Tel: +49 1888 412 3267
Fax: +49 1888 412 3003

Dr. D. James
Ty Llwyd
Llanwrda
Carmarthenshire
Wales SA19 8AW

E-mail: derek-a.james@virgin.net
Tel: +44 1550 779034

Dr. M. Marchand
IFREMER
Centre de Nantes
BP 21105
44311-Nantes
France

E-mail: mmarchan@ifremer.fr
Tel: +33 02 4037 4142
Fax: +33 02 4037 4001

Mr. M. Morrissette
Vice President, Dangerous Goods Advisory Council
Suite 301
1101 Vermont Avenue, NW
Washington, D.C. 20005-3521
U.S.A.

E-mail: mmorrissette@dgac.org
Tel: +1 202 289 4550
Fax: +1 202 289 4074

Prof. T. Syversen
Norwegian University of Science and Technology
Faculty of Medicine
Department of Neuroscience
Medisinsk Teknisk Senter
N-7489 Trondheim
Norway

E-mail: tore.syversen@medisin.ntnu.no
Tel: +47 73 59 88 48
Fax: +47 73 59 68 79

Prof. M. Wakabayashi
Shukutoku University
1150-1 Fujikubo
Miyoshi-machi
Iruma-gun 354-8510
Saitama-Pref
Japan

E-mail: mwak@ccb.shukutoku.ac.jp
Tel: +81 49 274 1511
Fax: +81 49 274 1521

IMO SECRETARIAT

Mr. J.V. Crayford
Secretary of the Working Group
International Maritime Organization
Marine Environment Division
4 Albert Embankment
London SE1 7SR
United Kingdom

E-mail: jcrayford@imo.org
Tel: +44 (0)20 7587 7611
Fax: +44 (0)20 7587 3210

Mr. N. M. Soutar
IMO Consultant
International Maritime Organization
Marine Environment Division
4 Albert Embankment
London SE1 7SR
United Kingdom

E-mail: nsoutar@imo.org
Tel: +44 (0)20 7463 4217
Fax: +44 (0)20 7587 3210

ANNEX 2

**DRAFT AGENDA FOR THE FORTIETH SESSION OF
THE GESAMP/EHS WORKING GROUP**

- 1 Adoption of the agenda
- 2 Evaluation of new substances proposed for carriage by ships (Existing and Revised procedure)
- 3 Consideration of queries from industry related to evaluations
- 4 Re-evaluation of the remaining products in the IBC Code in accordance with the criteria for the Revised GESAMP Hazard Evaluation Procedure including
- 5 Consolidation of all the evaluations made to date
- 6 Discussion on the consolidation of work carried out, the future work programme and date of the following sessions
- 7 GESAMP Reports and Studies 64
- 8 Any other business
- 9 Consideration and adoption of the report

ANNEX 3

**Changes to the Hazard profiles for animal, vegetable and marine fish oils
generated under the revised system**

(Columns where changes have been made shown in boxes)

	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E2	E3
Palm Oil	0	R	0	NI	0	0	0	0	0		Fp	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		Fp	2
Palm kernel Oil	0	R	(2)	NI	(0)	(0)	(0)	(0)	(1)		Fp	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) 1	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) 0	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)		Fp	2
Tallow	0	R	0	NI	0	0	(0)	0	0		Fp	2
Lard	0	R	0	NI	0	0	(0)	0	1		Fp	2
Fish Oil	0	R	(2)	NI	0	0	0	0	(0)		Fp	2

**Hazard Profiles for animal, vegetable and marine fish oils
generated under the existing system**

	A	B	C	D	E
Palm Oil	0	0	0	0	XX
Palm Olein	0	0	0	0	XX
Palm Stearin	0	0	0	0	XX
Palm kernel Oil	0	(2)	0	0	XX
Linseed Oil	0	(2)	0	0	XX
Rapeseed Oil/Canola Oil	0	(2)	0	0	XX
Groundnut Oil	0	(2)	0	0	XX
Soyabean Oil	0	(2)	0	0	XX
Olive Oil	0	(2)	0	0	XX
Coconut Oil	0	1	0	0	XX
Castor oil	0	(2)	0	0	XX
Corn oil	0	(2)	0	0	XX
Sunflower oil	0	0	0	0	XX
Cottonseed oil	0	(2)	0	0	XX
Tung oil	0	(2)	0	0	XX
Tallow	0	0	0	0	XX
Lard	0	0	0	0	XX
Fish Oil	0	2	0	0	XX

