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HAZARD EVALUATION OF SUBSTANCES TRANSPORTED BY SHIPS

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

The report of the forty-first session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships (EHS 41/9) is attached for information.

Any comments would be welcome and should be addressed to:

IMO Technical Secretary of the GESAMP/EHS Working Group
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WORKING GROUP ON THE
EVALUATION OF THE HAZARDS OF
HARMFUL SUBSTANCES CARRIED BY
SHIPS

41st session

Agenda item 9

EHS 41/9
7 July 2005
ENGLISH ONLY

REPORT OF THE FORTY-FIRST SESSION

1 INTRODUCTION

1.1 The forty-first 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 9 to 13 May 2005 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 noted that, at its fifty-second session held in October 2004 the Marine Environment Protection Committee (MEPC), adopted by resolution MEPC.118(52) the revised Annex II of the MARPOL Convention and resolution MEPC.119(52), on the consequential amendments to the IBC Code which are expected to enter into force on 1 January 2007 together with the revised MARPOL Annex II. In his opening remarks the Secretary-General when referring to the adoption of these instruments, recalled the considerable efforts made by the GESAMP/EHS Working Group in the evaluation of products subject to the IBC Code in preparing the revised MARPOL Annex II.

1.3 It was further noted that the seventy-ninth session of the Marine Safety Committee, also adopted by resolution MSC.176(79), the consequential amendments to the IBC Code since these are also mandatory under SOLAS.

1.4 The Group was informed that the Marine Environment Protection Committee, at its forty-ninth session and the Maritime Safety Committee, at its seventy-eighth session had agreed that products lacking essential data will not be included in the amendments to the IBC Code, adopted by MEPC.119(52) and MSC.176(79) and subsequently, the Marine Environment Protection Committee, at its fifty-second session and the Maritime Safety Committee, at its seventy-ninth session agreed to jointly circulate a list of products with missing data, to give industry the opportunity to provide such missing data to the GESAMP/EHS Working Group for evaluation and to allow for subsequent inclusion of the products in List 1 of the MEPC.2 Circular prior to the entry into force of the revised IBC Code on 1 January 2007.

1.5 In this regard the Group noted that in order to allow sufficient time for evaluation by the GESAMP/EHS Working Group and, where necessary, discussion by the BLG Sub-Committee and/or ESPH Working Group, IMO has requested that the data should be sent to the Secretariat of the GESAMP/EHS Working Group by **31 December 2005** at the latest. Manufacturers should

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note that the next meeting of the GESAMP/EHS Working Group is scheduled to take place in February 2006. This is the last opportunity for such data to be evaluated. The Group therefore emphasized that submissions will need to be complete in order to receive a profile and be evaluated on time.

1.6 The Group were also informed that MEPC 52 also discussed the “New GESAMP, Science for Sustainable Oceans”, and was invited to review the direction which the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) was planning to take and to reflect on IMO’s interests in GESAMP. As a result, the Committee had:

- .1 noted that GESAMP, as the joint advisory body for the UN system, had provided independent scientific advice on marine pollution and marine environmental protection issues since 1969 and that IMO had fulfilled, since the early 1970s, the Administrative Secretariat function for and on behalf of all Sponsors of GESAMP and was also a regular user of GESAMP’s advice such as activities in the hazard evaluation of chemicals;
- .2 recognized that IMO had benefited substantially from GESAMP;
- .3 also noted that the strategic vision for the New GESAMP provided concrete mechanisms to ensure GESAMP’s professionalism, including its effectiveness, efficiency, transparency, and accountability and in keeping with its strategic vision and mission statement, GESAMP had offered to play a lead role in the organization of the scientific work of the so-called GMA-process;
- .4 reiterated the view that the work currently carried out by GESAMP was very important and useful to the work of IMO, in particular in its role as an independent and impartial adviser in the evaluation of the hazards of noxious liquid substances under MARPOL Annex II and the IBC Code. It, therefore, agreed that the arrangement should be guaranteed through the continuation of current funding. In this regard, the Group were informed that the Council had approved the current funding for the next biennium; and
- .5 was not in a position to have a conclusive opinion on the new strategic vision and direction since it needed more information and explanation on several issues. In this regard, the Group were informed that the forthcoming June meeting on the GMA-process may clarify the exact role of GESAMP in the GMA-process.

2 CRITERIA FOR ESTIMATING INHALATION TOXICITY RATINGS (COLUMN 3)

2.1 The Group recalled that at EHS 40, the Mammalian Toxicology Sub-Group had developed draft guidelines with which to provide estimated ratings for column C3 (inhalation toxicity) by using other toxicological properties, including skin and eye irritation ratings amongst other criteria.

2.2 The Group were informed that, during the intersessional period, these guidelines were verified through their application to chemicals with C3 ratings based upon experimental inhalation studies. The Group were further informed that the results showed that where columns D2 or D3 values showed high estimated values, these correlated well with ratings based on experimental inhalation studies and where the D2 or D3 ratings were low, the estimated rating

for C3 was found to be higher than the rating based on experimental studies, which meant that in the latter case the estimated results would err on the side of caution. Based on this outcome, the Group decided to apply this estimation method to those substances which had either “NI” or previously estimated data i.e. in “()” in the C3 column. The rationale for the procedure for estimating acute inhalation toxicity ratings is given at annex 3.

2.3 The resultant hazard profiles for these products are shown in annex 4.

2.4 It was recalled that the ca. 800 IBC Code substances have been reviewed and updated according to the revised GESAMP hazard evaluation procedure. The experimental inhalation toxicity ratings provide a unique dataset upon which to base a system for estimating missing data in the context of marine transport of bulk chemicals. The members therefore discussed the desirability of producing a discussion document for wider distribution.

3 REPORTS AND STUDIES NO. 64 – EVALUATION OF NEW SUBSTANCES PROPOSED FOR BULK TRANSPORT BY SHIPS (EXISTING AND REVISED PROCEDURES)

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

- .1 Distilled Resin Oil (DRO);
- .2 Isononylaldehyde;
- .3 COATEX M 1083;
- .4 RADIAGREEN BD VLV;
- .5 RADIAGREEN BD LV;
- .6 Blend TN-100;
- .7 Mango kernel oil (containing less than 10% free fatty acids);
- .8 Palm Kernel Olein (containing less than 5% free fatty acids);
- .9 Palm Kernel Stearin (containing less than 5% free fatty acids);
- .10 Shea butter (containing less than 15% free fatty acids);
- .11 Illipe oil (containing less than 10% free fatty acids);
- .12 Rice bran oil (containing less than 10% free fatty acids);
- .13 Mixed acid oil;
- .14 Palm acid oil; and
- .15 Palm fatty acid distillate.

3.2 The acid oils and distillates (nos: 13-15) were rated by analogy to their parent vegetable oils (when known) and to their constituent fatty acids.

3.3 The resultant hazard profiles for these new products are shown in annex 5.

3.4 In considering the various products, the Group agreed that for:

- .1 Distilled Resin Oil and Blend TN-100, the ratings assigned to all columns were based by analogy on selected components with existing GESAMP hazard profiles;
- .2 COATEX M 1083, RADIAGREEN BD VLV, RADIAGREEN BD LV and Blend TN-100, a proper shipping name would be required;

- .3 RADIAGREEN BD VLV and RADIAGREEN BD LV a number of ratings could not be assigned since additional data are required;
- .4 the various vegetable oils, in the absence of supporting data and where it was recognized that these had a similar composition to Palm oil, ratings were assigned by analogy to Palm Oil;
- .5 synonyms associated with vegetable oils, the Group cross-checked these synonyms as requested by ESPH 10, but recognized that in the absence of quantitative information on composition for each synonym, this would remain incomplete. The Group considered that the onus for submitting correct synonyms rests with the industry submitting the data; and
- .6 Shea Butter a rating in A2 could not be assigned by analogy to palm oil due to the presence of anti-bacterial components, as evidenced by the composition provided.

4 CORRESPONDENCE WITH THE INDUSTRY AND CONSIDERATION OF QUERIES FROM INDUSTRY RELATED TO EVALUATIONS

List of products associated with queries from industry

4.1 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 Methacrylic acid-alkoxypoly(alkylene oxide) methacrylate copolymer sodium salt, aqueous solution;
- .2 Tall Oil Distilled;
- .3 Hydrocarbon waxes;
- .4 Poly(iminoethylene)-*graft-N*-poly(ethyleneoxy) solution (90% or less);
- .5 Alcohols (C12-C13) linear and alcohols (C14-C18) linear;
- .6 *N*-(3-Chloro-2-hydroxypropyl) trimethylammonium chloride solution (75% or less);
- .7 Ethoxylated tallow amine/ ethoxylated tallow amine glycol mixtures;
- .8 3-(Methylthio) propionaldehyde;
- .9 Urea ammonium nitrate solutions;
- .10 Vegetable oils; and
- .11 Fatty acid mixtures.

4.2 The resultant hazard profiles for these products are shown in annex 4. The Group noted that the correspondence showed no additional new information for *N*-(3-Chloro-2-hydroxypropyl) trimethylammonium chloride solution (75% or less);

Methacrylic acid-alkoxypoly(alkylene oxide) methacrylate copolymer sodium salt, aqueous solution

4.3 The Group noted the additional information received by the industry which enabled the hazard profile to be further completed in particular of assigning an “NR” in column A2.

Tall Oil Distilled (Tall Oil Crude & Distilled)

4.4 The Group reviewed the information on this product. The Group noted that the original IBC Code entry “Tall Oil Crude & Distilled” appears on the list of products, which were not included in the amendments to the IBC Code because these products lacked essential data (MSC/Circ.1128 - MEPC/Circ.423). The Group further noted that this entry covered the crude product containing resin acids and fatty acids as well as the distilled product comprising mainly of fatty acids. The manufacturer requested the Group to consider a new entry - Tall Oil Distilled. The mammalian toxicologists completed the ratings for tall oil distilled accordingly:

- .1 C2 (0): based on oral toxicity and comparison with tall oil entries;
- .2 C3 (1): by application of the derived formula using oral toxicity and skin and irritation; and
- .3 D2 (1): by comparison with Tall Oil crude and Tall Oil Fatty Acids.

4.5 The Group noted that at some stage, the manufacturer will need to submit Tall Oil Distilled to IMO for pollution categorization, ship typing and the assignment of carriage conditions.

4.6 The Group further noted that at the time there was no information available to assign any ratings for a projected new entry under the name “Tall Oil Crude”. This information is being collected by industry for transmission to the Group for further consideration.

4.7 To date, insufficient data has been received to complete the profiles of either this proposed new entry or the original “Tall Oil Crude & Distilled” entry. In the latter case, the Secretariat has been informed that the trade is ca. 500,000 tonnes per annum for “Tall Oil Crude & Distilled”. The majority of data appear to have been generated with the distilled product and generally a less hazardous product, leaving the combined entry, poorly supported by data.

Hydrocarbon Waxes

4.8 At the request of industry (European Wax Federation), the Group had previously evaluated ‘hydrocarbon waxes’ on the basis of data submitted. This was apparently intended by industry to consolidate the existing entries in the IBC Code (Waxes, Paraffin wax and Petrolatum). ESPH 10 had however reviewed this proposal when discussing the report of EHS 40 and noted that the existing entries adequately covered the known pollution and safety hazards of the products carried. They also noted that any proposed new entry would need to be submitted to IMO for assigning pollution category, ship type and carriage requirements. Therefore the Group did not further consider the hazard profile of hydrocarbon waxes.

Poly(iminoethylene)-graft-N-poly(ethyleneoxy) solution (90% or less)

4.9 The Group noted that a revised proposal data sheet for the above substance has been received from industry and reconfirmed the existing hazard profile of the substance. The only outstanding column to be rated is B2, for which no new data were provided.

Alcohols (C12-C13) linear and alcohols (C14-C18) linear

4.10 The environmental properties of the fatty alcohols were rated on the basis of the summary data provided by industry, enabling Columns A and B of the hazard profiles to be completed.

Ethoxylated tallow amine/ethoxylated tallow amine glycol mixture

4.11 The Group considered the following three products which had at various times been submitted for evaluation:

- .1 a trade name substance containing 60-70% amine;
- .2 Ethoxylated tallow amine, glycol mixture containing typical 71% amine with the remainder comprised of glycols; and
- .3 an older entry "Ethoxylated tallow amine" containing 75% amine with the remainder comprised of glycols.

4.12 In all three cases, the glycol component is of lower hazard than the amine itself.

4.13 In addition the Group also noted that industry wishes to ship a 98% pure product.

4.14 Upon examining the submitted data as a whole, it became apparent that for ethoxylated tallow amine glycol mixture with an amine content above 70%, the rating for skin irritation in D1 would increase from a 1 to a 2. One way to reflect these hazards would be to adopt two new entries "Ethoxylated tallow amine (> 70% amine)" and "Ethoxylated tallow amine ($\leq$ 70% amine)". Should it be decided that the "Ethoxylated tallow amine glycol mixture" be retained as the proper shipping name then an alternative would be for the Group to increase the rating in Column D1 from a 1 to a 2, i.e. to err on the side of caution. The ethoxylated tallow amine glycol mixture with an amine content above 70% would also cover the 98% product.

3-(Methylthio)propionaldehyde

4.15 Whilst noting that this product had its pollution category, ship type and carriage requirements assigned under the revised IBC Code, the Group considered the new information received by the industry on flash point and biodegradability and assigned an "R" in column A2.

Urea ammonium nitrate solutions

4.16 The Group noted that the entry, urea ammonium nitrate solutions, has a column B1 rating based on aqueous ammonia. Correspondence with the fertilizer industry indicates that this product contains less than 1% ammonium. The Group was therefore requested by industry to give a column B1 rating of 1 instead of the current 3, i.e. in line with the lesser hazard. However, for this to come into effect, the name would need to be changed by adding "(contains <1% aqueous ammonia)", in effect a new entry. The fertilizer industry will need to submit this to the ESPH Working Group of the BLG Sub-Committee. A separate entry under the name "Urea ammonium nitrate solutions (containing aqueous ammonia)" would then be needed to carry products with higher concentrations of ammonia.

