File No: NA/595

June 1998

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

TIPA Laureth Sulfate

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

TIPA Laureth Sulfate

1. Applicant

Kiwi Brand Pty Ltd of 622 Heatherton Road CLAYTON SOUTH VIC 3169 has submitted a standard notification statement in support of their application for an assessment certificate for TIPA Laureth Sulfate.

2. Identity of the chemical

Kiwi Brand Pty Ltd has applied for the chemical name, CAS number, molecular and structural formulae, molecular weight and spectral data to be exempted from publication in the Full Public Report and the Summary Report.

Other Names:	triisopropanolamine lauryl ether sulphate triisopropanolamine C_{12-14} ether sulphate
Trade Name:	TIPA Laureth Sulfate MARLINAT 242/90 T Ambi Pur Flush Liquid Toilet Rimblock (containing 30% of the notified chemical)
Method of Detection and Determination:	ultraviolet spectroscopy

3. Physical and chemical properties

Some data provided for physical and chemical properties were determined from the notified chemical and others from the product containing 30% the notified chemical.

Appearance at 20°C and 101.3 kPa:	a liquid which will be yellow, blue, purple or green in colour (product)
Boiling Point:	< 100°C (product)
Specific Gravity:	1.0 (product)

Vapour Pressure:	not determined (see comments below)
Water Solubility:	highly soluble in water (notified chemical)
Partition Co-efficient (n-octanol/water):	not determined (see comments below)
Hydrolysis as a Function of pH:	not determined (see comments below)
Adsorption/Desorption:	not determined (see comments below)
Dissociation Constant:	not determined (see comments below)
Flash Point:	not flammable (notified chemical)
Flammability Limits:	not determined
Autoignition Temperature:	not determined
Explosive Properties:	not determined
Reactivity/Stability:	not determined

Comments on Physico-Chemical Properties

As the notified chemical is an organic salt of relatively high molecular weight its vapour pressure is expected to be low.

The hydrolytic behaviour of the chemical has not been investigated. The chemical contains no functional groups that are likely to be susceptible to hydrolysis within the environmental pH range (4 to 9).

The notifier indicates that as the chemical is surface active a reliable partition coefficient cannot be determined. Due to its high solubility the chemical is likely to have a low octanol/water partition coefficient (log P_{ow}) but this may be offset by its tendency to seek out surfaces.

Based on the anticipated partition coefficient the substance would not be expected to strongly adsorb to sediments. However, quaternary ammonium ions are known to react with dissolved organic carbon in water to form part of the sediments, and become completely inactivated on contact with soils (Nabholz *et al*., 1993). The adsorption/desorption behaviour of lauryl ether sulfate is unclear, but some adsorption would be expected due to its surface activity.

The notified substance contains a quaternary ammonium cation which is expected to have typical acidity. The sulfate anion is expected to remain totally dissociated in water.

4. Purity of the chemical

Degree of Purity: 78.0 - 90.0%

Toxic or Hazardous Impurities:

Chemical name:	unsulfated matter
CAS No.:	not available
Weight percentage:	< 6%
Toxic properties:	may be an eye and skin irritant
Chemical name:	1,2-propylene glycol
CAS No.:	57-55-6
Weight percentage:	4 - 10%
Toxic properties:	an eye and skin irritant and may be a skin sensitiser (Sax & Lewis, 1989)

Additives/Adjuvants:

Name	CAS Number	% Weight
alcohols C_{12-14} ethoxylated		<10

5. Use, volume and formulation

The notified chemical will be used as an ingredient in toilet bowl cleaners.

The notified chemical will not be manufactured in Australia. The end use products contain 30% of the notified chemical and will be imported. Import volumes for the notified chemical are expected to be as follows:

Year	1	2	3	4	5
Import Volume (tonne)	30	35	40	45	50

6. Occupational exposure

The notified chemical will not be manufactured or reformulated in Australia. Ambi Pur Flush Liquid Toilet Rimblock containing 30% of the notified chemical will be imported into Australia in cartridges. The cartridges will be packed in blister packs with 12 blister packs per carton.

Australian workers will handle the product during import, storage and distribution. The product will be unloaded from the ship, transported by road to a central distribution warehouse then to customer sites for sale in supermarkets and retail outlets. Shelf stackers will open the shipper carton and stack the product on the shelves. The product will be directly sold to the public.