ANNEX 4

Products discussed during the meeting

29-Apr-04

--- Existing GHP ----

----- Revised GESAMP Hazard Profile (GHP) system -----

Page 1 of 9

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(1-6)ethoxylates	294	0	4	1	I	X	5	3	3	R	4	1	0	0	(1)	2	2		NI	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, C13 and above as individuals and mixtures	2039	0	1	0	0	X	5	NI	5	R	4	1	0	0	0	(1)	(1)		NI	Fp	1
Alcohols (C12-C13), linear	2294						5	NI	5	R	4	(1)	0	0	(0)	1	1		NI	Fp	
Alcohols (C14-C18), linear	2293						5	NI	5	NI	0	1	0	0	0	1	1		NI	Fp	
Alkanes (C6-C9)	2202		3				5	NI	5	(R)	(4)	NI	(0)	(0)	(1)	(2)	(2)	N	NI	FE	2
Iso- and cyclo-alkanes (C10-C11)	2203		0				(5)	NI	(5)	NI	(0)	(0)	(0)	(0)	(0)	(1)	(0)		NI	NI	NI
Iso-and cyclo-alkanes (C12+)	2204		0				(5)	NI	(5)	NI	(0)	NI	0	0	(1)	NI	NI		NI	NI	1
n-Alkanes (C10-C20)	296	0	0	(1)	0	0	(5)	NI	(5)	(R)	0	0	(0)	(0)	(0)	(1)	(0)	A	NI	F	3
Alkyl (C3-C4) benzenes	2206		3				3	NI	3	NR	3	NI	0	NI	NI	(2)	(1)		NI	FE	2
Alkyl (C5-C8) benzenes	2207		4				5	4	4	NI	4	NI	0	0	(1)	(2)	(1)		NI	F	1
Alkyl benzenes, C9-C17 (straight or branched)	1783	0	1	-	-	-	0	4	4	NR	1	NI	0	(0)	(0)	(1)	(1)		NI	F	1
Ammonium nitrate solutions	1912	0	1	1	0	0	Inorg	0	0	Inorg	1	NI	0	0	(1)	1	2		NI	D	2
Aviation alkylates (C8 paraffins and iso-paraffins BPt 95-120 Celcius)	286	0	3	(1)	0	0	(5)	NI	(5)	(R)	(4)	NI	0	0	(0)	(0)	(0)		NI	FE	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Borax, anhydrous or hydrated, crude or refined	359	0	1	2	II	XX	Inorg	0	0	Inorg	1	0	0	0	(0)	1	1	R	NI	S	2
Boric acid	360	0	1	2	II	XX	Inorg	0	0	0	1		0	(0)	(0)	1	1	R	NI	S	2
sec-Butanol	383	0	0	0	0	X	0	(0)	0	R	0	NI	0	0	0	0	2		NT	D	2
2-Butanone	385	0	0	1	I	X	0	NI	0	R	1	0	0	0	1	2	2		NI	DE	2
Butyl acrylate	390	0	3	1	II	XXX	2	NI	2	R	3	NI	1	1	1	2	2	SA	NI	FED	2
Butyl benzyl phthalate	398	Z	4	1	0	X	4	4	4	R	4	2	0	0	(0)	(0)	(0)	R	NI	S	3
Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture	2295						(5)	NI	(5)	(NR)	(3)	NI	0	0	0	2	2		NI		
Butyl methacrylate	409	0	1	0	I	XX	(5)	NI	(5)	(NR)	(3)	NI	0	0	0	1	1	S	NI	FE	2
Calcium carbonate slurry	2016	0	D	0	0	0	Inorg	0	0	Inorg	1	NI	0	(0)	(1)	1	2		NI	S	2
Carbolic oil	437	T	3	2	II	XX	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI		NI	NI	NI
Castor oil	442	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	1	1		NI	Fp	2