4.17 A similar approach for urea ammonium phosphate might be considered and similar ratings given by analogy provided the manufacturer can provide a statement of the actual levels of ammonia carried in the product to the Group.

4.18 The Group instructed the Secretariat to advise IMO to consider this matter, bearing in mind that a decision not to change the names would lead to over classification of the "<1% aqueous ammonia product".

Vegetable oils

4.19 At the request of ESPH 10, industry had re-submitted data on eight vegetable oils previously evaluated at EHS 40. These submissions indicated higher free-fatty contents in their names than those previously received by the Group and as a result were re-evaluated. The environmental criteria in columns A1, A2, B1 and E2 remained unchanged, while some changes were made to columns C3 and D1 and D2 as appropriate. The hazard profile for Safflower oil (containing less than 5% free fatty acids) was also completed.

4.20 The resultant hazard profiles for these vegetable oils are also shown in annex 4.

Fatty acid mixtures

4.21 A submission from industry in the form of robust summaries for fatty acid mixtures was received during the course of the meeting and evaluated, enabling the profiles of the following substances to be completed:

- .1 Fatty acids, saturated, linear, C12+;
- .2 Fatty acids, linear C12+ saturated and C12+ unsaturated;
- .3 Fatty acids, unsaturated, linear, C16+;
- .4 Fatty acids, linear C8-18 saturated with C18 unsaturated;
- .5 Coconut oil fatty acid (by analogy to dodecanoic (lauric) acid and appears in the list of products omitted from the amendments to IBC Code due to missing data); and
- .6 Tallow fatty acid (by analogy to fatty acids, linear C8-18 saturated with C18 unsaturated and appears in the list of products omitted from the amendments to IBC Code due to missing data).

5 CONSOLIDATION OF ALL THE EVALUATIONS MADE TO DATE

Lube oil additives

5.1 The Group noted that ESPH 10 requested that lube-oil additives (LOAs) be given priority as the results of the evaluations of these additives were needed to carry out calculations for mixtures in List 2 of MEPC.2/Circ. The Group used the list of (LOAs) which appeared in Annex 10 to MEPC.2/Circ.10 as a basis for their work. On review of the list the Group further noted that most of the LOAs which feature in Annex 10 also appear on the list of products missing data and for the most part were evaluated under agenda item 7.

5.2 Recent submissions from industry were evaluated and the essential ratings assigned, enabling the profiles for a number of LOAs to be completed. It is hoped that industry can provide data for the remaining LOAs which appear in MEPC.2/Circ.10, Annex 10 and MSC/Circ.1128 - MEPC/Circ.423 (missing pollution and/or safety data), allowing them to be completed in a similar way at EHS 42.

5.3 The resultant hazard profiles for these products are shown in annex 4 and/or 7 as appropriate.

Action required in the database from EHS 40

5.4 A document prepared by the Secretariat regarding issues of nomenclature as well as minor corrections to hazard profiles and queries regarding interpretation of data was reviewed by the Group. Decisions were made on the following substances:

- .1 Acrylates and methacrylates: these groups of substances had been the subject of a consolidation exercise in the intersessional period. It was decided to suspend work on these groups, with the exception of action required to complete any profile with missing essential data, until after the entry into force of the revised MARPOL Annex II in 2007;
- .2 Butyl methacrylate; the ratings in columns A1A, A1B, A1, A2 and B1 should read 2, NI, 2, NR, 1 respectively;
- .3 Dodecanoic acid; this EHS entry is not a proper shipping name associated with the IBC Code and was therefore proposed for deletion. 'Lauric acid' already exists as an EHS entry and is an IBC code entry. This will be noted in the respective files;
- .4 Dodecylbenzene; the rating in column B2 (chronic toxicity) is given as 0, it was agreed to check this rating in the intersessional period, as data in the file tended to indicate a higher value. It will be reviewed again at EHS 42;
- .5 Fatty acids, linear (C8-C18 saturated with C18 – unsaturated) and fatty acids saturated (linear C12+); the justification for ratings in brackets in Columns C1 to C3, D1 and D2 was given as 'human experience' for both substances. This will be noted in the respective files;
- .6 Isoprene; the basis for a "CM" rating in column D3 was confirmed as being: IARC – carcinogen class 2B, IUCLID – positive mutagen and EU 'R phrases' R45 and R 68. No change to the hazard profile is proposed. This will be noted in the respective files; and
- .7 Propylene dimer; it was recommended that if possible, columns C1 to C3, D1 and D2 be completed by analogy to hexene (all isomers). Similarly, diisobutylene, might be rated by analogy to octene (all isomers). These substances will be considered at EHS 42.

Solidifying floating substances as persistent floaters

5.5 At EHS 40, the Group agreed that an Fp rating in column E2 would be assigned to those substances which could be characterized as solid floaters (melting point $>20^{\circ}\text{C}$, density < 1.03 , and solubility $\leq 10\%$). Presently these substances are classified as floaters (F). The rationale for the change in classification is documented in EHS 40/9. Although the profiles of the vegetable oils had been upgraded, due to a lack of time at EHS 40, not all substances affected by the change could be identified. This review was therefore conducted during the present meeting and the list of the solidifying substances which are assigned a rating of Fp is shown at annex 6.

6 RE-EVALUATION OF THE PRODUCTS IN THE IBC CODE WITH MISSING POLLUTION AND/OR SAFETY DATA

6.1 Following the publication by IMO of the list of products (MSC/Circ.1128 - MEPC/Circ.423), which because they lacked essential data were not included in the amendments to the IBC Code, the Group noted that additional data had been received from industry which enabled a number of profiles for those products to be completed.

6.2 The Group noted that IMO when publishing the list of products with missing data had requested that the essential data needed to assign Pollution Category and Ship Type based on the revised GESAMP Hazard Profile are A1 (aquatic bioaccumulation), B1 (acute aquatic toxicity), E2 (physical effects on wildlife and benthic habitats), C1 (mammalian acute oral toxicity), C2 (mammalian acute dermal toxicity) and C3 (mammalian acute inhalation toxicity) whilst information on A2 (aquatic biodegradation), B2 (chronic aquatic toxicity) and D3 (long-term human health effects) would also greatly assist the process or necessary in some cases. The Group further noted that data on D1 and D2 (skin and eye irritation and corrosion) would also be beneficial since these are used in the estimation method for C3 and in developing a value for D3.

6.3 Prior to the evaluation exercise, the Group had an exchange of views on the role of robust study summaries (RSS) which were submitted by industry in support of the work to complete the hazard profiles for those products with missing data. The results of these deliberations are reflected in paragraphs 7.1 and 7.2.

6.4 The hazard profiles were completed for 60 products (see annex 7).

7 ANY OTHER BUSINESS

Robust Study Summaries

7.1 The Group noted that a number of robust study summaries (RSS) were submitted by industry in support of the work to complete the hazard profiles for those products with missing data (agenda item 7). The Group further noted that the GESAMP Reports and Studies No. 64 describes what is expected from industry/ manufacturers to support a submission for a hazard evaluation of a product and that supporting references and/or original test laboratory reports are preferred where appropriate. The Group however recognized that the robust summary approach is now in widespread use internationally and is an effective and efficient way to provide and share data.

7.2 The Group reiterated that the GESAMP/EHS Reporting Form is required for a new submission and where necessary or appropriate supporting documents may include RSS.

Publication of the GESAMP/EHS Composite List of Hazard Profiles

7.3 The Group recognized that there is a demand from different stakeholders for the GESAMP/EHS Composite List of Hazard Profiles and agreed that it would be useful to publish a list of substances and their associated hazard profiles which have been evaluated on the basis of the revised GESAMP Hazard Evaluation Procedure. The Group further agreed that in addition to taking this course of action, this Composite List should be made available on the internet to make interested parties aware of it.

REACH Implementation Projects (RIPs)

7.4 The Group was informed by one of the members regarding progress on the new chemical safety legislation in the European Union entitled “Registration, Evaluation and Authorization of Chemicals (REACH)”. To assess the need for technical guidance in advance of the implementation of REACH, the Group was further informed that scoping documents are under preparation.

7.5 One scoping document per ‘endpoint’ was being prepared with regard to technical guidance for industry and a second scoping document was being prepared to provide technical guidance for the 25 member States. One of the RIP projects will consider data collection and generation strategies for non-test methods. The Group considered that its inhalation toxicity estimation technique (see annex 3) might be of interest in this regard but warned that care should be taken should anyone wish to use this method out of the context of MARPOL Annex II and the ca. 800 chemicals associated with or contained in the IBC Code, for which a basis of peer reviewed, experimental data are available with which to give the estimation method reliability.

OECD Chronic aquatic toxicity

7.6 The Group was also informed of the work of the OECD expert group on environmental hazards and in particular on the outcome of the 14th meeting of the OECD Task Force on the GHS which was held in Paris in February 2005. The meeting discussed the completion of work on chronic aquatic toxicity, in particular the possible use of Acute to Chronic Ratios (ACR's). The GESAMP/EHS Working Group was represented by one of its members who informed the OECD expert group that the Group, in devising the revised GESAMP hazard evaluation procedure, had deliberately not used ACR's in evaluating chemical hazards and that as a result, the Column B1 scale representing acute aquatic toxicity and the Column B2 scale reflecting ‘measured’ chronic aquatic toxicity should be considered as separate hazards and hence that no attempt should be made to link the two by any ratio or fixed factor. The Group was further informed that the OECD expert group was working on a new proposal for long-term aquatic toxicity. Several members expressed concern that the OECD and the UN was already changing some elements of the GHS while this is still in the early phases of implementation, IMO being one of the few bodies which had already implemented the GHS in its mechanism for the revised Annex II of MARPOL.

8 FUTURE WORK PROGRAMME AND DATES OF THE FOLLOWING SESSIONS

Consolidation of the hazard profiles

8.1 The Group recalled that the ca. 800 substances in the IBC code had been re-evaluated according to the revised GESAMP hazard evaluation procedure between 1998 and 2003, often at a rate of more than 100 substances per meeting. As a result, the Group at EHS 39 had started to consolidate the profiles in order to correct any errors and fill in gaps on the basis of groups of related chemical substances. Upon receipt of a request from IMO to focus on substances with incomplete profiles and in particular the LOAs in the amendments to IBC code as well as those required for calculating mixtures, this ongoing consolidation work remains incomplete. The Group felt that in the interests of data integrity and the accuracy of the ratings this consolidation exercise should be completed in the future. It was however decided to postpone this until the current request has been completed.

Intersessional meetings

8.2 Following the publication by IMO of the list of products (MSC/Circ.1128 - MEPC/Circ.423), which because they lacked essential data were not included in the amendments to the IBC Code, the Group noted that additional data had been received from industry which enabled a number of profiles for some of the products which appeared in the list to be completed (agenda item 6/annex 7). The Group further noted that for these products a voluminous quantity of the information was received which required careful review.

8.2 The Group recognized that in order to complete the evaluation of the remaining products with missing data by the time frames set, it may be necessary to hold, in addition to the regular EHS/GESAMP Working Group meeting scheduled for early next year, an additional intersessional meeting for each of the aquatic toxicology and of the mammalian toxicology sub-groups and urged the Secretariat to do its utmost to secure the necessary funds to this end.

Date of next meeting

8.3 It was agreed that the date of the next regular meeting of the Group would be 20 to 24 February 2006 whilst the intersessional meetings would be arranged by the sub-groups subject to obtaining financial support for holding such meetings.

9 CONSIDERATION AND ADOPTION OF THE REPORT

9.1 The Group adopted the report and, having thanked members for the considerable amount of effort, including extensive preparatory work, *inter alia*, the collection, collation and evaluation of data to generate *Revised Hazard Profiles*, the Chairman closed the session on Friday, 13 May 2005 at 13:00 hrs.

ANNEX 1

**LIST OF MEMBERS ATTENDING THE FORTY-FIRST SESSION
OF THE GESAMP/EHS WORKING GROUP**

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ANNEX 2**AGENDA FOR THE FORTY-FIRST SESSION OF THE
GESAMP/EHS WORKING GROUP**

- 1 Adoption of the agenda
 - Matters arising from IMO and other Organizations relevant to the activities of the Working Group
- 2 Reports and Studies No. 64
 - Criteria for estimating inhalation toxicity ratings (column 3)
- 3 Evaluation of new substances proposed for bulk transport by ships (existing and revised procedures)
- 4 Correspondence with the industry and consideration of queries from industry related to evaluations
- 5 Consolidation of all the evaluations made to date
 - Lube oil additives
 - Action required in the database from EHS 40
 - Solidifying floating substances as persistent floaters
- 6 Re-evaluation of the products in the IBC Code with missing pollution and/or safety data
- 7 Any other business
- 8 Future work programme and dates of the following sessions
- 9 Consideration and adoption of the report

ANNEX 3

PROCEDURE ADOPTED BY THE EHS WG FOR ESTIMATING ACUTE INHALATION TOXICITY RATINGS

1 Introduction

The rating of chemicals for inhalation toxicity (in column C3) is normally based on LC₅₀ data relating to 4 h exposures in experimental animals, usually rats. Where such information is available it is used to establish the rating. Where LC₅₀ data relating to 1 h exposure is available, such values are divided by 4 to be considered equivalent to LC₅₀ for 4 h and thus employed.

2 Absence of acute inhalation toxicity data

Although data for inhalation toxicity (column C3) is required to complete a GESAMP hazard profile, the majority of chemicals (64%) currently in the revised composite list lack this information. In view of the complexity of acute inhalation studies, and especially for the need to avoid unnecessary testing in animals, the EHS WG was stimulated to seek a simple and reliable method for estimating acute inhalation toxicity based on other data that is usually more readily available, namely, *inter alia*, acute oral toxicity and skin/eye irritation/corrosivity. It is recognized that although there have been proposals for extrapolation techniques, there is as yet no scientifically accepted nor validated method readily available. In order to alleviate the substantial problem of missing acute inhalation toxicity data, the EHS WG chose to employ a simple technique for providing reasonable estimates for acute inhalation toxicity ratings to be included in the GESAMP hazard profile, represented within brackets () to clearly identify them as estimates. This approach was described in Section 4.3.4 of the GESAMP Reports and Studies No. 64.