Waterside, warehouse and transport workers and shelf stackers are unlikely to be exposed to the notified chemical when handling the product during these activities.

7. Public exposure

The product will be in a sealed blister pack with an outer shipping carton. In case of accidental spillage, the substance is to be absorbed in sand or other inert material and the contaminated surface will be washed with water. According to the Material Safety Data Sheet (MSDS), spills of the substance should be treated with "the best available techniques before discharging into drains or the aquatic environment". Waste material and empty containers should be disposed of through an approved waste management facility, in accordance with Federal, State and Local government regulations. The amount of the notified chemical released to the environment for public disposal is estimated to be less than 2% per year (1% from residuals in containers and 1% from damaged packaging).

The notified chemical will enter the public domain as lavatory bowl cleaner packages (55 mL) sold through supermarkets and retail outlets. The product is supplied either as two components, a sealed reservoir containing the surfactant mixture and a holder which clips onto the rim of the lavatory pan or as a refill pack containing only the reservoir. Insertion of the reservoir into the holder causes a plastic spike to penetrate the base of the reservoir. When depleted, the reservoir will be removed from its holder and disposed of as domestic garbage. Up to 1% of the initial volume may remain in the reservoir. The general public may therefore come into dermal contact with small quantities of the notified chemical during insertion or disposal of the reservoir. However, the product label directs users to wash their hands after handling the product, so contact would be brief.

Each time the reservoir is flushed, approximately 0.03 mL of the notified chemical will be released from the reservoir into the water. Considering that a full flush releases 9 L of water and a half flush releases 4 L of water, the final maximum concentration of the notified chemical in the water will be 7.5 ppm. No significant exposure is therefore anticipated from this source. Although infants may be attracted to the colour and make accidental contact with the product in the reservoir or water, an examination of a sample of the product package

revealed that it is unlikely that infants or young children could detach the reservoir from the holder once it is inserted. Therefore, exposure on these occasions will be low.

8. Environmental exposure

Release

No release of the notified substance is anticipated during transport except in the event of an accident. In the unlikely event of an accident the small size of the package will mean that any release from individual packs will be extremely limited.

It is anticipated that almost all the notified substance will be released to the sewer through its use as a toilet bowl cleaner. A small amount of the notified substance may be disposed of with the cartridges into domestic waste.

Fate

The substance was examined for biodegradation potential using EEC Directive 92/69, Part C.4-A (DOC-Die Away Test). Over the 28-day test, biodegradation reached 75% (Diefenbach, 1987b). This exceeds the 70% cutoff for ready biodegradability for this test. However, 70% degradation was not quite achieved within 10 days of the degradation reaching 10% indicating that notified substance is not strictly readily biodegradable under the conditions of the test. However, it is anticipated that it will biodegrade in the environment given the stringency of this test and how closely the substance was to passing the test (about 68% degradation reached within 10 days of the degradation reaching 10%). Additionally, as a class, alkyl ether sulfates have been shown to readily biodegrade (Painter, 1992).

The vast majority of notified substance will be discharged to sewer in a diffuse manner. Here the notified substance is expected to separate into constituent ions. The quaternary ammonium cation will rapidly react with the suspended or dissolved organic carbon (DOC) in the water column, forming an insoluble flocculant that should be removed with the sludge (Nabholz *et al*., 1993). The sludge will either be consigned to landfill or incinerated. Incineration products will include oxides of carbon, nitrogen and sulfur. The anion is expected to stay mainly in waste water, but will degrade both here and in sediment. It will be biodegraded by bacteria in the sludge via: (a) β-oxidation of the alkyl chain, (b) hydrolytic desulfation to form an ether and (c) etherase cleavage of the ethoxylate moiety (Painter, 1992). The latter pathway predominates, and all pathways can operate simultaneously in the one species.

Minor amounts of the product remaining as residues in product containers disposed of to landfill should be contained. Any leaks would quickly become immobile through absorbing to soil.

The high water solubility, relatively high molecular weight and charged nature of the notified substance indicate that it is unlikely to bioaccumulate (Connell, 1989).

9. Evaluation of toxicological data

Toxicological studies of MARLINAT 242/90 T, a trade name for the notified chemical were provided by the notifier.