Cetyl/Eicosyl methacrylate (mixture)	445	0	0	0	I	X	0	NI	0	(NR)	(0)	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Chlorinated paraffins (C18 and above) with any level of chlorine	2024	0	0	0	II	XX	0	NI	NI	NR	0	0	0	0				C	NI	S	2
N-(3-Chloro-2-hydroxypropyl) trimethylammonium chloride solution (75% or less)	2286						NI	0	0	NI	1	NI	0	0	(1)	0	(2)	SC	NI	D	0
Citric acid	493	0	1/B OD	0	0	0	0	NI	0	R	1	0	0	(0)	(2)	1	3		NI	D	2
Coconut oil	503	0	0	0	0	XX	0	NI	0	R	1	NI	0	0	(0)	0	1		NI	Fp	2
Cotton seed oil	523	0	0	(1)	I	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	1		NI	Fp	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Cycloheptane	535	0	3	(1)	II	X	4	NI	4	(NR)	4	NI	0	(0)	(1)	(0)	(1)		NI	FE	2
Cyclohexane	536	0	3	1	II	X	3	3	3	NR	3	NI	0	0	1	0	1		NI	E	2
Cyclohexanol	537	0	2	1	II	XX	1	NI	1	R	2	NI	0	0	0	2	2		NI	Fp	2
1,3-Cyclopentadiene dimer (molten)	545	T	3	2	II	XXX	3	3	3	NR	3	NI	2	0	3	2	2		NI	Fp	2
Cyclopentane	546	0	3	(1)	I	X	3	NI	3	NR	3	NI	0	(0)	0	1	(1)		NI	E	2
Decahydronaphthalene	551	0	(1)	1	0	X	4	4	4	NR	3	NI	0	0	(0)	1	1		NI	F	2
Decane	554	0	0	(1)	0	0	5	NI	5	R	0	0	0	0	0	1	0		NI	F	0
1-Decene	558	0	3	(1)	0	0	5	NI	5	NI	NI	NI	0	0	0	(1)	(1)		NI	F	1
Decyl acrylate	559	0	4	1	I	X	5	NI	5	NI	5	NI	0	0	(1)	2	1		NI	Fp	2
Dialkyl phthalates C9-C13	566	0	0	(1)	0	XX	0	4	4	(NR)	0	(2)	0	0	(0)	1	1	R	NI	Fp	3
Di-n-butyl phthalate	582	0	4	0	II	XX	4	4	4	R	4	(1)	0	0	1	0	1	R	NI	S	3
Diethyl benzene (mixed isomers)	624	T	3	1	I	X	4	4	4	NR	3	NI	0	(0)	(1)	2	1		NI	F	2
Diethylene glycol phthalate	1438	0	1	0	0	0	NI	NI	NI	NR	1	NI	0	0	(1)	(1)	2		NI	S	2
Di-(2-ethylhexyl) phthalate	642	0	0	0	II	XX	0	4	4	NR	0	3	0	0	(0)	1	1	CR	NI	Fp	3
Diheptyl phthalate	655	0	0	(0)	0	XX	0	2	2	R	0	NI	0	0	(0)	1	1	R	NI	Fp	3
Di-hexyl phthalate	2125	-	-	0	II	XX	5	NI	5	R	0	2	0	0	(0)	1	1	R	NI	Fp	3
Diisobutene	575	0	3	(1)	0	0	4	4	4	NR	3	NI	0	0	0	1	0		NI	FE	2
Diisobutyl phthalate	581	0	3	0	0	X	4	(4)	4	R	4	1	0	0	(0)	0	0	R	NI	S	3
Diisononyl adipate	690	0	0	0	0	XX	0	NI	0	NI	0	NI	0	0	NI	1	1		NI	Fp	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Diisooctyl phthalate	693	0	0	0	II	XX	0	4	4	(NI)	0	0	0	0	(0)	1	0		NI	Fp	2
Di-n-octyl phthalate	692	0	0	0	I	XX							0	0	(0)	1	(1)	R	NI	Fp	3
Dipentene	686	T	2	1	I	X	4	NI	4	NR	(4)	NI	0	0	(1)	2	2	S	NI	F	3
Diphenylol propane	2289						4	NI	4	NI	NI	NI							NI		
Diundecyl phthalate	715	0	0	(1)	0	XX	0	NI	0	NR	0	0	0	0	(1)	1	1		NI	Fp	2
Dodecane	718	0	0	(1)	0	0	5	NI	5	(R)	0	NI	0	0	(0)	(1)	(0)		NI	Fp	2
Dodecanoic acid	2257												0	(0)	(1)	1	2		NI	F	