3 Procedure

3.1 Where acute inhalation toxicity data is not available for a chemical, and in order to be able to provide an estimate of the potential acute inhalation toxicity, thus enabling as comprehensive a rating as possible, EHS WG toxicologists take account of all information available to reach an expert opinion. Thus, adopting a precautionary approach regarding potential hazards to human health, the aim is to allocate a rating for acute inhalation for Column C3.

3.2 In the absence of experimental data, the approach undertaken takes into consideration all available evidence to assist in making an expert judgement regarding the required inhalation toxicity rating. All available evidence can include, *inter alia*, extrapolation from oral acute toxicity, skin and/or eye irritation/corrosivity values, toxicokinetics, evidence from human exposure, and data from closely analogous chemicals using structure activity relationship.

3.3 As a basis for applying a consistent approach, the EHS WG toxicologists devised a rating estimation guide based initially upon the acute oral and/or dermal toxicity, and also the skin and/or eye irritation/corrosivity data. The table below indicates the guidance values followed, referred to as an estimation rationale:

Highest Oral and/or Dermal ratings for Columns C1 and/or C2	Highest Skin and/or Eye irritation ratings for Columns D1 and/or D2	Proposed estimated Acute Inhalation Toxicity rating 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	

3.4 It should be noted, however, that whilst the above rationale is utilized, in order to maintain consistency in approach and outcome, the application of this procedure is dependant on circumstances and where applied is conducted for each individual chemical on a case-by-case basis. It is emphasized that this procedure is employed only where the required data is not available, and in order to avoid unnecessary further testing in animals, with the objective of enabling a more complete hazard profile to be established.

4 Validation of the above rationale approach

4.1 The revised composite list contains approximately 800 chemicals, of which 290 (36%) contain actual experimental data for acute inhalation toxicity. In order to test the validity of the proposed rationale procedure, estimation of acute inhalation toxicity rating, using the proposed table values, were made for all chemicals which have actual values in column C3. The results were assessed for correlation of the estimated values with the actual values.

4.2 The results indicate that skin or eye irritation/corrosivity values were principal in estimating acute inhalation toxicity, providing a good correlation (ie. rating = or +1 compared to actual value) for 192 (66%) chemicals when skin or eye irritation rating was 3. Where skin or eye rating was lower, there was a tendency to overestimate the acute inhalation toxicity rating (eg. +2). Nevertheless, a good or reasonable estimate was achieved for 265/290 (91%) of the chemicals assessed by applying this simple approach. These findings were considered acceptable when weighed against the prevailing problem of missing acute inhalation toxicity data.

4.3 Consequently, on the basis of the results of this validation exercise, and in the interest of expediency and consistency, the proposed method of estimation has been applied throughout the database, for all chemicals which lacked acute inhalation toxicity data, and also for those with estimated acute inhalation toxicity ratings made previously by other means.

4.4 In applying this method to column C3 throughout the database it is important to emphasize the following points:

- .1 only those chemicals with either no data (NI) or previously estimated data () were addressed;
- .2 the method of estimation using the rationale is not intended for automatic implementation, nor has it been so applied. Each chemical was assessed individually;
- .3 where information from analogous chemicals has provided a more reliable means of estimating acute inhalation toxicity than reference to skin/eye irritation values, this has been used in preference;
- .4 in some special cases, eg. respiratory sensitizers, estimation of the acute inhalation toxicity rating needs to be assessed on the basis of chemical structure and toxicological experience;
- .5 for all chemicals which have been addressed, the estimation was achieved by expert judgement, on a case-by-case basis; and
- .6 it is recognized that for a relatively small number of chemicals which are highly reactive, eg. epsilon caprolactam, application of the rationale approach is not reliable as it may underestimate the acute inhalation hazard.

5 Conclusion

5.1 A simple method has been employed, and has been validated to acceptability for purpose, to enable acute inhalation toxicity rating to be reasonably estimated where actual values are not available, thereby avoiding the necessity to request further testing in experimental animals.

5.2 Throughout the revised composite list, some 510 (64%) chemicals with missing acute inhalation data or with previously estimated acute inhalation ratings, have been provided with estimated values employing a consistent approach and applied by expert judgement.

5.3 In all cases, the approach to estimation is undertaken only in the absence of experimental data, and takes into consideration all other available evidence to assist in making an expert judgement regarding the required acute inhalation toxicity rating. All available evidence can include, *inter alia*, extrapolation from oral acute toxicity, skin and/or eye irritation/corrosivity values, toxicokinetics, evidence from human exposure, and data from closely analogous chemicals using structure activity relationship. This approach requires appropriately trained and experienced toxicology experts to enable a reliable estimate of acute inhalation toxicity to be derived.