9.1 Acute Toxicity

Summary of the acute toxicity of MARLINAT 242/90 T

Test	*Species*	*Outcome*	*Reference*
acute oral toxicity	rat	$LD_{50} > 2\ 000$ mg.kg^{-1}	(Krueger, 1997a)
acute dermal toxicity	rat	$LD_{50} > 2\ 000$ mg.kg^{-1}	(Krueger, 1997b)
skin irritation	rabbit	moderate to severe irritant	(Krueger, 1997c)
eye irritation	rabbit	slight to moderate irritant	(Krueger, 1997d)
skin sensitisation	guinea pig	not sensitising	(Krueger, 1997e)

9.1.1 Oral Toxicity (Krueger, 1997a)

Species/strain:	rat/Wistar
Number/sex of animals:	5/sex
Observation period:	14 days
Method of administration:	gavage
Clinical observations:	none
Mortality:	none
Morphological findings:	none
Test method:	according to OECD Guidelines (Organisation for Economic Co-operation and Development, 1995-1996)
LD_{50}:	> 2 000 mg.kg^{-1}
Result:	the notified chemical was of low acute oral toxicity in rats

9.1.2 Dermal Toxicity (Krueger, 1997b)

Species/strain:	rat/Wistar
Number/sex of animals:	5/sex
Observation period:	14 days
Method of administration:	the undiluted notified chemical was given dermally for 24 hours under a semi-occlusive dressing
Clinical observations:	moderate to severe dermal irritation was observed in animals
Mortality:	none
Morphological findings:	none
Test method:	according to OECD Guidelines (Organisation for Economic Co-operation and Development, 1995-1996)
LD_{50}:	> 2 000 $mg.kg^{-1}$
Result:	the notified chemical was of low acute dermal toxicity in rats

9.1.3 Skin Irritation (Krueger, 1997c)

Species/strain:	rabbit/White Russian
Number/sex of animals:	3 females
Observation period:	14 days
Method of administration:	a single application to the shorn intact skin under a semi-occlusive dressing for 4 hours

Draize scores (Draize, 1959):

		Time after treatment (days)					
Animal	***1***	***2***	***3***	***6***	***8***	***10***	***14***
Erythema							
1	2[a]	3	3	2	2	0	0
2	2	2	2[b]	1[b]	1[b]	0	0
3	2	2	3[b]	2	1	0	0
Oedema							
1	4	4	4	2	2	0	0
2	2	2	2[b]	1[b]	1[b]	0	0
3	2	2	3[b]	2	0	0	0

[a] see Attachment 1 for Draize scales
[b] localised skin reaction

Test method: according to OECD Guidelines (Organisation for Economic Co-operation and Development, 1995-1996)

Result: the notified chemical was a moderate to severe irritant to the skin of rabbits

9.1.4 Eye Irritation (Krueger, 1997d)

Species/strain: rabbit/White Russian

Number/sex of animals: 3 females

Observation period: 24 days

Method of administration: a single application of the notified chemical (0.1 mL) into the conjunctival sac of one eye for 24 hours

Draize scores (Draize, 1959) :

	Time after instillation									
Animal	***1 day***		***2 days***		***3 days***		***6 days***		***8 days***	
Cornea	o^a	a^b	o^a	a^b	o^a	a^b	o^a	a^b	o^a	a^b
1	[1]1	4	1	4	1	4	1	2	1	1
2	1	4	2	3	2	3	0	0	0	0
3	1	4	1	4	1	4	1	1	1	1
	10 day		***13 days***		***17 days***		***21 days***		***24 days***	
	o^a	a^b	o^a	a^b	o^a	a^b	o^a	a^b	o^a	a^b
1	1	1	1	1	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0	0	0

Iris	***1 day***	***2 days***	***3 days***	***6 days***	***8 days***
1	0	0	0	0	1
2	1	1	1	0	0
3	0	0	0	0	0
	10 day	***13 days***	***17 days***	***21 days***	***24 days***
1	1	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0

Conjunctiva	***1 day***		***2 days***		***3 days***		***6 days***		***8 days***	
	r^c	c^d	r^c	c^d	r^c	c^d	r^c	c^d	r^c	c^d
1	2	2	3	1	3	1	2	1	2	1
2	2	2	2	2	3	2	2	1	2	1
3	2	2	2	1	3	1	2	1	2	1
	10 day		***13 days***		***17 days***		***21 days***		***24 days***	
	r^c	c^d	r^c	c^d	r^c	c^d	r^c	c^d	r^c	c^d
1	2	1	1	0	0	0	0	0	0	0
2	2	1	2	1	1	0	1	0	0	0
3	2	1	1	0	0	0	0	0	0	0