1-Dodecanol	719	0	3	0	0	X	5	NI	5	R	4	1	0	0	(0)	2	(1)		NI	Fp	2
Dodecene (all isomers)	720	0	(3)	(1)	I	0	5	NI	5	NR	4	NI	0	0	(0)	1	0		NI	F	1
Dodecyl benzene	126	0	0	0	I	X	0	NI	0	NR	0	0	0	0	(1)	(2)	(1)		NI	F	1
Dodecyl/octadecyl methacrylate (mixtures)	2116	0	0	0	I	XX	(5)	NI	(5)	(NR)	(0)	NI	0	0	(1)	1	(1)		NI		NI
Dodecyl/pentadecyl methacrylate (mixture)	724	0	0	0	0	X	(5)	NI	(5)	(NR)	(0)	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Ethyl cyclohexane	751	0	(3)	1	0	0	4	4	4	nr	3	NI	(0)	(0)	(1)	(0)	(1)		NI	FE	2
Ethylene-propylene copolymer	1508	-	-	-	-	-	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)		NI	NI	NI
Fatty acids, linear, C8-C18 saturated with C18 unsaturated	2260						NI	NI	NI	NI	NI	NI	(0)	(0)	(1)	(3)	(3)		NI		
Fatty acids, linear C12+ saturated with C12+ unsaturated	2261						NI	NI	NI	NI	NI	NI	(0)	(0)	(1)	(1)	(2)		NI		
Fish oil	801	0	0	0	I	XX	0	NI	0	R	2	NI	0	0	0	0	(0)		NI	Fp	2
Glycidyl ester of C10 trialkyl acetic acid	441	0	3	1	II	XX	3	NI	3	NR	3	NI	0	0	(0)	2	1		NI	F	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Groundnut oil	820	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	0		NI	Fp	2
Heptane	827	0	3	0	0	0	4	NI	4	R	4	NI	0	0	0	(1)	1	A	NI	E	2
Heptanoic acid	831	0	1	0	I	X	2	NI	2	R	1	NI	0	0	(1)	3B	(3)		NI	FD	3
Heptanol (all isomers)	2223						2	NI	2	R	2	NI	0	0	(2)	(1)	(2)		NI	FD	2
1-Heptanol	828	0	2	1	I	0	2	NI	2	R	2	NI	1	0	2	(2)	(2)		NI	FD	(3)
Heptene (all isomers)	2225						3	NI	3	NI	2	NI	(0)	(0)	(1)	(2)	(0)		NI	E	2
Hexane	850	0	3	0	II	X	3	NI	3	R	4	NI	0	0	0	2	2	NA	NI	E	2
Hexanoic acid	853	0	1	1	I	X	2	NI	2	R	2	NI	0	0	(2)	(3)	3		NI	FD	3
1-Hexanol	854	0	1	1	II	XX	1	0	0	R	2	NI	1	0	(2)	1	3		NI	FD	3
Hexene (all isomers)	2224						3	NI	3	R	3	NI	(0)	(0)	(0)	(2)	(1)		NI	E	2
Hydrocarbon waxes	2278						0	NI	0	NR	0	0	0	0	2	1	1		NI	Fp	2
Isobutanol	382	0	0	1	I	X	0	NI	0	R	1	0	0	0	1	2	3		NI	D	3
Isobutyl methacrylate	408	0	1	0	I	XX	2	NI	2	NR	1	NI	0	0	0	2	2	S	NI		NI
Isobutyric acid	419	0	1	2	II	XX	0	NI	0	R	2		2	2	(3)	3	3		NI		NI
Isodecanol	557	T	3	0	II	X	3	2	2	R	3	NI	0	0	0	2	1		NI	Fp	2
Isononanol	1059	T	3	1	II	XX	3	NI	3	NR	3	1	(0)	(0)	(1)	(2)	(2)		NI	Fp	2
Isooctanol	1076	T	2	1	0	X	3	NI	3	R	2	0	1	0	(2)	2	(2)		NI	F	2
Isopentene	1113	0	2	-	0	0	2	NI	2	NI	2	NI	(0)	(0)	(0)	(0)	(1)		NI	E	0
Isopropanol	1181	0	0	1	0	0	0	NI	0	R	0	0	0	0	0	1	2		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