Annex 4

EHS 41/9

All products discussed at the meeting

--- Existing GHP -----

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

Page 1 of 25

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Acetochlor (ISO)	2047	0	4	1	II	XXX	3	2	2	NI	4	NI	1	0	(1)	0	0	S	NI	S	2
Acrylamide	23	0	2	2	II	XX	0	0	0	R	2	0	2	2	(2)	1	2	CMN S	NI	D	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	(2)	2	2		NI	FD	2
Alachlor (ISO)	1488	0	4	1	I	XX	3	3	3	NI	4	1	1	0	(2)	1	0	CS	NI	S	3
Alcohol(C12-C16) poly(20 and above)ethoxylates	1482	0	2	1	I	X	4	(3)	(3)	R	2	0	(0)	(0)	(2)	2	1		NI	D	2
Alcohol(C6-C17)(secondary) poly(6)ethoxylate	722	0	4	1	0	0	4	3	3	R	4	2	0	(0)	(3)	3	2		NI	D	3
Alcohol(C6-C17)(secondary) poly(12)ethoxylate	295	0	4	1	0	0	3	3	3	R	4	1	1	0	(3)	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)		NI	D	2
Alcohol(C12-C16) poly(1-6)ethoxylates	294	0	4	1	I	X	5	3	3	R	4	1	0	0	(2)	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	(3)	3	3		NI	D	3
Alcohols (C8-C11)	2279						(3)	NI	(3)	(R)	(3)	(1)	(0)	(0)	(2)	(2)	(2)		NI	Fp	
Alcohols (C12-C13), linear	2294						5	NI	5	R	4	(1)	0	0	(1)	1	1		NI	Fp	2
Alcohols (C14-C18), linear	2293						5	NI	5	R	0	1	0	0	(1)	1	1		NI	Fp	2
Iso- and cyclo-alkanes (C10-C11)	2203		0				(5)	NI	(5)	NI	(0)	(0)	(0)	(0)	(1)	(1)	(0)		NI	NI	NI
n-Alkanes (C10-C20)	296	0	0	(1)	0	0	(5)	NI	(5)	(R)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	A	NI	F	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Alkane (C14-C17) sulphonic acid, sodium salt	334	0	3	1	I	X	NI	NI	NI	NI	3	NI	0	0	(2)	2	2		NI	D	2
Alkenylamide, long chain, more tha C10	1858	0	4	0	0	XX	NI	NI	(3)	NI	4	NI	0	(0)	(1)	0	1		NI	Fp	1
Alkenyl succinic anhydride	298	0	1	0	II	XX	0	0	0	NR	1	NI	0	0	(2)	2	(2)	S	NI	FD	2
Alkyl acrylate/Vinyl pyridine copolymer in toluene	299	0	2	1	II	XX	2	2	2	R	2	0	0	0	(2)	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	S	NI	Fp	2
Alkylated phenols (C4-C9)	2273	0	1	1	I	X	0	2	0	NR	1	0	1	0	(2)	1	1		NI	Fp	1
Alkyl (C3-C4) benzenes	2206		3				(3)	NI	(3)	(NR)	4	NI	0	(0)	(2)	(2)	(1)		NI	FE	2
Alkyl (C5-C8) benzenes	2207		4				5	4	4	NI	4	NI	0	0	(2)	(2)	(1)		NI	F	1
Alkyl benzenes, C9-C17 (straight or branched)	1783	0	1	-	-	-	0	4	4	NR	1	NI	0	(0)	(1)	(1)	(1)		NI	F	1
Alkyl(C11-C13)benzenesulphonates straight chain	301	0	3	1	0	0	3	3	3	R	3	1	1	(1)	(3)	2	3		NI	FD	1
Alkyl (C7-C9) nitrates	8	Z	3	0	II	XX	4	NI	4	NR	3	NI	0	0	(3)	2	(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	(1)	1	1		NI	FD	1
Alkyl(C8-C9)phenylamine, in aromatic solvent (LOA)	2096	T	3	2	II	XX	2	NI	2	NR	3	NI	(0)	(0)	(2)	2	2		NI	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	(3)	2	3		NI	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	(2)	2	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
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	(3)	2	(3)		NI	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	(3)	2	3		NI	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	(3)	2	3		NI	D	3
Alkylsulphonic acid ester of phenol (MESAMOLL)	1878	0	0	0	0	0	5	NI	5	NR	0	NI	0	(0)	(0)	0	0		NI	S	0
Aluminium sulphate solution	2205		3				Inorg	Inorg	2	Inorg	3	1	1	(0)	(3)	(2)	(3)		NI	D	3
2-(2-Aminoethoxy) ethanol	75	0	1	0	II	X	0	0	0	NR	1	0	0	1	(3)	3	3		NI	D	3
Aminoethylethanolamine/Aminoethyl diethanolamine solution	74	0	1	1	I	0	Inorg	0	0	NR	1	0	1	(1)	(3)	(3B)	(2)	S	NI	D	2
N-Aminoethylpiperazine	88	0	1	1	II	XX	0	0	0	NR	1	NI	0	2	(3)	3	3	S	NI	D	3
Ammonium lignosulphonate (46% solution in water)	2086	0	0	1	0	0	0	NI	0	NR	0	NI	0	(0)	(0)	0	0		NI	D	0
Ammonium nitrate solutions	1912	0	1	1	0	0	Inorg	0	0	Inorg	1	NI	0	0	(2)	1	2		NI	D	2
Ammonium sulphide soln.(45% or less)	310	0	3	2	II	XX	Inorg	0	0	Inorg	3	NI	1	0	(2)	2	2	N	NI	D	2
Ammonium thiosulphate solution (60% or less)	312	0	1	1	0	0	Inorg	0	0	Inorg	1	NI	0	(0)	(1)	(1)	(1)		NI	D	1
tert-Amyl methyl ether	2141	0	2	1	I	XX	1	NI	1	NI	4	NI	1	0	(2)	0	1		NI	ED	2
Amyl propionate	1484	0	2	0	I	X	2	NI	2	R	2	NI	0	0	(2)	2	1		NI	F	2
Animal oil	263	0	0	0	I	XX	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	S	NI	Fp	2
Animal oil	263	0	0	0	I	XX	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	S	NI	Fp	2
Barium long chain alkaryl sulphonate (C11-C50) (LOA)	1978	0	3	1	0	XX	4	NI	4	NR	3	NI	2	0	(2)	0	0		NI	S	2
Benzene sulphonyl chloride	320	0	(1)	1	II	XX	1	1	1	R	(1)	NI	1	(2)	(3)	3	3		NI	SD	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
bis(hydrogenated tallow alkyl) methylamines	2232	-	-	0	1	X	Ni	NI	NI	NI	NI	NI	0	NI	NI	1	NI		NI	Fp	2
N,N-Bis(2-hydroxyethyl)oleamide (LOA)	2110	Z	3	0	I	XX	5	NI	5	NR	NI	NI	0	0	(2)	2	2		NI	Fp	2
Blend TN-100	2303	(0)	(3)	0	II	XXX	(2)	(2)	(2)	(R)	(3)	(0)	0	0	(2)	2	2	ACM NR		FE	2
Borax, anhydrous or hydrated, crude or refined	359	0	1	2	II	XX	Inorg	0	0	Inorg	1	0	0	0	(1)	1	1	R	NI	S	2
Boric acid	360	0	1	2	II	XX	Inorg	0	0	Inorg	1	0	0	(0)	(1)	1	1	R	NI	S	2
Butyl benzene	1774	T	3	0	I	X	4	NI	4	NI	4	1	0	0	(2)	2	1		NI	Fp	2
Butyl butyrate	399	T	(2)	0	I	XX	2	NI	2	NI	2	NI	0	0	(1)	1	NI		NI	FE	2
Butylene glycol methyl ether acetat	953	0	1	1	I	X	1	1	1	R	3	NI	0	(0)	(1)	1	1		NI	FED	1
Butylene glycol monomethyl ether	952	0	0	1	I	X	0	NI	0	R	(1)	NI	0	0	(1)	0	1		NI	D	1
Butyl methacrylate	409	0	1	0	I	XX	2	NI	2	NR	1	NI	0	0	0	2	2	S	NI	FE	2
Butyl octyl phthalate	410	0	-	-	-	X					NI		0	0	(1)	1	1	R	NI	Fp	3
Calcium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	70	0	2	0	I	XX	0	NI	0	NR	2	NI	0	0	(1)	(1)	(1)	S	NI	Fp	2
Calcium alkyl phenol sulphide,polyolefin phosphorosulphide mixture (LOA)	1435	0	4	0	I	XX	NI	NI	NI	NR	4	NI	0	0	(0)	NI	NI		NI	NI	NI
Calcium bromide (solutions)	427	0	0	1	I	0	Inorg	0	0	Inorg	1	0	(0)	(0)	(2)	(1)	(2)		NI	D	2
Calcium carbonate slurry	2016	0	D	0	0	0	Inorg	0	0	Inorg	1	NI	0	(0)	(2)	1	2		NI	S	2
Calcium hydroxide	431	0	1	0	I	0	Inorg	0	0	Inorg	1	NI	0	(0)	(2)	1	2		NI	S	2
Calcium lignosulphonate (52% solution in water)	2087	0	0	1	0	0	0	NI	0	NR	0	NI	0	(0)	(0)	0	0		NI	D	NI
Calcium long chain alkaryl sulphonate (C11-C50) (LOA)	1973	0	0	0	I	XX	NI	0	0	NR	0	NI	0	0	NI	NI	NI	S	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
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		NI	NI	1
Calcium long chain alkyl phenate sulphide (C8-C40) (LOA)	1756	0	1	0	I	XXX	0	NI	0	NR	0	NI	0	0	(2)	(2)	(2)	S	NI	Fp	2
Calcium nitrate	1803	0	0	1	I	X	Inorg	0	0	Inorg	0	NI	0	NI	(1)	1	1		NI	D	1
Calcium nitrate/ Magnesium nitrate/Potassium chloride solution	1734	0	0	1	I	X	Inorg	0	0	Inorg	1	0	0	NI	(1)	NI	1		NI	D	1
Camphor oil, white	1897	T	(3)	2	0	XX	NI	NI	NI	NI	NI	NI	2	NI	(2)	1	NI		(T)	FE	2
Carbon disulphide	439	0	2	3	II	XXX	2	1	1	NR	3	NI	2	(3)	4	3A	2	RN	NI	SD	3
Castor oil (containing less than 10% free fatty acids)	2314	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	0	(1)	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	(1)	(1)	(1)	C	NI	S	2
Chlorinated paraffins (C10-C13) with 60% chlorine or more	2021	+	4	0	II	XX	5	5	5	NR	5	2	0	0	(1)	1	1	C	NI	S	3
Chlorinated paraffins (C14-C17) with less than 1% shorter chain length	2112	0	0	0	0	XX	0		0				0	0	(2)	2	2	C	NI	S	2
N-(3-Chloro-2-hydroxypropyl) trimethylammonium chloride solution (75% or less)	2286	0	1	0	I	XX	NI	0	0	NR	NI	NI	0	0	(2)	0	(2)	SC	NI	D	0
Chloronitrobenzenes	467	Z	3	2	II	XX	2	2	2	NR	3	NI	2	2	(2)	1	1		NI	S	2
Citric acid	493	0	1/B OD	0	0	0	0	NI	0	R	1	0	0	(0)	(3)	1	3		NI	D	2
Coal tar	499	T	3	-	II	XXX	(4)	(4)	(4)	NR	3	NI	0	0	0	1	NI	C	(T)	SD	3
Coal tar pitch (molten)	491	0	1	-	II	XXX	(3)	(3)	(3)	NR	4	NI	0	0	(1)	1	0	C	NI	S	3
Coatex M 1083	2302	0	1	0	I	X	(2)	NI	(2)	NR	1	NI	0	0	(1)	1	1			D	0
Cobalt naphthenate in solvent naphtha	501	T	3	1	II	XXX	NI	NI	NI	NR	3	NI	0	(0)	(1)	NI	1	C	NI	FE/F	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Coconut oil	503	0	0	0	0	XX	0	NI	0	R	1	NI	0	(0)	(1)	0	1		NI	Fp	2
Coconut oil fatty acid	505	0	2	-	-	-	4	0	0	(R)	0	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Coconut oil fatty acid	505	0	2	-	-	-	4	0	0	(R)	0	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Copper salt of long chain(>C17) alkanolic acid (LOA)	2111	0	1	1	I	XX	0	NI	0	(R)	2	NI	0	0	(0)	0	0		NI	Fp	2
Corn oil	521	0	0	0	0	XX	0	NI	0	R	(2)	NI	0	(0)	(1)	1	1		NI	Fp	2
Cotton seed oil	523	0	0	(1)	I	XX	0	NI	0	R	(2)	NI	(0)	(0)	(1)	0	1		NI	Fp	2
Creosote (coal tar)	524	T	3	1	II	XXX	(4)	(4)	(4)	NR	4	NI	1	0	(2)	2	1	C	(T)	S	3
Creosote (wood tar)	525	T	3	2	II	XXX	NI	NI	NI	NR	NI	NI	1	0	(2)	2	1	C	(T)	SD	3
Cresols (mixed isomers)	527	T	3	2	II	XXX	2	2	2	R	3	0	2	2	(3)	3A	3		T	SD	3
Cresylic acids, dephenolized	1875	T	3	1	II	XXX	2	2	2	R	3	0	(2)	(2)	(3)	(3A)	(3)		(T)	S	3
Cresylic acid, sodium salt solution	1914	T	3	1	II	XXX	(2)	(2)	(2)	(R)	(3)	(0)	1	(2)	(3)	3	3		(T)	D	3
Cyclohexyl acetate	541	0	(3)	0	II	XX	2	NI	2	(R)	(2)	NI	0	0	(2)	2	1		NI	FED	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
Decahydronaphthalene	551	0	(1)	1	0	X	4	4	4	NR	3	NI	0	0	(1)	1	1		NI	F	2
Decanoic acid	555	0	2	0	II	XX	4	NI	4	R	4	1	0	0	(2)	2	2		NI	Fp	2
1-Decene	558	298	3	(1)	0	0	5	NI	5	R	4	2	0	0	0	2	0	A	NI	F	1
Decyl acetate	1767	0	(3)	0	I	X	4	NI	4	NI	NI	NI	0	0	(1)	(1)	(1)		NI	F	1
Decyl acrylate	559	0	4	1	I	X	5	NI	5	NI	5	NI	0	0	(2)	2	1		NI	Fp	2
Decyloxytetrahydrothiophene dioxi	1859	0	4	0	I	XX	3	NI	3	NR	4	NI	0	0	(1)	1	0		NI	Fp	2
Diacetone alcohol	563	0	1	1	I	X	0	NI	0	R	1	0	0	0	(2)	2	2		NI	D	2
Dialkyl phthalates C9-C13	566	0	0	(1)	0	XX	0	4	4	(NR)	0	(2)	0	0	(1)	1	1	R	NI	Fp	3
Dibutyl hydrogen phosphonate	1857	0	2	1	II	XXX	1	NI	1	NI	2	NI	0	0	(3)	3	3		NI	F	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
2,6-Di-tert-butyl phenol	2082	+	4	0	I	XX	4	NI	4	NR	4	NI	0	0	(1)	1	1		NI	Fp	2
1,1-Dichloroethane	590	0	(1)	1	0	0	1	NI	1	NR	1	NI	1	(1)	0	2	2		NI	SD	2
Dichloromethane	594	0	1	1	II	XX	1	2	2	NR	1	0	1	(1)	0	2	2	CM	NI	SD	3
2,4-Dichlorophenoxyacetic acid, diethanolamine salt, solution	599	T	3	1	II	XX	0	1	1	R	3	NI	1	0	(3)	(1)	3		(T)	D	3
2,4-Dichlorophenoxyacetic acid, dimethylamine salt, 70 % or less solution	600	T	3	1	II	XX	0	1	1	R	3	NI	1	1	(3)	(1)	(3)		(T)	D	1
2,2-Dichloropropionic acid	609	0	1	1	II	X	2	2	2	NR	2	NI	1	0	(3)	3	3		NI	D	3
2,6-Diethylaniline	1437	0	2	1	II	X	3	3	3	NR	2	NI	1	1	(2)	1	2		NI	FD	2
Diethyl benzene (mixed isomers)	624	T	3	1	I	X	4	4	4	NR	3	NI	0	(0)	(2)	2	1		NI	F	2
Diethylene glycol phthalate	1438	0	1	0	0	0	NI	NI	NI	NR	1	NI	0	0	(2)	(1)	2		NI	S	2
Diethylenetriamine pentaacetic acid pentasodium salt (40% solution in water)	2076	0	0	1	0	0	0	NI	0	NR	0	NI	0	(0)	(0)	0	0		NI	D	NI
Di-(2-ethylhexyl) phosphoric acid	643	0	2	1	I	X	(2)	1	1	NR	2	NI	0	1	(2)	2	2		NI	Fp	2
Di-(2-ethylhexyl) phthalate	642	0	0	0	II	XX	0	4	4	NR	0	0	0	0	(1)	1	1	CR	NI	Fp	3
Diethyl phthalate	648	0	2	1	II	X	3	3	3	R	2	0	1	0	(2)	1	1		NI	S	1
Diglycidyl ether of Bisphenol A	653	0	3	0	II	XX	3	NI	3	NR	4	NI	0	0	(2)	1	2	S	NI	S	2
Diglycidyl ether of Bisphenol F	728	0	3	0	II	XX	2	NI	2	NI	3	NI	0	(0)	(2)	1	(2)	SR	NI	S	3
Diheptyl phthalate	655	0	0	(0)	0	XX	0	2	2	R	0	NI	0	0	(1)	1	1	R	NI	Fp	3
Di-n-hexyl adipate	656	0	3	0	0	XX	5	NI	5	(NR)	5	0	0	0	(1)	0	1		NI	FE	1
Di-hexyl phthalate	2125	-	-	0	II	XX	5	NI	5	R	0	2	0	0	(1)	1	1	R	NI	Fp	3
Diisononyl adipate	690	0	0	0	0	XX	0	NI	0	NI	0	NI	0	0	(1)	1	1		NI	Fp	2
Diisooctyl phthalate	693	0	0	0	II	XX	0	4	4	(NR)	0	0	0	0	(1)	1	0		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
1,3-Diisopropylbenzene	706	T	4	0	0	0	5	4	4	NR	4	NI	0	0	2	2	1		NI	F	2
Diisopropyl naphthalene, mixed isomers	712	+	3	1	I	XX	5	4	4	NR	(3)	NI	0	0	(1)	1	1		NI	Fp	2
N,N-Dimethyldodecylamine	2126	+	4	2	II	XXX	5	NI	5	R	4	NI	1	(1)	(3)	3	3		NI	F	3
2,2-Dimethyloctanoic acid	675	0	2	1	II	XX	3	NI	3	R	4	1	0	0	(2)	2	2		NI	Fp	2
Dimethyl phthalate	678	0	2	1	0	X	2	2	2	R	2	0	0	0	(1)	0	1	R	NI	SD	3
2,2-Dimethylpropane-1,3-diol	679	0	(1)	0	0	0	0	0	0	NR	0	0	0	0	0	2	2		NI	Fp	2
Dinonyl phthalate	689	0	0	1	0	XX							0	0	(1)	1	1	R	0	Fp	3
Di-n-octyl phthalate	692	0	0	0	I	XX	0	(5)	(5)	(R)	NI	0	0	0	(1)	1	(1)	R	NI	Fp	3
Dipentene	686	T	2	1	I	X	4	NI	4	NR	2	NI	0	0	(2)	2	2	S	NI	F	3
Diphenyl	694	+	3	1	II	XXX	3	4	4	R	4	1	0	0	(2)	2	1		NI	S	2
Diphenylamine (molten)	2186	0	3	0	I	X	3	3	3	NR	3	1	0	0	(1)	1	1		NI	S	1
Diphenylamine, reaction product with 2,4,4-trimethylpentene	1500	-	(4)	0	II	XX	NI	NI	NI	NR	3	NI	0	0	(1)	1	1	S	NI	Fp	3
Diphenylamines, alkylated	1770	+	3	0	0	0	5	NI	5	NR	(3)	NI	0	0	(1)	(1)	(1)	S	NI	F	2
Diphenyl/Diphenyl ether (mixtures)	698	T	3	1	II	XXX			4	NR	4	1	0	0	(1)	1	1		(T)	S	1
Diphenylol propane-epichlorohydrin resins	2237						3	NI	3	NR	4	NI	0	0	(2)	1	2		NI	S	2
Di-n-propyl phthalate	713	0	(3)	1	I	X							0	0	(1)	1	1	R	NI		3
Distilled Resin Oil, DRO	2299	(0)	(3)	0	II	XXX	(3)	NI	(3)	(NR)	(3)	NI	0	0	(2)	2	1	MN		FE	2
Dithiocarbamate ester (C7-C35)	2185	0	4	0	I	XX	NI	2	2	NR	4	NI	0	0	(1)	1	1		NI	S	1
Ditridecyl phthalate	714	0	0	0	0	XX							0	0	(1)	1	NI		0	Fp	2
Dodecane	718	0	0	(1)	0	0	5	NI	5	(R)	0	NI	0	0	(1)	(1)	(0)		NI	Fp	2
tert-Dodecanethiol	2233	+	4	0	I	XX	5	NI	5	NR	4	NI	0	0	(2)	2	1	S	NI	F	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
1-Dodecanol	719	0	3	0	0	X	5	2	2	R	4	1	0	0	(1)	1	(1)		NI	Fp	2
Dodecene (all isomers)	720	0	(3)	(1)	I	0	5	NI	5	NR	4	NI	0	0	(2)	2	1	A	NI	F	1
2-Dodecenyl succinic acid, dipotassium salt, solution	727	O	0	1	0	0	4	NI	4	NR	1	NI	(0)	(0)	NI	NI	NI		NI	D	NI
Dodecylamine/Tetradecylamine mixture	721	-	4	2	II	XX	5	NI	5	NI	4	NI	1	(2)	(3)	3C	3		NI	F	3
Dodecyl benzene	126	0	0	0	I	X	0	NI	0	NR	0	3	0	0	(2)	(2)	(1)		NI	F	1
Dodecyl benzene sulphonic acid (contains 1.5% Sulphuric acid)	1739	0	3	1	I	X			3	R	3	1	1	(1)	(2)	(1)	(1)		NI	D	1
Dodecyl phenol	725	+	4	1	II	XX	0	4	4	NI	4	NI	0	0	(3)	3	2		NI	Fp	3
Dodecyl-, Tetradecyl-, Hexadecyl-dimethylamine mixture	2248	+	5	1	II	XX	5	NI	5	R	5	2	1	(1)	(3)	3C	3		NI	F	3
Dodecylxylene	1763	0	0	0	0	0	0	NI	0	NI	0	NI	0	0	(1)	1	1		NI	Fp	2
Ethoxylated tallow amine (containing more than 70% amine) glycol mixture	2313	4	4	1	II	XX	(4)	NI	(4)	(NR)	(4)	NI	1	0	(3)	2	3			SD	
Ethoxylated long chain (>C16)alkyloxyalkanamine (LOA)	2103	0	1	1	II	XX	5	NI	5	NR	1	NI	0	0	(3)	3	(3)		NI	Fp	3
Ethoxylated tallow amine (containing less than or equal to 70 % amine) glycol mixture	2252	4	4	1	II	XX	4	NI	4	NR	4	NI	1	0	3	1	3		NI		3
Ethyl acetoacetate	736	0	(1)	1	I	X	0	0	0	R	1	NI	0	0	(1)	1	1		NI	D	1
Ethyl amyl ketone	1784	T	2	-	-	-	2	NI	2	NI	2	NI	0	0	(2)	2	NI		NI	FD	2
Ethyl butyrate	748	0	2	0	I	X	1	NI	1	NI	2	NI	0	0	(2)	2	NI		NI	FED	2
Ethylene carbonate	755	0	0	0	I	X	0	NI	0	R	0	NI	0	0	(2)	1	2		NI	SD	2
Ethylene cyanohydrin	757	0	(1)	1	I	X	0	0	0	NI	2	NI	1	0	(2)	1	2		NI	D	2
Ethylene diamine, tetra acetic acid, di- and tetra-sodium salt	759	0	0	1	II	0	0	NI	0	NR	2	0	1	(1)	(2)	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
Ethylene glycol methyl ether acetate	773	0	2	1	II	XXX	0	NI	0	R	2	NI	1	0	(2)	NI	1	R	NI	D	3
Ethylene glycol monoacetate	762	0	(1)	1	I	X	0	NI	0	R	2	NI	0	0	(3)	NI	(3)	R	NI	D	3
Ethylene glycol phenyl ether	775	0	1	1	II	XX	1	NI	1	R	1	NI	1	0	(2)	1	2		NI	SD	2
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether mixture	1740	0	1	1	II	XX			1	R	1	NI	1	0	(2)	(2)	(2)		NI	SD	2
2-Ethylhexanoic acid	776	0	1	1	I	0	2	NI	2	R	2	NI	0	0	(2)	2	2	R	NI	FD	3
2-Ethylhexyl acrylate	782	0	(3)	0	I	X	3	NI	3	R	2	NI	0	0	(2)	2	2	S	NI	F	3
Ethyl isoamyl ketone	737	0	2	1	I	X							0	0	(1)	1	(2)		NI	FD	1
Ethyl propionate	790	0	1	1	I	X	1	NI	1	NI	2	NI	0	(1)	(2)	2	2		NI	ED	2
Fatty acids, essentially linear, C6-C18, 2-ethylhexyl ester	2253	0	1	0	0	XX	0	NI	0	R	1	NI	0	0	(1)	1	0		NI	Fp	2
Fatty acids, essentially linear, C6-C18, 2-ethylhexyl ester	2253	0	1	0	0	XX	0	NI	0	R	1	NI	0	0	(1)	1	0		NI	Fp	2
Fatty acids, linear, C8-C18 saturated with C18 unsaturated	2260						(4)	NI	(4)	R	(4)	(1)	(0)	(0)	(3)	(3)	(3)		NI		
Fatty acids, linear C12+ saturated with C12+ unsaturated	2261						5	0	0	(R)	0	NI	(0)	(0)	(2)	(1)	(2)		NI		
Fatty acids, saturated, linear, C12+	2258						5	0	0	R	0	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Fatty acids, unsaturated, linear, C16	2259						0	0	0	R	(0)	NI	0	0	(0)	0	0		NI	Fp	
Ferric chloride	339	0	2	2	0	X	Inorg	5	5	Inorg	2	0	1	(0)	(3)	2	3		NI	D	3
Ferric hydroxyethyl ethylene diamine triacetic acid, tri- sodium salt, solution	796	0	1	1	II	0	NI	NI	NI	NI	NI	NI	0	0	(1)	(0)	1		NI	D	1
Ferric nitrate/nitric acid solution	337						Inorg	5	5	Inorg	2	0	0	(0)	(3)	3	3		NI	D	3
Fish oil (containing less than 10% free fatty acids)	2316	0	0	0	I	XX	0	NI	0	R	2	NI	(0)	(0)	(1)	(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
Fish oil	801	0	0	0	I	XX	0	NI	0	R	2	NI	(0)	(0)	(1)	(0)	(1)		NI	Fp	2
Formic acid	809	0	1	1	II	XX	0	NI	0	R	2	NI	1	(1)	2	3C	3		NI	D	3
Glycerine	814	0	0	0	0	0	0	NI	0	R	0	NI	0	0	(1)	0	1		NI	D	1
Glycerine (83%)/ Dioxane-dimethanol (17%) mixture	1743	0	1	1	I	X	NI	NI	NI	R	1	NI	0	(0)	(1)	(0)	1		NI	D	1
Glycerol monooleate	1898	0	(1)	0	0	XX	0	0	0	R	0	NI	0	(0)	(1)	1	1		NI	Fp	2
Glycerol, propoxylated, mwt <1000	2282	(+)	-	1	I	X	(4)	NI	(4)	(NR)	NI	NI	1	0	(2)	1	(1)		NI		
Glycerol, propoxylated, mwt >1000	2275	(0)	(1)	1	I	X	NI	(0)	(0)	(NR)	(1)	NI	1	0	(2)	1	(1)		NI		
Glycidyl ester of C10 trialkyl acetic acid	441	0	3	1	II	XX	3	NI	3	NR	3	NI	0	0	(2)	2	1		NI	F	2
Glycine, Sodium salt, solution	817	0	0	0	0	0	0	NI	0	NI	0	NI	0	(0)	(1)	(0)	(1)		NI	D	1
Glycolic acid	2218	0	1	1	II	XXX	0	0	0	R	1	NI	1	(1)	2	3C	3		NI	D	3
Glyoxylic acid	1535	0	1	2	II	X	0	NI	0	R	2	0	0	0	(3)	0	3	S	NI	D	3
Glyphosate solution, without surfactant	1765	0	1	1	I	X	0	0	0	NR	3	0	0	0	(3)	0	3		NI	D	3
Heptanoic acid	831	0	1	0	I	X	2	NI	2	R	1	NI	0	0	(3)	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	(2)
Heptene (all isomers)	2225						3	NI	3	NI	2	NI	(0)	(0)	(2)	(2)	(0)		NI	E	2
1-Heptene	832	0	2	(1)	0	0	3	NI	3	NI	2	NI	(0)	(0)	(2)	(2)	(0)		NI	E	(2)
Heptyl acetate	833	0	(3)	0	I	X	3	NI	3	NI	(3)	NI	0	0	(2)	1	2		NI	F	2
Hexadecyl naphthalene/dihexadecyl naphthalene mixture	2159	0	0	0	0	0	0	NI	0	NR	0	NI	0	0	(1)	1	1		NI	Fp	2
Hexamethylene glycol	847	0	0	1	0	0	0	NI	0	R	1	NI	0	0	(1)	0	1		NI	D	1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Hexamethylene tetramine (40% solution)	849	0	0	1	II	XX	0	NI	0	R	0	NI	0	0	(1)	0	1	S	NI	D	2
Hexanoic acid	853	0	1	1	I	X	2	NI	2	R	2	NI	0	0	(3)	(3)	3		NI	FD	3
1-Hexanol	854	0	1	1	II	XX	1	0	0	(R)	2	NI	1	0	(3)	1	3		NI	FD	3
Hexene (all isomers)	2224						3	NI	3	R	3	NI	(0)	(0)	(1)	(1)	(1)		NI	E	2
1-Hexene	855	0	2	(1)	0	0	3	NI	3	R	3	NI	0	0	0	1	1		NI	E	0
2-Hexene (mixed isomers)	856	0	(2)	-	0	0	3	NI	3	R	3	NI	(0)	(0)	(1)	(1)	(1)		NI	E	(0)
Hexyl acetate	857	0	3	0	0	0	2	NI	2	NI	3	NI	0	0	(1)	1	1		NI	FE	2
Hexylene glycol	859	0	0	1	0	0	0	NI	0	R	0	0	0	0	(2)	2	2		NI	D	2
Hitec 320	2003	0	3	0	II	XX	NI	NI	NI	NI	3	NI	0	0	(2)	2	2		NI	S	2
Hydrogen peroxide, more than 8% but not more than 60%	2231						Inorg	0	0	Inorg	3	NI	1	0	(2)	3	3		NI	D	3
N-(2-Hydroxyethyl) ethylene diamine triacetic acid, trisodium salt (solution)	870	0	1	1	II	0	0	NI	0	NI	1	NI	0	0	(1)	1	1	R	NI	D	3
2-Hydroxy-4-(methylthio) butanoic acid	871	0	1	1	II	XX	1	NI	1	R	1	NI	0	0	(3)	1	3		NI	D	3
Icosa(oxypropane-2,3-diyl)s	2092	0	3	(1)	I	X	NI	NI	NI	NI	NI	NI	0	(0)	(2)	2	(2)		NI	Fp	2
Icosa(oxypropane-2,3-diyl)s	2092	0	3	(1)	I	X	NI	NI	NI	NI	NI	NI	0	(0)	(2)	2	(2)		NI	Fp	2
Illipe oil (containing less than 10% free fatty acids)	2304	(0)	(0)	(0)	(0)	XX	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Isobutanol	382	0	0	1	I	X	0	NI	0	R	1	0	0	0	1	2	3		NI	D	3
Isobutyric acid	419	0	1	2	II	XX	0	NI	0	R	2	NI	2	2	(3)	3	3		NI	E	NI
Isononanol	1059	T	3	1	II	XX	3	NI	3	NR	3	1	0	0	(2)	2	2		NI	Fp	2
Isononylaldehyde	2300	0	(3)	0	II	XX	3	NI	3	NR	(3)	NI	0	0	(2)	2	1			F	1
Isooctaldehyde	1071	T	3	1	I	X	2	NI	2	NI	3	NI	0	0	(1)	1	1		NI	NI	1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
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	2
Isophorone	879	0	2	1	II	XX	1	1	1	R	2	0	1	1	(2)	1	2		NI	FD	2
Isophorone diamine	880	0	1	1	II	XXX	0	0	0	NR	2	0	1	(1)	(3)	3	3	S	NI	D	3
Isoprene	882	0	2	0	I	0	2	2	2	NR	2	NI	0	0	0	1	2	CM	NI	E	3
Isopropyl cyclohexane	1199	0	(3)	0	0	0	4	NI	4	(NR)	(3)	NI	(0)	(0)	(1)	(0)	(1)		NI	D	2
Lactic acid	886	0	1/B OD	1	0	0	0	NI	0	R	1	NI	0	0	(3)	2	3		NI	D	3
Lactonitrile solution (80% or less)	887	0	3	2	II	XX	0	NI	0	R	4	NI	2	4	(4)	NI	NI		NI	D	3
Lard	888	0	0	0	0	X	0	NI	0	R	0	NI	0	(0)	(1)	0	1		NI	Fp	2
Lard (containing less than 10% free fatty acids)	2317	0	0	0	0	X	0	NI	0	R	0	NI	0	(0)	(1)	0	1		NI	Fp	2
Latex, ammonia inhibited	889	0	1	0	0	XX	0	NI	0	R	(2)	NI	NI	NI	NI	NI	NI		NI	NI	NI
Lauric acid	891	0	3	0	0	0	4	NI	4	R	4	1	0	(0)	(2)	1	2		NI	Fp	2
Lecithin (soybeans)	2146	0	0	0	0	0	0	NI	0	R	0	NI	(0)	(0)	(0)	0	(0)		NI	SD	0
Lignin sulphonic acid, salt solution	34	0	0	0	0	0	NI	NI	NI	NI	0	NI	0	(0)	NI	NI	NI		NI	D	NI
Linseed oil (containing less than 4% free fatty acids)	2318	0	0	0	1	XX	0	NI	0	R	(2)	NI	0	(0)	(1)	0	(1)		NI	Fp	2
Linseed oil	905	0	0	0	I	XX	0	NI	0	R	(2)	NI	0	(0)	(1)	0	(1)		NI	Fp	2
Long chain alkaryl sulphonic acid (C16-C60) (LOA)	1966	0	0	0	II	XX	NI	NI	NI	(NR)	0	NI	0	0	(2)	(1)	2		NI	Fp	2
Lubrizol polyolefin anhydride	1865	0	0	0	0	XX	0	NI	0	NR	1	NI	0	0	(2)	1	(2)		NI	Fp	2
Magnesium alkyl (long chain) salicylate (overbased) in mineral oil (LOA)	71	0	2	0	I	XX	(0)	NI	(0)	NR	(2)	NI	0	0	(1)	(1)	(1)	S	NI	S	1
Magnesium hydroxide slurry	916	0	0	0	0	0	Inorg	0	0	Inorg	0	NI	0	0	(1)	(0)	1		NI	S	1