[1] see Attachment 1 for Draize scales
[a] opacity [b] area [c] redness [d] chemosis [e] discharge

Test method: according to OECD Guidelines (Organisation for Economic Co-operation and Development, 1995-1996)

Result: the notified chemical was a slight to moderate irritant to the eyes of rabbits

9.1.5 Skin Sensitisation (Krueger, 1997e)

Species/strain: guinea pigs/Dunkin Hartley

Number of animals: 20 females for test group,
10 females for control group

Induction procedure: Day 0: gauze dressings wetted with the notified chemical (50% in water) were placed on the skin of the left flank and covered with an occlusive plaster and a bandage for 6 hours

Day 7 and Day 14: same as Day 0

Challenge procedure: Day 28: gauze dressings wetted with the notified chemical (25% in water) were placed on the skin of the right flank and covered with an occlusive plaster and a bandage for 6 hours

Challenge outcome:

Challenge concentration	***Test animals***		***Control animals***	
	30 hours*	***54 hours****	***30 hours***	***54 hours***
25%	**0/20	0/20	0/10	0/10

* time after patch removal
** number of animals exhibiting positive response

Test method: according to OECD Guidelines (Organisation for Economic Co-operation and Development, 1995-1996)

Result: the notified chemical was not sensitising to the skin of guinea pigs

9.2 Repeated Dose Toxicity (Pittermann, 1994)

The notifier provided a repeat dose toxicity study on Texapon N 70 which has a similar chemical structure to the notified chemical.

Species/strain: rat/Hsd/Win:Wu

Number/sex of animals: 10/sex for groups 1-4
5/sex for groups 5-7

Method of administration:	all groups (1-7) received Texapon N 70 orally by gavage daily for 90 days; recovery groups (5-7) had an additional treatment-free period of 28 days
Dose/Study duration:	group 1: 0 $mg.kg^{-1}$ group 2: 25 $mg.kg^{-1}$ group 3: 75 $mg.kg^{-1}$ group 4: 225 $mg.kg^{-1}$ group 5: 0 $mg.kg^{-1}$ group 6: 75 $mg.kg^{-1}$ group 7: 225 $mg.kg^{-1}$ (vehicle: water)
Clinical observations:	no treatment-related symptoms were observed in any test groups
Clinical chemistry/Haematology	the clinical chemistry tests showed no treatment-related effects and the haematological examination showed no deviations in any parameter in any test group
Histopathology:	local treatment-related effects of varying degree in the forestomach of test groups 2 to 4
Test method:	according to OECD guidelines (Organisation for Economic Co-operation and Development, 1995-1996)
Result:	Texapon N 70 was of low toxicity in the 90-day oral study in rats with a no effect level of 225 $mg.kg^{-1}.day^{-1}$

9.3 Genotoxicity

9.3.1 *Salmonella typhimurium* Reverse Mutation Assay (Ebert, 1996)

Strains:	TA 98, TA 100, TA 1535 and TA 1537
Concentration range:	1 to 5 000 $\mu g.plate^{-1}$ with or without S9 metabolising system
Test method:	similar to OECD guidelines (Organisation for Economic Co-operation and Development, 1995-1996)

Result: the notified chemical was not a bacterial mutagen under the test conditions

9.4 Overall Assessment of Toxicological Data

The notified chemical exhibited low acute oral toxicity (LD_{50} greater than 2 000 $mg.kg^{-1}$) and low acute dermal toxicity (LD_{50} greater than 2 000 $mg.kg^{-1}$) in rats. It was a moderate to severe skin irritant and slight to moderate eye irritant in rabbits. When tested in guinea pigs, it was not a skin sensitiser. In the presence or absence of metabolic activation, the notified chemical was not mutagenic in bacteria. The notifier provided an oral repeat dose study on Texapon N 70 which has similar structure to the notified chemical. Texapon N 70 showed low toxicity in the 90-day oral toxicity study with a no effect level of 225 $mg.kg^{-1}.day^{-1}$. The notifier applied for a variation of schedule data requirements for the inhalation toxicity study, induction of germ cell damage and chromosome damage studies. This was accepted after consideration of the existing toxicity data and anticipated exposure pattern.