Isopropyl cyclohexane	1199	0	(3)	0	0	0	4	NI	4	(NR)	(3)	NI	(0)	(0)	(1)	(0)	(1)		NI	D	2
Isopropyltoluenes	549	T	4	1	I	X	4	4	4	(NR)	3	NI	0	(0)	1	2	(1)		NI	FE	2
Lauryl methacrylate	893	0	0	0	I	X	5	NI	5	NR	0	NI	0	(0)	(1)	1	1		NI	F	2
Linseed oil	905	0	0	0	I	XX	0	NI	0	R	(2)	NI	0	0	0	0	(1)		NI	Fp	2
Methacrylic acid-aloxy poly (alkylene oxide) methacrylate co-polymer sodium salt (45% or less solution)	2288						NI	0	0	NI	1	NI	NI	NI	NI	NI	NI		NI	D	0
Methyl acrylate	955	0	3	2	II	XXX	0	NI	0	R	3	NI	2	1	2	3	3	MS	NI	D	3
Methyl cyclopentadiene, dimer	977	0	(3)	1	I	X	4	NI	4	(NR)	(3)	NI	0	(0)	(3)	(2)	(2)		NI	F	1
Methylene bridged isobutenylated phenols	2290						NI	NI	NI	NI	NI	NI							NI		
3-Methyl-3-methoxy butanol	996	0	0	0	I	X	1	NI	1	NR	0	NI	0	(0)	(1)	1	(2)		NI	FD	1
2-Methyl pentane	1000	0	3	(0)	0	0	3	NI	3	NI	4	NI	(0)	(0)	(0)	(2)	(2)		NI	E	0
Nalco 5740S Antifoam	2291																		NI		
Neodecanoic acid	1025	0	2	1	II	XX	4	NI	4	NR	2	NI	0	0	(1)	0	2		NI	Fp	2
Nonane	1054	0	3	(0)	0	0	4	NI	4	R	4	NI	0	0	1	0	0	A	NI	FE	2
Nonanoic acid	1055	0	1	1	II	XX	3	NI	3	R	2	NI	0	0	(1)	2	3		NI	F	3
Nonene (All isomers)	2222						4	NI	4	NI	3	NI	0	0	0	1	1		NI	FE	2
Nonyl methacrylate monomer	1061	0	0	-	-	-	5	NI	5	R	3	(0)	(0)	(1)	(1)	(1)	(1)		NI	F	1
Octanoic acid (Caprylic acid)	1074	0	1	0	I	X	3	NI	3	R	1	NI	0	0	(1)	3	3		NI	F	3
1-Octanol	1075	T	2	1	0	X	3	NI	3	R	2	0	1	0	(2)	2	2		NI	Fp	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Octene (all isomers)	1079	0	3	0	I	X	4	NI	4	NR	3	NI	0	0	(1)	2	1		NI	FE	2
Olefin mixtures (C5-C7)	2243						<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0	0	1	2	0	<input type="text"/>	NI		2
Olefins C13 and above, all isomers	2028	0	0	0	0	0	5	NI	5	NR	0	NI	0	0	(0)	0	0		NI	Fp	1
Olive oil	1090	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	0	1		NI	Fp	2
Palm nut oil	1094	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(0)	(0)	(1)		NI	F	2
Palm nut oil fatty acid	1095	0	2	-	-	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	NI	NI	NI	NI	NI		NI	F	1
Palm oil	2249						0	NI	0	R	0	NI	0	(0)	(0)	(0)	0	<input type="text"/>	NI	F	0
Paraffin wax	1086	0	0	0	0	0	0	NI	0	R	0	NI	(0)	(0)	(0)	1	1		NI	Fp	1
1,3-Pentadiene	1102	0	2	-	-	-	2	NI	2	NI	2	NI	(0)	(0)	0	NI	NI		NI	E	2
Pentane	1105	0	3	0	0	0	3	NI	3	R	3	NI	0	0	0	1	1	<input type="text"/>	NI	E	2
Pentanoic acid	1109	0	1	1	II	XX	1	NI	1	NI	2	NI	1	2	(3)	3	3		NI	FD	3