--- Existing GHP ---

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

Page 14 of 25

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Magnesium long chain alkaryl sulphonate (C11-C50) (LOA)	1967	0	0	0	0	XX	0	NI	0	NR	0	NI	0	0	NI	NI	NI	S	NI	Fp	2
Maleic anhydride	921	0	1	2	II	XX	1	NI	1	R	2	0	1	2	(3)	3	3	S	NI	D	3
Mango kernal oil (containing less than 10% free fatty acids)	2305	(0)	(0)	(0)	(0)	XX	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
MCP 121 (polycarboxylic ester)	2000	0	0	0	I	X	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
MCP 121 (polycarboxylic ester)	2000	0	0	0	I	X	NI	NI	NI	NI	NI	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
2-Mercaptobenzothiazol	925	0	3	2	II	XX	2	1	1	NR	4	2	0	0	(0)	0	0	S	NI	S	2
Metam-sodium (ISO)	202	0	4	2	II	XX	0	NI	0	NR	5	NI	1	2	(2)	2	1	S	NI	D	2
Methacrylic acid-aloxypoly (alkyle oxide) methacrylate co-polymer sodium salt (45% or less solution)	2288	0	1	0	0	0	NI	0	0	NR	1	NI	0	(0)	(1)	1	0		NI	D	0
Methacrylic acid-aloxypoly (alkyle oxide) methacrylate co-polymer sodium salt (45% or less solution)	2288	0	1	0	0	0	NI	0	0	NR	1	NI	0	(0)	(1)	1	0		NI	D	0
Methacrylic resin in 1,2 Dichloroethane soln.	2046						1	1	1	NR	2	0	(1)	(0)	(2)	(1)	(2)	C	NI	SD	2
Methanol	951	0	0	3	II	XX	0	NI	0	R	0	0	3	(3)	(4)	2	2	T	NI	DE	2
Methyl acetoacetate	335	0	1	1	I	X	0	NI	0	R	1	NI	0	0	(2)	1	2		NI	D	2
3-Methyl-1-butanol	965	0	1	1	0	0	1	1	1	(R)	1	0	1	0	(2)	2	2		NI	FED	2
3-Methyl-1-butanol	965	0	1	1	0	0	1	1	1	(R)	1	0	1	0	(2)	2	2		NI	FED	2
Methyl butenol	967	0	(1)	1	I	X	0	NI	0	R	2	NI	1	0	(2)	2	2		NI	D	2
Methyl cyclopentadiene, dimer	977	0	(3)	1	I	X	4	NI	4	(NR)	(3)	NI	0	(0)	(2)	(2)	(2)		NI	F	1
N-Methyldiethanolamine	1491	0	1	1	I	X	0	NI	0	R	2	NI	1	0	(2)	1	2		NI	D	2
2-Methyl-6-ethylaniline	984	0	2	1	II	XX	2	NI	2	NR	2	NI	1	1	(2)	0	2		NI	FD	2
2-Methyl-5-ethylpyridine	986 (T)	(1)	1	II	XX		2	NI	2	NI	2	NI	1	2	(3)	3	3		NI	FD	3