On the basis of submitted data, the notified chemical would be classified as hazardous in accordance with NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1994a) in relation to the irritancy effects (skin) reported in the submitted skin irritation study. The acute lethal effects (oral and dermal), irritancy effect (eye) and sensitising effects (skin) are insufficient to warrant classification for these effects.

10. Assessment of environmental effects

The following ecotoxicity studies have been supplied by the notifier. The tests were carried out according to OECD Test Methods.

Species	Test	Concentrations[a] ($mg.L^{-1}$)	Result ($mg.L^{-1}$)	Reference
European carp *(Cyprinus carpio)*	Semi-static 96 h acute	1.1, 2.6, 6.5, 17, 40, 97	LC_{50} = 6.2 (C.I. 4.5-8.5)	(Scholz, 1987a)
Water Flea *(Daphnia magna)*	Static 48 h acute	1.1, 2.6, 6.5, 17, 40, 97	3.5 < EC_{50} <10[c]	(Scholz, 1987b)
Algae *(Scenedesmus subspicatus)*	72 h growth	1.1, 2.6, 6.5, 17, 40, 97	ErC_{50}= 9.5[b] EbC_{50}= 5.1[b] NOEC = 2.0	(Scholz, 1987c)
Bacteria *(Pseudomonas putida Migula)*	16 h growth	0.1, 1, 10, 100, 1 000, 10 000	EC_{50} > 10 000	(Diefenbach, 1987a)

[a]Concentration measured at start.
[b]Calculated using probit analysis.
[c]Highest concentration showing no mortalities and lowest concentration showing 100% mortality.

No other observations of effects were made during the studies.

The ecotoxicity data for the notified substance indicate that it is moderately toxic to fish, aquatic invertebrates and algae, and practically non-toxic to bacteria. While Scenedesmus are considered by the US EPA to be insensitive genera when compared to the US preferred genus, Selenastrum (USEPA), similar alkyl ether sulfates have exhibited growth inhibition to algae at between 10 to 100 $mg.L^{-1}$ over 5 days. EC_{50} values for Daphnia between 1.4 to 20 $mg.L^{-1}$ and LC_{50} values between 2.1 and 55 $mg.L^{-1}$ for fish are found in the literature (Painter, 1992). The above values are in the range of literature values observed for fish and Daphnia, but are marginally more toxic for algae. The increased toxicity toward algae my result from the presence of the quaternary ammonium cation which is known to be toxic to algae (Nabholz *et al*., 1993).

11. Assessment of environmental hazard

The vast majority of the notified substance will be discharged to sewer through product use. The notifier has estimated the concentration of the notified substance in the discharge from a single flush (average 6 L of water) to be 5 ppm. This level is similar to the level shown to be toxic to fish, aquatic invertebrates and algae. However, the level will be further diluted in the daily sewage discharges of up to 500 ML in main cities and 1 ML in small communities. The notifier has provided predicted environmental concentrations (PECs) for both city and country areas of 0.06 ppt and 0.03 ppb, respectively (assuming 10 flushes containing the notified chemical diluted in the daily discharges). These figures are for use in a single toilet and do not take into account use in other toilets connected to the same sewage system.

As the product will be used in a dispersed manner all around the country, and sent to sewage treatment plants in both city and country locations, a PEC based on continental use has been calculated by Environment Australia:

Import Volume	50 000 kg
Amount discharged to sewer	100%
Sewer output per day*	2 700 ML
Concentration in Sewage Treatment Plant	51 $\mu g.L^{-1}$ (ppb)

*Sewer output based on an Australian population of 18 million, each using 150 L water per day.

The PEC is around 100 times lower than the lowest EC_{50} value. Additionally, the PEC would be further reduced adsorption to sewerage sludge, biodegradation in the treatment plant and dilution in receiving waters.

The minor amount remaining as residues in product containers after use should be confined to landfill. Any leaking substance will be rapidly and completely adsorbed to soil.

Hence, the overall environmental hazard of the chemical can be rated as low when used in toilet bowl cleaning products at the proposed levels.