Pentanoic acid (64%)/2-methyl butyric acid (36%) mixture	2144	0	1	1	II	XXX	1	NI	1	NI	2	NI	1	2	(3)	3	3		NI	FD	3
1-Pentanol	1110	0	1/B OD	2	II	X	1	1	1	R	1	0	1	0	(2)	2	3		NI	FED	3
Pentene (all isomers)	1992	0	2	(1)	0	0	2	NI	2	NI	2	NI	(0)	(0)	(0)	(0)	(1)		NI	E	2
1-Pentene	1114	0	(2)	(1)	0	0	2	NI	2	NI	2	NI	(0)	(0)	0	(0)	(1)		NI	E	0
2-Pentene	1115	0	2	(1)	0	0	2	NI	2	NI	2	NI	(0)	(0)	(0)	(0)	(1)		NI	E	0
Petroleum wax	1122	0	0	0	0	X	0	NI	0	NR	0	NI	0	0	(0)	0	0		NI	F	1
Phthalic anhydride (molten)	1146	0	2	1	II	XX	1	NI	1	R	2	0	1	0	(2)	1	3	S	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
Pine oil	1148	0	2	1	I	X	4	NI	4	NR	4	NI	0	0	(0)	(1)	(1)	S	(T)	NI	2
Poly alkyl methacrylate (C1-C20) (LOA)	1984	-	-	-	-	-	(5)	NI	(5)	NR	0	NI	0	0	0	0	0		NI	Fp	2
Poly alkyl(C10-C18) methacrylate/ethylene-propylene copolymer mixture	2201	0	0	0	1	XX	0	0	0	NR	0	0	0	0	(0)	1	1	A	NI	Fp	3
Polyether, borated	1863	0	3	0	0	XX	0	NI	0	NR	3	NI	0	(0)	(0)	1	0		NI	Fp	2
Poly (iminoethylene)-graft-N-poly (ethyleneoxy) solution (90% or less)	2287						0	0	0	NR	0	NI	0	0	(0)	0	1		NI	D	0
Poly (17+) olefin amine	2049	0	2	0	0	0	0	NI	0	NR	2	NI	0	(0)	(0)	(1)	(1)		NI	Fp	0
Propylene dimer	1201	0	(2)	1	0	0	3	NI	3	R	3	NI	NI	NI	NI	NI	NI		NI	E	2
Propylene tetramer	2255						4	NI	4	NR	(4)	NI	(0)	(0)	(0)	(1)	(1)		NI	F	1
Rape seed oil	1217	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(0)	NI	NI		NI	Fp	2
Resin Intermediate RI-1116	2234			1	I	X	NI	NI	NI	NR	2	NI	1	1	(2)	2	(2)		NI	FE	2
Sodium nitrate	1259	0	0	1	0	0	Inorg	0	0	Inorg	0	NI	NI	NI	NI	NI	NI		NI	D	0
Sodium nitrite	340	0	3	2	0	0	Inorg	0	0	Inorg	3	0	2	(2)	2	0	1		NI	SD	2
Soya bean oil	1267	0	0	0	0	XX	0	NI	0	R	0	NI	0	0	(0)	(0)	1		NI	Fp	2
Sulphur	906	0	0/D	0	0	0	Inorg	0	0	Inorg	0	NI	0	0	(0)	1	1		NI	S	1
Sunflower oil	1283	0	0	0	0	XX	0	NI	0	R	0	NI	0	0	(0)	(0)	(1)		NI	Fp	2
Toluene	330	0	2	1	II	XXX	2	2	2	R	3	0	0	0	0	2	2	ANR	(T)	E	3
Tridecanoic acid	1334	0	3	(1)	0	X	5	NI	5	R	3	NI	(0)	(0)	(0)	(1)	(2)		NI	F	NI
Tridecyl acetate	1768	0	0	0	I	X	5	NI	5	NI	0	NI	0	(0)	(1)	2	2		NI	F	2

--- 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
1,3,5-Triethylbenzene	1340	T	4	0	0	0	5	NI	5	NI	4	NI	0	(0)	(1)	(2)	(1)		NI	F	1
Tung oil	1378	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(0)	(0)	(1)		NI	F	2
1-Undecene	1383	0	3	(1)	0	0	5	NI	5	NR	4	NI	(0)	(0)	(0)	(1)	(1)		NI	F	1
Urea-ammonium nitrate solutions	1387	0	1	1	0	0	Inorg	NI	Inorg	R	1	NI	0	0	(1)	1	2		NI	D	2