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
N-Methylglucamine, 60% aqueous solution	2048	0	0	0	I	X	0	NI	0	R	0	NI	1	0	(3)	0	3		NI	D	3
3-Methyl-3-methoxy butanol	996	0	0	0	I	X	1	NI	1	NR	0	NI	0	(0)	(2)	1	(2)		NI	FD	1
Methyl naphthalenes	1999	T	(3)	1	0	X	4	NI	4	(NR)	(4)	NI	1	0	(2)	1	1		T	F	1
2-Methyl pentane	1000	0	3	(0)	0	0	3	NI	3	NI	4	NI	(0)	(0)	(2)	(2)	(2)		NI	E	2
2-Methyl-1,3-propanediol	2200	0	0	0	0	0	0	0	0	NR	0	0	0	0	(0)	0	0		NI	D	NI
Methyl propyl ketone	1003	0	0	1	I	X	0	NI	0	R	0	NI	1	0	(2)	1	2		NI	FED	2
alpha-Methylstyrene	1010	T	3	1	0	X	3	3	3	NR	3	NI	0	0	1	2	1	M	(T)	FE	3
3-(Methylthio) propionaldehyde	993	T	2	2	II	XXX	0	NI	0	R	3	1	1	1	2	2	3	NS	NI	D	3
Metolachlor (ISO)	113	0	3	1	I	X	2	2	2	NR	5	1	1	0	(2)	1	0	S	NI	S	2
Mixed acid oil	2306	(0)	(0)	(0)	1	XX	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	(1)	1			Fp	2
Myrcene	1019	0	1	0	0	0	4	NI	4	R	4	1	0	0	(2)	2	NI		NI	F	2
Naphthalene	1	T	3	2	I	X	3	3	3	NR	4	1	1	0	(2)	1	1	C	T	S	3
Naphthalene sulphonic acid condensed with formaldehyde, sodium salt, solution	1020	0	1	1	II	XX	0	1	1	(NR)	1	NI	0	(0)	(1)	0	1		NI	D	NI
Neodecanoic acid	1025	0	2	1	II	XX	4	NI	4	NR	2	NI	0	0	(2)	0	2		NI	Fp	2
Nitroethane	1037	0	1	1	I	X	0	NI	0	NR	2	NI	1	0	(2)	(0)	(1)		NI	SD	1
2-Nitrophenol	1041	0	3	1	I	XX	1	2	2	R	3	(2)	0	0	(1)	1	1		NI	S	1
o-Nitrotoluene	1049	(T)	2	1	I	XX							1	0	(2)	0	1	M	NI	S	3
Nonanoic acid	1055	0	1	1	II	XX	3	NI	3	R	2	NI	0	0	(3)	2	3		NI	F	3
Nonene (all isomers)	2222						4	NI	4	NI	3	NI	0	0	0	1	1	A	NI	FE	2
1-Nonene	1060	0	3	(1)	0	0	4	NI	4	NI	3	NI	0	0	0	1	1	A	NI	FE	0
Nonyl methacrylate monomer	1061	0	0	-	-	-	5	NI	5	R	3	NI	(0)	(0)	(1)	(1)	(1)		NI	F	1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Nonyl phenol	1062	Z	4	1	II	XX	5	4	4	NR	5	3	1	0	(3)	3	3		NI	FD	3
Nonyl(C6-C12)phenol poly(4-12)ethoxylate	1063	0	3	1	I	X	4	NI	4	NR	3	1	0	0	(2)	2	1		NI	D	2
Nonyl(C6-C12)phenol poly(4-12)ethoxylate	1063	0	3	1	I	X	4	NI	4	NR	3	1	0	0	(2)	2	1		NI	D	2
Nonyl(C6-C12)phenol poly(4-12)ethoxylate	1063	0	3	1	I	X	4	NI	4	NR	3	1	0	0	(2)	2	1		NI	D	2
Octanoic acid (Caprylic acid)	1074	0	1	0	I	X	3	NI	3	R	1	NI	0	0	(3)	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
1-Octanol	1075	T	2	1	0	X	3	NI	3	R	2	0	1	0	(2)	2	2		NI	Fp	2
Octene (all isomers)	1079	0	3	0	I	X	4	NI	4	NR	3	NI	0	0	0	2	1	A	NI	FE	2
Octyl acetate	1080	0	2	1	I	X	3	NI	3	R	2	NI	0	0	(1)	1	NI		NI	FD	1
OGA 480 OGA 492 (Polyether amine)	1457	0	2	1	II	XX	NI	NI	NI	NR	2	NI	0	0	(2)	2	2		NI	Fp	2
OGA 480 OGA 492 (Polyether amine)	1457	0	2	1	II	XX	NI	NI	NI	NR	2	NI	0	0	(2)	2	2		NI	Fp	2
Olefin mixtures (C5-C15)	2321						(5)	NI	(5)	R	(4)	NI	(0)	(0)	(2)	(2)	(1)	A		FE	2
Olefin/Alkyl ester copolymer (molecular weight 2000+) (LOA)	1965	0	0	-	-	XXX	NI	NI	0	NR	0	NI	0	0	(0)	0	0		NI	Fp	2
Olefin mixtures (C5-C7)	2243						3	NI	3	R	3	NI	(0)	(0)	(2)	(2)	(1)	A	NI	E	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	2
alpha-Olefins (C6-C18),mixture	2030	0	3	0	0	0	NI	(5)	(5)	R	(4)	NI	(0)	(0)	(2)	(2)	(1)	A	NI	FE	2
Oleic acid	1089	0	1	0	I	XX	0	NI	0	R	0	NI	0	1	(2)	1	1		NI	Fp	2
Oleylamine	1862	0	4	1	II	XX	NI	NI	NI	NR	4	NI	1	(1)	(3)	3B	3		NI	Fp	3
Olive oil	1090	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(1)	0	1		NI	Fp	2
OLOA 224	1728	0	0	0	I	0	NI	NI	NI	NR	0	NI	0	0	(1)	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
OLOA 225	1754	0	0	0	I	X	(0)	NI	(0)	(NR)	0	NI	0	0	(2)	2	2	S	NI	Fp	2
Palm acid oil	2307	(0)	(0)	(0)	1	XX	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1		NI	Fp	2
Palm fatty acid distillate	2310	(0)	(0)	(0)	1	XX	NI	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1		NI	Fp	2
Palm kernel olein (containing less than 5 % free fatty acids)	2308	(0)	1	0	0	XX	(0)	NI	(0)	(R)	1	NI	(0)	(0)	(0)	(0)	(0)		Ni	Fp	2
Palm kernel stearin (containing less than 5% free fatty acids)	2309	(0)	(0)	(0)	(0)	XX	0	(0)	(0)	(R)	0	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Palm oil (containing less than 15% free fatty acids)	2319						0	NI	0	R	0	NI	0	(0)	(1)	(0)	(1)		NI	Fp	2
Palm nut oil	1094	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(1)	(0)	(1)		NI	Fp	2
Palm oil	2249						0	NI	0	R	0	NI	0	(0)	(0)	0	0		NI	Fp	2
Palm oil fatty acid methyl ester	1097	0	0	0	0	XX													NI	NI	NI
Palm olein	2250						0	NI	0	R	0	NI	0	(0)	(0)	0	0		NI	Fp	2
Palm stearin	2251						0	NI	0	R	0	NI	0	(0)	(0)	0	0		NI	Fp	2
Paraffin wax	1086	0	0	0	0	0	0	NI	0	R	0	NI	(0)	(0)	(1)	1	1		NI	Fp	2
Pentaethylene hexamine	1103	0	(1)	1	II	XX	0	NI	0	NI	NI	NI	1	(2)	(3)	3	(3)	S	NI	D	3
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	(3)	2	3		NI	FED	3
2-Pentanol	1111	0	1	1	0	0	1	1	1	R	1	0	0	(0)	(2)	2	2		NI	D	2
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	2
2-Pentene	1115	0	2	(1)	0	0	2	NI	2	NI	2	NI	(0)	(0)	(1)	(0)	(1)		NI	E	2

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Petrolatum	2244						0	NI	0	NR	0	NI	0	0	2	1	1		NI	Fp	2
Petroleum wax	1122	0	0	0	0	X	0	NI	0	NR	0	NI	0	0	(0)	0	0		NI	Fp	2
Phenol	1124	0	2	2	II	XX	1	2	2	R	3	0	2	2	(3)	3	3		NT	S	3
Phenylxylylethane	1135	-	-	1	-	-	5	4	4	NR	(2)	NI	1	0	(1)	(0)	0		NI	F	1
Phosphate esters, alkyl(C12-C14)amine (LOA)	1854	0	3	0	0	XX	NI	NI	NI	NI	3	NI	0	(0)	(2)	1	2		NI	FE	2
Phthalic anhydride (molten)	1146	0	2	1	II	XX	1	NI	1	R	2	0	1	0	(3)	1	3	S	NI	S	3
Pine oil	1148	0	2	1	I	X	4	NI	4	NR	4	NI	0	0	(1)	(1)	(1)	S	(T)	NI	2
Poly(C18-C22)alkyl acrylate in xylene	1151	0	2	1	I	X	(3)	NI	(3)	NR	2	NI	0	0	(2)	2	1		NI	Fp	2
Polyalkylene oxide polyol	1441	0	2	0	0	0	NI	NI	NI	NI	NI	NI	0	0	(1)	(1)	(1)		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	(1)	1	1	A	NI	Fp	3
Polyaluminium chloride (sol.)	1136	0	0	(0)	0	0	Inorg	0	0	Inorg	0	NI	(0)	(0)	(1)	(0)	(1)		NI	D	1
Polybutene	1154	0	0	0	0	0	NI	NI	NI	NI	0	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
Polybutenylsuccinimide in oil	2055	0	0	0	0	XX	5	NI	5	NR	0	NI	(0)	(0)	(0)	0	(0)		NI	Fp	2
Poly(2+)cyclic aromatics	2246						4	4	4	NR	(4)	NI	(1)	(1)	(2)	(1)	(1)	CM	NI	S	3
Polyether, borated	1863	0	3	0	0	XX	0	NI	0	NR	3	NI	0	(0)	(1)	1	0		NI	D	0
Polyether (molecular weight 2000+, (LOA)	1975	0	1	-	-	-	NI	NI	NI	NI	NI	NI	(0)	(0)	(1)	(1)	(1)		NI	Fp	2
Polyethylene glycol dimethyl ether	1158	0	0	0	0	0	0	NI	0	NR	0	NI	0	0	(1)	1	(1)		NI	D	1
Polyferric sulphate solution	338	0	(2)	1	I	X	Inorg	0	0	Inorg	(2)	NI	1	(1)	(3)	3	(3)		NI	D	3
Polyglycerine, sodium salt, solution	1874	0	0	0	0	0	NI	NI	NI	NI	NI	NI	0	0	(3)	(2)	3		NI	D	3
Polyglycerol	1511	0	0	0	0	0	NI	NI	NI	NI	NI	NI	0	(0)	(0)	(0)	(0)		NI	D	0