12. Assessment of public and occupational health and safety effects

Acute toxicity studies and mutagenicity tests were carried out with the notified chemical. The notified chemical is of low acute oral and low acute dermal toxicity in rats (LD_{50} greater than 2 000 $mg.kg^{-1}$ via both routes). The notified chemical was a moderate to severe skin irritant and slight to severe eye irritant in rabbits but was not a skin sensitiser in guinea pigs. In a bacterial reverse mutation assay, the notified chemical was not genotoxic at up to 5 000 µg per plate. A 90-day oral repeat dose toxicity study was assessed in rats on Texapon N 70 which is considered structurally similar to the notified chemical. Texapon N 70 showed low toxicity at the tested doses (local irritant effects in the forestomach which reversed after 28 days of recovery) in this study with a no effect level of 225 $mg.kg^{-1}.day^{-1}$. The notifier applied for variations of schedule data requirements for the inhalation toxicity study and chromosome damage studies. On the basis of the skin irritation effects reported in the submitted skin irritation study, the notified chemical would be classified as hazardous in accordance with NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1994a).

Products containing the notified chemical will require R38 (Irritating to skin) on their label when the notified chemical is present at greater than and equal to 20%. The product Ambi Pur Flush Liquid Toilet Rimblock is exempt from this labelling requirement under NOHSC *National Model Regulation for the Control of Workplace Hazardous Substances* (NOHSC, 1994c), where toilet products are listed as being outside the scope of the model regulations.

The notified chemical contains unsulfated matter (less than 6%) and 1,2-propylene glycol (4 to 10%) as impurities. The impurities together with C12-14 ethoxylated alcohols (1 to 10%) present in the product, have eye and skin irritation potential. 1,2-Propylene glycol may also be a skin sensitiser in humans. According to the MSDS supplied by the notifier, repeated or prolonged contact with the product may lead to contact dermatitis.

No formulation or repackaging will take place in Australia. Australian workers will handle the product containing the notified chemical during import, storage and distribution. Waterside, warehouse and transport workers and workers stacking shelves are unlikely to be exposed to the notified chemical when handling the product during these activities. The risk of adverse health effects from conducting these operations is expected to be non-existent unless spillage occurs. In this case, workers may experience skin irritation if contaminated with the chemical.

No significant public exposure to the notified chemical is anticipated during transport. Members of the public may, however, make dermal contact with the notified chemical when inserting or removing the reservoir containing the formulation. Where exposure does occur, the notified chemical is unlikely to pose a significant systemic toxicological hazard given its low acute and oral repeat dose toxicology profile coupled with the brief and intermittent pattern of anticipated exposure. However, given that the notified chemical is a skin and eye irritant, it is desirable that contact with the product is minimised.

13. Recommendations

To minimise occupational and public exposure to TIPA Laureth Sulfate the following guidelines and precautions should be observed:

- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees;
- Products containing the notified chemical should bear the warning statement "Avoid contact with eyes and skin" and the safety direction "Wash hands after handling the holder and liquid container".

14. Material Safety Data Sheet

The MSDS for the product containing the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994b).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

15. Requirements for secondary notification

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. References

Connell DW (1989) General characteristics of organic compounds which exhibit bioaccumulation. In: D. W. Connell ed. Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton.

Diefenbach R (1987a) Determination of the bacteriotoxicity of Marlinat 242/90T in the Pseudomonas cell multiplication inhibition test (DIN 38412 Part 8), Project No. PZ-96/05, GLP-Prufinstitut Biologie, Huls AG, Marl, Germany.

Diefenbach R (1987b) Determination of the biodegradability of Marlinat 242/90T in the DOC-DIE AWAY test as specified by EC directive 92/96 EEC, Project No. DDA-119, GLP-Prufinstitut, Huls AG, Marl, Germany.

Draize JH (1959) Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics. Association of Food and Drug Officials of the US, **49**: 2-56.

Ebert R (1996) Final report AM-96/22, S. typhimurium Reverse mutation assay (Ames Test) with MARLINAT 242/90 T,. Huls AG, Department of Toxicology, Germany.

Krueger N (1997a) Final report AO-96/0197, MARLINAT 242/90 T, Acute oral toxicity to the rat,. Huls AG, Department of Toxicology, Germany.

Krueger N (1997b) Final report AD-96/0197, MARLINAT 242/90 T, Acute dermal toxicity to the rat,. Huls AG, Department of Toxicology, Germany.

Krueger N (1997c) Final report AH-96/0197, Test of the acute irritation of the skin by MARLINAT 242/90 T on rabbits,. Huls AG, Department of Toxicology, Germany.