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Poly (iminoethylene)-graft-N-poly (ethyleneoxy) solution (90% or less	2287	0	0	0	0	0	0	0	0	NR	0	NI	0	0	(1)	0	1		NI	D	0
Polyisobutenamine in aliphatic (C11-C14) solvent	2192	0	2	1	-	XX	0	0	0	NR	2	NI	0	(0)	(2)	2	1		NI	FED	2
Polyisobutenyl anhydride adduct	2127	0	0	0	I	X	0	NI	0	NR	0	NI	0	0	(1)	0	1		NI	FD	1
Poly(4+)isobutylene	2264						0	NI	0	NR	0	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
Polymethylene polyphenyl isocyan	1153	0	0	0	II	XX	NI	(2)	(2)	NR	0	0	0	0	(2)	2	2	S	NI	S	3
Polyolefin acid, potassium salt	1895	0	0	1	I	X	NI	NI	NI	NR	0	NI	0	0	(0)	0	0		NI		0
Polyolefinamide alkene(C16+)amin (LOA)	2104	0	0	1	I	XX	5	NI	5	NR	0	NI	0	0	(1)	1	(1)		NI	Fp	2
Polyolefin amide alkeneamine (C28+) (LOA)	1971	0	0	0	0	XXX	0	NI	0	NR	0	NI	0	0	(0)	1	(1)		NI	NI	1
Polyolefin amide alkeneamine borat (C28-C250) (LOA)	1970	0	0	0	I	XXX	0	NI	0	NR	0	NI	0	0	(0)	0	(0)		NI	Fp	2
Polyolefin amide alkeneamine/molybden oxysulphide mi	2256						NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI		NI	NI	2
Polyolefin amide alkylene amine polyol	1989	0	0	0	I	XXX	0	NI	0	NI	0	NI	0	0	(0)	0	(0)		NI	NI	NI
Poly (17+) olefin amine	2049	0	2	0	0	0	0	NI	0	NR	2	NI	0	(0)	(1)	(1)	(1)		NI	Fp	0
Polyolefinamine (C28-C250) (LOA	2107	0	2	0	I	XX	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)		NI	Fp	2
Polyolefinamine (C28-C250) (LOA	2107	0	2	0	I	XX	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)		NI	Fp	2
Polyolefinamine (C28-C250) (LOA	2107	0	2	0	I	XX	0	NI	0	NR	2	NI	0	(0)	(2)	2	(1)		NI	Fp	2
Polyolefin aminoester salt	2095	0	1	0	I	XX	NI	NI	NI	NR	1	NI	0	0	(1)	1	(1)		NI	Fp	2
Polyolefin ester (C28-C250) (LOA)	1969	0	0	0	0	XXX	0	NI	0	NR	0	NI	0	0	(0)	0	0		NI	Fp	2
Polyolefin (molecular weight 300+) (LOA)	1968	0	0	0	0	0	0	NI	0	NR	0	NI	0	0	0	0	0		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
Polyolefin phenolic amine (C28-C250) (LOA)	1980	0	0	0	I	XX	0	NI	0	NI	0	NI	0	0	(1)	(1)	(1)		NI	Fp	2
Polyolefin phosphoro sulphide - barium derivative (C28-C250) (LOA)	1976	0	2	1	0	0	0	NI	0	NI	2	NI	0	(0)	(0)	(0)	(0)		NI	S	NI
Polyoxyethylene sorbitan monoole	1442	0	0	0	0	0	3	NI	3	NI	(3)	NI	0	(0)	(1)	0	1		NI	D	1
Polypropylene	1512	-	-	-	-	-	0	NI	0	NR	NI	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
Polypropylene glycol	1159	0	1	0	0	0	(1)	NI	(1)	(R)	1	NI	0	0	(1)	1	1		NI	D	1
Potassium chloride	1513	0	0	2	I	0					0		1	(0)	(2)	NI	1		NI	D	1
Potassium formate solution (75% or more)	2121	0	0	0	I	X	0	NI	0	R	0	NI	(0)	(0)	(2)	2	2		NI	D	2
Potassium hydroxide (sol.)	1171	0	1	2	II	X	Inorg	0	0	Inorg	2	NI	2	(2)	(3)	3C	3		NI	D	3
Potassium oleate	1497	0	(2)	-	I	X	3	NI	3	R	4	NI	(0)	(0)	(1)	1	1		NI	FD	1
Potassium thiosulphate solution (50% or less)	2152	0	2	0	I	X	Inorg	0	0	Inorg	2	NI	0	0	(2)	2	(2)		NI	D	2
Propanolamine	1183	0	2	1	I	X	0	NI	0	R	2	NI	0	1	(3)	3	3		NI	D	3
Propionic acid	1186	0	1	1	II	XX	0	NI	0	R	2	NI	0	0	(3)	3B	3		NI	D	3
Propionic anhydride	1187	0	2	1	I	X	0	NI	0	R	2	NI	0	0	(3)	2	3		NI	FD	3
Propylene carbonate	2056	0	0	0	I	0	0	NI	0	R	0	NI	0	0	(3)	2	3		NI	D	3
1,2-Propylene glycol	1202	0	0	0	0	0	0	NI	0	R	0	0	0	0	(1)	0	1		NI	D	1
Propylene glycol phenyl ether	2057	0	1	1	I	X	1	NI	1	NI	1	NI	0	0	(1)	(1)	(1)		NI	SD	1
Propylene tetramer	2255						4	NI	4	NR	(4)	NI	(0)	(0)	(1)	(1)	(1)		NI	F	1
Propylene trimer	1207	0	3	1	0	0	5	4	4	NR	3	2	(0)	(0)	(1)	(1)	(1)		NI	FE	2
Pyridine bases	2131	0	2	2	II	XXX	1	NI	1	R	2	NI	2	1	(3)	3B	3		NI	FED	3
Pyrolysis gasoline	2271	+	4	-	-	-	(4)	(3)	(4)	(NR)	(4)	(1)	1	0	(2)	2	2	TCM	NI	FE	3
Radiagreen BDMF LV	2298	NI	0	-	0	0	NI	NI	NI	R	0	NI	NI	NI	NI	0	0			F	1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Radiagreen BDMF VLV	2301	NI	0	-	-	-	NI	NI	NI	R	0	NI	NI	NI	NI	NI	NI			F	1
Rapeseed oil (high erucic acid; containing less than 4% free fatty acids)	2315	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(0)	NI	NI		Ni	Fp	2
Rape seed oil fatty acid, methyl este	2209	0	0	0	I	X	0	0	0	R	0	NI	0	(0)	(1)	1	1		NI	Fp	2
Rice bran oil (containing less than 15% of free fatty acids)	2312	(0)	0	0	I	X	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1			Fp	2
Safflower oil (containing less than 5% free fatty acids)	1222	0	0	0	0	XX	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(1)	1	1		0		2
Saturated and unsaturated alkyl (C10-C20) phosphite (LOA)	2108	0	2	0	0	XX	0	NI	0	R	1	NI	0	0	(0)	0	0		NI	Fp	2
Shea butter (containing less than 15% free fatty acids)	2311	(0)	(0)	0	I	X	(0)	NI	(0)	NI	(0)	NI	(0)	(0)	(1)	(0)	(1)			Fp	2
Sodium aluminate (solution)	1234	0	1	1	I	0	Inorg	0	0	Inorg	NI	NI	(0)	(0)	(3)	(3)	(3)		NI	D	3
Sodium benzoate	1475	0	1	1	I	X	0	NI	0	R	1	NI	0	(0)	(1)	0	1		NI	D	1
Sodium borohydride/sodium hydroxide mixture (soln.)	1239	0	1	2	II	X	Inorg	0	0	Inorg	2	NI	(2)	(1)	(3)	(3)	(3)		NI	D	3
Sodium chlorate solid and solutions (50% or less)	1244	0	0	2	0	0	Inorg	0	0	Inorg	1	NI	1	0	(2)	1	1	S	NI	D	2
Sodium hydrogen sulphite,solutions	1251	0	(2)	1	0	0	Inorg	0	0	Inorg	1	NI	0	(0)	(0)	0	0		NI	D	0
Sodium hydroxide	1254	0	1	1	II	X	Inorg	0	0	Inorg	2	NI	1	1	(3)	3C	3		NI	D	3
Sodium lignosulphonate (51% solution in water)	2088	0	0	1	0	0													NI	SD	0
Sodium perborate monohydrate	2284	-	3	1	II	XXX	Inorg	NI	NI	Inorg	3	NI	1	0	(3)	2	3		NI		
Sodium petroleum sulphonate	1860	0	3	0	II	XXX	0	NI	0	(NR)	NI	NI	0	(0)	NI	NI	NI	S	NI	S	NI
Sodium polyacrylate solution	1487	0	0	1	0	0	0	NI	0	NR	1	0	0	(0)	(1)	1	1		NI	D	2
Sodium silicate (solution)	1262	0	2	1	II	X	Inorg	0	0	Inorg	2	NI	1	0	(3)	3	3		NI	D	3
Sodium sulphate (solution)	1499	0	0	0	0	0	Inorg	0	0	Inorg	0	0	0	(0)	(1)	1	1		NI	SD	1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Sodium sulphide (solution)	1263	0	2	2	II	XX	Inorg	0	0	Inorg	3	NI	1	1	(3)	3A	3		NI	D	3
Sodium sulphite (solution)	9	0	2	1	0	0	Inorg	0	0	Inorg	2	NI	0	(0)	(1)	0	1		NI	D	1
Sodium thiocyanate	1264	0	(3)	1	0	0	Inorg	0	0	Inorg	2	NI	1	(0)	(1)	0	0		NI	D	1
Sorbitol	1265	0	0	0	0	0	0	NI	0	R	NI	NI	0	(0)	(0)	(0)	(0)		NI	D	NI
Soyabean oil (containing less than 4% free fatty acids)	2320						0	NI	0	R	0	NI	0	(0)	(1)	(0)	1		NI	Fp	2
Soya bean oil	1267	0	0	0	0	XX	0	NI	0	R	0	NI	0	(0)	(1)	(0)	1		NI	Fp	2
Styrene (monomer)	1273	T	3	2	II	XXX	3	(2)	3	R	3	NI	1	0	2	2	2	CM	NI	FE	3
Styrene butadiene rubber latex	1274	0	0	0	I	X	0	NI	0	NI	0	NI	NI	NI	NI	NI	NI		NI	NI	NI
Sulfurized fat(C14-C20) (LOA)	1853	0	1	0	0	XX	0	NI	0	NR	1	NI	0	(0)	(1)	0	(1)		NI	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		NI	FD	NI
Sulpho hydrocarbon (C3-C88) (LOA)	1972	0	1	0	0	XX	4	NI	4	NR	2	NI	0	0	0	0	0		NI	Fp	2
Sulphur	906	0	0/D	0	0	0	Inorg	0	0	Inorg	0	NI	0	0	(1)	1	1		NI	S	1
Sunflower oil	1283	0	0	0	0	XX	0	NI	0	R	0	NI	(0)	(0)	(1)	(0)	(1)		NI	Fp	2
Tall oil, crude and distilled	1285	0	3	0	I	XX	0	NI	0	R	3	NI	0	NI	(1)	(1)	(1)		NI	Fp	2
Tall oil, distilled	2283						0	NI	0	R	0	NI	0	(0)	(1)	0	(1)		NI		
Tall oil fatty acid (resin acids less than 2%)	1287	0	0	0	II	XX	0	0	0	R	0	NI	0	NI	(1)	1	1		NI	Fp	2
Tall oil fatty acid, barium salt	1864	0	3	1	I	XX							(1)	(0)	(2)	1	2		NI	S	2
Tall oil soap (disproportionated solution)	1286	0	3	1	0	X	NI	NI	NI	NI	NI	NI	(1)	(0)	(2)	1	2		NI	D	2
Tallow	1288	0	0/B OD	0	0	XX	0	NI	0	R	0	NI	0	0	(0)	(0)	(0)		NI	Fp	1
Tallow fatty acid	1289	(	(0)	0	0	XX	(4)	0	(4)	(R)	(4)	(1)	0	(0)	(0)	(0)	(0)		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
Tetradecanoic acid (Myristic acid)	1298	0	0	0	I	X	5	NI	0	R	0	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Tetradecanoic acid (Myristic acid)	1298	0	0	0	I	X	5	NI	0	R	0	NI	0	(0)	(1)	(1)	(1)		NI	Fp	2
Tetraethylene pentamine	1302	0	1	1	I	X	0	NI	0	NR	3	NI	0	2	(3)	3	3	S	NI	D	3
Tetrahydronaphthalene	1305	0	2	1	I	X	3	3	3	NR	3	NI	0	0	(2)	2	0		NI	F	2
1,2,3,4-Tetramethylbenzene	1307	T	3	0	0	0	4	NI	4	NI	4	NI	0	(0)	(1)	1	(1)		NI	F	1
Toluidines	1316	0	2	2	II	XX	1	1	1	R	4	2	1	0	(2)	2	2	CM	NI	FD	3
2,4-Tolylenediamine	1317	0	2	2	II	XX	0	2	2	NR	3	0	2	2	4	1	2	CMS	NI	Fp	3
Tolyl triazole	2292						1	NI	1	NR	2	NI							NI		
1,2,3-Trichlorobenzene	2191	+	4	1	I	X	4	4	4	NR	4	2	1	0	(2)	2	2		NI	S	2
1,2,4-Trichlorobenzene	1323	Z	3	1	I	X	4	5	5	NR	4	1	1	0	(2)	2	2	M	NI	S	3
1,1,1-Trichloroethane	1326	0	2	1	0	0	2	NI	2	NR	2	NI	0	0	0	2	2		NI	SD	2
Tricresyl phosphate (less than 1% ortho-isomers)	1331	+	3	1	II	XX	5	(3)	(3)	(R)	(4)	(4)	0	1	0	1	1	N	NI	S	1
Tricresyl phosphate (more than 1% ortho-isomers)	1332	+	4	1	II	XXX	5	3	3	R	4	4	0	1	0	1	1	N	NI	S	2
Tridecane	1333	0	0	-	-	-	0	NI	0	NI	0	NI	0	0	(1)	1	0		NI	Fp	2
Tridecanoic acid	1334	0	3	(1)	0	X	5	NI	5	(R)	3	NI	(0)	(0)	(1)	(1)	(1)		NI	Fp	2
Tridecyl acetate	1768	0	0	0	I	X	5	NI	5	NI	0	NI	0	(0)	(2)	2	2		NI	F	2
Triethanolamine	1338	0	1	0	I	0	0	0	0	R	1	NI	0	0	(2)	1	2		NI	D	2
1,3,5-Triethylbenzene	1340	T	4	0	0	0	5	NI	5	NI	4	NI	0	(0)	(2)	(2)	(1)		NI	F	1
Triethylene glycol	1341	0	0	0	0	0	0	NI	0	R	0	0	0	0	(1)	1	1		NI	D	1
Triethylenetetramine	1346	0	1	1	II	XXX	0	NI	0	NR	3	NI	0	2	(3)	3	3	S	NI	D	3
Trimethylacetic acid	1350	0	1	1	I	X	1	1	1	R	2	NI	1	1	(2)	2	2		NI	Fp	2

--- Existing GHP ---

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

Page 24 of 25

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
2,4,4-Trimethyl hexamethylene diamine	1359	0	(1)	(1)	I	XX	1	NI	1	NI	NI	NI	1	0	(3)	2	3	S	NI	D	3
Trimethylol propane polyethoxyla	1362	0	1	0	0	0	NI	NI	NI	NR	1	NI	0	0	NI	NI	NI		NI	NI	NI
Trimethylol propane, propoxylated	2274						Ni	Ni	NI	(NR)	1	NI	0	0	(1)	0	1		NI		
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	1845	0	0	1	I	X	4	NI	4	NI	0	NI	0	0	(1)	1	0		NI	F	1
2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate	1364	0	2	1	0	0	3	NI	3	NI	2	NI	0	0	(1)	1	1		NI	Fp	2
Tripropylene glycol	1372	0	0	0	0	0	0	0	0	NR	0	NI	0	0	(0)	0	0		NI	D	0
Trixylenyl phosphate	1377	+	3	(1)	II	XXX	5	4	4	NR	4	1	(0)	(1)	(2)	(1)	(1)		NI	S	1
Tung oil	1378	0	0	0	0	XX	0	NI	0	R	(2)	NI	(0)	(0)	(1)	(0)	(1)		NI	Fp	2
1-Undecanol	1382	T	3	1	I	X	4	NI	4	R	4	NI	0	0	(2)	2	(1)		NI	Fp	2
1-Undecene	1383	0	3	(1)	0	0	5	NI	5	NR	4	NI	(0)	(0)	(1)	(1)	(1)		NI	F	1
Urea	1384	0	0/B OD	0	0	0	0	0	0	R	1	NI	0	0	(1)	1	(1)		NI	D	1
Urea	1384	0	0/B OD	0	0	0	0	0	0	R	1	NI	0	0	(1)	1	(1)		NI	D	1
Urea/Ammonium nitrate solution (containing < 1% aq. ammonia)	1387	0	1	1	0	0	Inorg	NI	Inorg	R	1	NI	0	0	(2)	1	2		NI	D	2
Urea/Ammonium nitrate solution (: 1% aq. ammonia)	2322	0	1	1	0	0	Inorg	NI	Inorg	R	1	NI	0	0	(2)	1	2		NI	D	2
Urea-ammonium phosphate solution	2179	0	1	0	0	0	0	0	0	R	3	2	(0)	(0)	(2)	(2)	(2)		NI	D	2
Vegetable protein solution,hydrolyz	1398	0	0	0	0	0	0	NI	0	NI	0	NI	(0)	(0)	(0)	(0)	(0)		NI		NI
Vinylidene chloride	1406	0	1	2	II	XX	2	1	1	NR	2	NI	2	0	(2)	2	2	M	NI	SD	3
Vinyl neodecanoate	1404	0	3	0	II	X	5	NI	5	NR	3	NI	0	0	(3)	3	3		NI	F	3
Vinyl toluenes	1409	T	3	1	I	X	3	3	3	NR	3	NI	0	0	2	2	1	NM	(T)	F	3
White spirit, low (15-20%)aromatic	1411	Z	3	1	II	X							(0)	(0)	(2)	(1)	(2)	A	NI	F	3

--- Existing GHP -----

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

Page 25 of 25

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Xylene (mixed isomers)	1408	0	3	1	II	XX	3	NI	3	NR	3	0	0	0	0	2	2		(T)	FE	2
Xylenes/Ethyl benzene (10% or more) mixture	2269						3	2	2	NR	3	1	(0)	(0)	(2)	(2)	(2)		(T)	FE	2
Xylenols (mixtures)	1422	T	2	2	II	XX	2	NI	2	R	3	NI	1	2	(3)	3	3		(T)	Fp	3
Zinc alkaryl dithiophosphate (C7-C16) (LOA)	1977	+	(2)	1	II	XX	0	NI	0	NR	3	NI	0	0	(0)	(0)	(0)		NI	Fp	2
Zinc alkenylcarboxamide (LOA)	2053	0	0	0	0	XX	NI	0	0	NR	0	NI	0	0	(1)	1	(1)		NI	Fp	2
Zinc bromide solutions	2227			1	II	XXX	Inorg	4	4	Inorg	3	NI	1	(2)	(3)	3B	3	S	NI	D	3
Zinc chloride	1425	0	3	2	0	0	Inorg	4	4	Inorg	4	1	(1)	(1)	(3)	(3)	(3)		NI	D	3
Zinc chloride	1425	0	3	2	0	0	Inorg	4	4	Inorg	4	1	(1)	(1)	(3)	(3)	(3)		NI	D	3

Annex 5

EHS 41/9

Evaluation of new substances proposed for bulk transport by ships

--- Existing GHP -----

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

Page 1 of 1

NAME	EHS	A	B	C	D	E	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Blend TN-100	2303	(0)	(3)	0	II	XXX	(2)	(2)	(2)	(R)	(3)	(0)	0	0	(2)	2	2	ACM NR		FE	2
Coatex M 1083	2302	0	1	0	I	X	(2)	NI	(2)	NR	1	NI	0	0	(1)	1	1			D	0
Distilled Resin Oil, DRO	2299	(0)	(3)	0	II	XXX	(3)	NI	(3)	(NR)	(3)	NI	0	0	(2)	2	1	MN		FE	2
Illipe oil (containing less than 10% free fatty acids)	2304	(0)	(0)	(0)	(0)	XX	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Isononylaldehyde	2300	0	(3)	0	II	XX	3	NI	3	NR	(3)	NI	0	0	(2)	2	1			F	1
Mango kernal oil (containing less than 10% free fatty acids)	2305	(0)	(0)	(0)	(0)	XX	(0)	NI	(0)	(R)	(0)	NI	(0)	(0)	(0)	(0)	(0)		NI	Fp	2
Mixed acid oil	2306	(0)	(0)	(0)	1	XX	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	(1)	1			Fp	2
Palm acid oil	2307	(0)	(0)	(0)	1	XX	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1		NI	Fp	2
Palm fatty acid distillate	2310	(0)	(0)	(0)	1	XX	NI	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1		NI	Fp	2
Palm kernel olein (containing less than 5 % free fatty acids)	2308	(0)	1	0	0	XX	(0)	NI	(0)	(R)	1	NI	(0)	(0)	(0)	(0)	(0)		Ni	Fp	2
Palm kernel stearin (containing less than 5% free fatty acids)	2309	(0)	(0)	(0)	(0)	XX	0	(0)	(0)	(R)	0	NI	(0)	(0)	(0)	(0)	(0)			Fp	2
Radiagreen BDMF LV	2298	NI	0	-	0	0	NI	NI	NI	R	0	NI	NI	NI	NI	0	0			F	1
Radiagreen BDMF VLV	2301	NI	0	-	-	-	NI	NI	NI	R	0	NI	NI	NI	NI	NI	NI			F	1
Rice bran oil (containing less than 15% of free fatty acids)	2312	(0)	0	0	I	X	(0)	NI	(0)	(R)	(0)	NI	0	(0)	(1)	0	1			Fp	2
Shea butter (containing less than 15% free fatty acids)	2311	(0)	(0)	0	I	X	(0)	NI	(0)	NI	(0)	NI	(0)	(0)	(1)	(0)	(1)			Fp	2

ANNEX 6

SOLIDIFYING FLOATING SUBSTANCES

SUBSTANCE	E2
alkenyl (C11+) amide	Fp
bis(hydrogenated tallow alkyl)oleamide	Fp
N,N-bis(2-hydroxyethyl)oleamide	Fp
cyclopentadiene dimer	Fp
decanoic acid	Fp
2,6-di-tert-butylphenol	Fp
dimethyl octanoic acid	Fp
2,2-dimethylpropane-1,3-diol (molten or solution)	Fp
dodecanoic acid	Fp
ethoxylated long chain (C16+) alkyloxyalkylamine	Fp
fatty acids, saturated linear C12+	Fp
glycerol monooleate	Fp
lard	Fp
lauric acid	Fp
palm nut oil fatty acid	Fp
palm oil	Fp
palm stearin	Fp
oleylamine	Fp
petrolatum	Fp
polyalkyl(C18-C22)acrylate in xylene	Fp
toluenediamine	Fp
tridecanoic acid	Fp
trimethylacetic acid	Fp
undecanoic acid	Fp
waxes	Fp
xlenol	Fp

Re-evaluation of the Products in the IBC Code with missing pollution and/or safety data (MSC/Circ. 1128 - MEPC/Circ.423)

Revised GESAMP Hazard Profile (GHP) system

Page 1 of 3

PSN	EHS	A1	A2	B1	C1	C2	C3	D3	E2
Acrylamide solution (50% or less)	23	0	R	2	2	2	(2)	CMNS	D
Alkyl acrylate-vinylpyridine copolymer in toluene	299	2	R	2	0	0	(2)	RNA	F/Fp
Alkyl (C3-C4) benzenes	2206	(3)	(NR)	4	0	(0)	(2)		FE
Alkyl (C11-C17) benzene sulphonic acid	1739	3	R	3	1	(1)	(2)		D
Alkylbenzene sulphonic acid, sodium salt solution	301	3	R	3	1	(1)	(3)		FD
Alkyl (C7-C9) nitrates	8	4	NR	3	0	0	(3)	S	F
Alkyl(C7-C11)phenol poly(4-12) ethoxylate	1063	4	NR	3	0	0	(2)		D
2-(2-Aminoethoxy) ethanol	75	0	NR	1	0	1	(3)		D
Aminoethyldiethanolamine/Aminoethyleneethanolamine solution	74	0	NR	1	1	(1)	(3)	S	D
N-Aminoethylpiperazine	88	0	NR	1	0	2	(3)	S	D
Ammonium lignosulphonate solutions	2086	0	NR	O	0	(0)	(0)		D
Ammonium thiosulphate solution (60% or less)	312	0	Inorg	1	0	(0)	(1)		D
Benzene sulphonyl chloride	320	1	R	(1)	1	(2)	(3)		SD
Calcium hydroxide slurry	431	0	Inorg	1	0	(0)	(2)		S
Calcium lignosulphonate solutions	2087	0	NR	0	0	(0)	(0)		D
Calcium long-chain alkyl salicylate (C13+)	70	0	NR	2	0	0	(1)	S	Fp
Coal tar	499	(4)	NR	3	0	0	0	C	SD
Coal tar pitch (molten)	491	(3)	NR	4	0	0	(1)	C	S
Coconut oil fatty acid	505	0	(R)	0	0	(0)	(1)		Fp
Copper salt of long chain (C17+) alkanolic acid	2111	0	(R)	2	0	0	(0)		Fp

PSN	EHS	A1	A2	B1	C1	C2	C3	D3	E2
Creosote (coal tar)	524	(4)	NR	4	1	0	(2)	C	S
Cresylic acid, sodium salt solution	1914	(2)	(R)	(3)	1	(2)	(3)		D
Decene	558	5	R	4	0	0	0	A	F
Decyloxytetrahydrothiophene dioxi	1859	3	NR	4	0	0	(1)		Fp
Dichloromethane	594	2	NR	1	1	(1)	0	CM	SD
Diethylene glycol diethyl ether	630	0	NR	0	1	0	(2)		D
Diethylenetriaminepentaacetic acid, pentasodium salt solution	2076	0	NR	0	0	(0)	(0)		D
Di-(2-ethylhexyl) phosphoric acid	643	1	NR	2	0	1	(2)		Fp
Diglycidyl ether of bisphenol A	653	3	NR	4	0	0	(2)	S	S
Diisopropylnaphthalene	712	4	NR	(3)	0	0	(1)		Fp
Diphenylamine (molten)	2186	3	NR	3	0	0	(1)		S
Diphenylamines, alkylated	1770	5	NR	(3)	0	0	(1)	S	F
Ethylenediaminetetraacetic acid, tetrasodium salt solution	759	0	NR	2	1	(1)	(2)		D
Ethylene glycol acetate	762	0	R	2	0	0	(3)	R	D
Ethylene glycol methyl ether acetate	773	0	R	2	1	0	(2)	R	D
Ethylene glycol phenyl ether	775	1	R	1	1	0	(2)		SD
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether mixture	1740	1	R	1	1	0	(2)		SD
Glyoxylic acid solution (50 % or less)	1535	0	R	2	0	0	(3)	S	D
Lecithin	2146	0	R	0	(0)	(0)	(0)		SD
Long-chain alkylphenate/Phenol sulphide mixture	1754	(0)	(NR)	0	0	0	(2)	S	Fp
Magnesium long-chain alkyl salicylate (C11+)	71	(0)	NR	(2)	0	0	(1)	S	S
2-Methyl-1,3-propanediol	2200	0	NR	0	0	0	(0)		D
Myrcene	1019	4	R	4	0	0	(2)		F

PSN	EHS	A1	A2	B1	C1	C2	C3	D3	E2
Naphthalenesulphonic acid- Formaldehyde copolymer, sodium salt solution	1020	1	(NR)	1	0	(0)	(1)		D
Nonylphenol poly(4+)ethoxylate	1063	4	NR	3	0	0	(2)		D
n-Octyl acetate	1080	3	R	2	0	0	(1)		FD
Olefin mixtures (C5-C7)	2243	3	R	3	(0)	(0)	(2)	A	E
Olefin mixtures (C5-C15)	2321	(5)	R	(4)	(0)	(0)	(2)	A	FE
alpha-Olefins (C6-C18) mixtures	2030	(5)	R	(4)	(0)	(0)	(2)	A	FE
Polybutenyl succinimide	2055	5	NR	0	(0)	(0)	(0)		Fp
Polymethylene polyphenyl isocyan	1153	(2)	NR	0	0	0	(2)	S	S
Polyolefin (molecular weight 300+)	1968	0	NR	0	0	0	0		Fp
Pyrolysis gasoline	2271	(4)	(NR)	(4)	1	0	(2)	TCM	FE
Rape seed oil fatty acid methyl este	2209	0	R	0	0	(0)	(1)		Fp
Sodium poly(4+)acrylate solutions	1487	0	NR	1	0	(0)	(1)		D
Styrene monomer	1273	3	R	3	1	0	2	CM	FE
Sulphohydrocarbon (C3-C88)	1972	4	NR	2	0	0	0		Fp
Tallow fatty acid	1289	(4)	(R)	(4)	0	(0)	(0)		Fp
Tricresyl phosphate (containing less than 1% ortho-isomer)	1331	(3)	(R)	(4)	0	1	0	N	S
Xylenes/ethylbenzene (10% or more mixture)	2269	2	NR	3	(0)	(0)	(2)		FE