Krueger N (1997d) Final report AA-96/0197, Test of the acute irritant effect on eyes and mucosa of MARLINAT 242/90 T in rabbits,. Huls AG, Department of Toxicology, Germany.

Krueger N (1997e) Final report HS-96/0197, Test of the skin sensitizing effect of MARLINAT 242/90 T in guinea pigs (Buhler method),. Huls AG, Department of Toxicology, Germany.

Nabholz JV, Miller P & Zeeman M (1993) Environmental Risk Assessment of New Substances under the Toxic Substances Control Act Section Five. In: W. G. Landis, J. S. Hughes and M. A. Lewis ed. Environmental Toxicology and Risk Assessment, American Society for Testing and Materials. ASTM STP 1179, Philadelphia, 40-55.

National Occupational Health and Safety Commission (1994a) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1994c) Control of Workplace Hazardous Substances [NOHSC:1005(1994) & NOHSC:2007(1994)]. Canberra, Australian Government Publishing Service.

Organisation for Economic Co-operation and Development (1995-1996) OECD Guidelines for the Testing of Chemicals on CD-Rom. OECD, Paris.

Painter H (1992) Anionic Surfactants. Springer-Verlag, Berlin.

Pittermann W (1994) Biological research toxicology, Texapon N 70, 90 day oral (gavage) subchronic toxicity study in the rat, Project No. R 9300413, Henkel KgaA

Sax NI & Lewis RJ (1989) Dangerous Properties of Industrial Materials. Van Nostrand Reinhold, New York.

Scholz (1987a) Determination of the effects of Marlinat 242/90T on fish (as specified by 92/96C1 EEC), Project No. FK-1370, GLP-Prufinstitut Biologie, Huls AG, Marl, Germany.

Scholz (1987b) Determination of the effects of Marlinat 242/90T on the swimming behaviour of Daphnia magna (as specified by 92/96/EEC), Project No. DK686, GLP-Prufinstitut Biologie, Huls AG, Marl, Germany.

Scholz (1987c) Determination of the effects on Marlinat 242/90T on the growth of Scenedesmus subspicatus 86.81, SAG (algal growth inhibition test complying with Directive 92/96/EEC), Project No. AW-443, GLP-Prufinstitut Biologie, Huls AG, Marl, Germany.

Attachment 1

The Draize Scale for evaluation of skin reactions is as follows:

Erythema Formation	*Rating*	*Oedema Formation*	*Rating*
No erythema	0	No oedema	0
Very slight erythema (barely perceptible)	1	Very slight oedema (barely perceptible)	1
Well-defined erythema	2	Slight oedema (edges of area well-defined by definite raising	2
Moderate to severe erythema	3	Moderate oedema (raised approx. 1 mm)	3
Severe erythema (beet redness)	4	Severe oedema (raised more than 1 mm and extending beyond area of exposure)	4

The Draize scale for evaluation of eye reactions is as follows:

CORNEA

Opacity	*Rating*	*Area of Cornea involved*	*Rating*
No opacity	0 none	25% or less (not zero)	1
Diffuse area, details of iris clearly visible	1 slight	25% to 50%	2
Easily visible translucent areas, details of iris slightly obscure	2 mild	50% to 75%	3
Opalescent areas, no details of iris visible, size of pupil barely discernible	3 moderate	Greater than 75%	4
Opaque, iris invisible	4 severe		

CONJUNCTIVAE

Redness	*Rating*	*Chemosis*	*Rating*	*Discharge*	*Rating*
Vessels normal	0 none	No swelling	0 none	No discharge	0 none
Vessels definitely injected above normal	1 slight	Any swelling above normal	1 slight	Any amount different from normal	1 slight
More diffuse, deeper crimson red with individual vessels not easily discernible	2 mod.	Obvious swelling with partial eversion of lids	2 mild	Discharge with moistening of lids and adjacent hairs	2 mod.
Diffuse beefy red	3 severe	Swelling with lids half-closed	3 mod.	Discharge with moistening of lids and hairs and considerable area around eye	3 severe
		Swelling with lids half-closed to completely closed	4 severe		

IRIS

Values	*Rating*
Normal	0 none
Folds above normal, congestion, swelling, circumcorneal injection, iris reacts to light	1 slight
No reaction to light, haemorrhage, gross destruction	2 severe