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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Promidium IS

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Director
Chemicals Notification and Assessment

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Promidium IS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Uniqema Australia Pty Ltd (ABN 00018084), Level 37, 101 Collins St MELBOURNE VIC 3000

Symex Holdings Pty Ltd (ABN 29 091 035 353), 14 Woodruff St PORT MELBOURNE VIC 3207

NOTIFICATION CATEGORY
Standard: Chemical other than polymer (more than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication: molecular and structural formulae, molecular weight, spectral data, purity.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows:

Vapour pressure, hydrolysis as a function of pH, dissociation constant, adsorption/desorption, acute dermal toxicity, skin and eye irritation, skin sensitisation, repeat dose toxicity, chromosome damage and ecotoxicity.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None.

NOTIFICATION IN OTHER COUNTRIES
Europe: Notification number: 03-54-0801-00.

2. IDENTITY OF CHEMICAL

CHEMICAL NAME
The notified chemical is a component of Promidium™ 2 whose INCI name is: PPG-2 hydroxyethyl coco isostearamide.

MARKETING NAME(S)
Promidium™ 2.

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD	UV/Vis, Infrared and nuclear magnetic resonance spectroscopy.
Remarks	Reference spectra were provided.

3. COMPOSITION

DEGREE OF PURITY
High.

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
None.

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)
One impurity at 10%.

ADDITIVES/ADJUVANTS
None.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
Initially in a range of preformulated personal care and industry cleaning agents but later may be imported in 200 L drums or 20 L pails.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	< 10	< 10	< 10	< 10	< 10

USE
As a cleansing agent, solubiliser, consistency agent and foam booster in personal care products and industrial cleaning agents.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Unknown.

IDENTITY OF MANUFACTURER/RECIPIENTS
Unknown.

TRANSPORTATION AND PACKAGING
Preformulated personal care products will be transported in typical containers depending on the nature of the product. Industrial cleaning agents are normally packaged in 20 L pails and 200 L plastic or steel drums.

5.2. Operation description

For preformulated personal care products operations are restricted to transportation and warehouse storage followed by distribution for retail sale. For industrial cleaning agents additional operations include decanting from containers for dilution prior to use.

Formulation of both industrial cleaners and personal care products will take place by batch processes. These involve addition of a range of ingredients in a particular sequence to mixing vessels which may be open or closed. It appears that mixing will generally be slow to avoid foaming and the weighing, mixing and drumming off areas are typically provided with local exhaust ventilation and/or general ventilation. Addition of ingredients is expected to be by use of a drum spear and pump or drum cradle and gravity feed. The assembly lines are typically largely automated.

5.3. Occupational exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Delivery to wharf	10	4 hours/day	40 days/year
Distribution (storage and transport)	100	6 hours/day	240 days/year
Formulation preparation	200	"	"
Point of sale	1000	"	"

Exposure Details
Exposure to the notified chemical is limited to 25% in the imported concentrated form and approximately 1% in final products. Exposure to the concentrate during transport and storage may occur in the event of accidental rupture of container and is expected to be mainly dermal. Exposure to the concentrate during transfer from the import containers to the mixing vessel is possible through drips and spills and is expected to be controlled by the use of personal protective equipment. Some dermal exposure may occur during cleaning of transfer and mixing apparatus but should involve a dilute form of the notified chemical. Dermal exposure to small quantities of product containing approximately 1% notified chemical may occur during quality control testing.

5.4. Release

RELEASE OF CHEMICAL AT SITE
Since the notified chemical will be imported in prepared formulations there will be no release in Australia due to manufacture.

There will be some release during reformulation into personal skin care products (eg hair care products, bath, shower and shaving products). Waste notified chemical will be generated during reformulation via:

- Spills up to 190 kg/annually
- Import container residues up to 10 kg/annually
- Process Equipment cleaning up to 100 kg/annually.

RELEASE OF CHEMICAL FROM USE
Up to 200 kg of the notified chemical will remain in the personal care end user containers when these are disposed of to the domestic rubbish. Since the notified chemical is a component in personal care products (and cleaning products), ultimately the majority of the notified chemical will be washed off the skin and into the sewer.

5.5. Disposal

Reformulation solid wastes, including spills and import containers and any residues present, will be disposed of to landfill. This represents up to 200 kg per year of the notified chemical. A further 200 kg will be disposed of to landfill in end-user containers.

The process equipment cleaning effluent containing up to 100 kg of notified chemical will be disposed of to sewer. Approximately 95% of the notified chemical will end up in the sewer due to use of the end-product. A total of 96% of the imported volume of notified chemical will go to sewer, ie up to 9600 kg per annum.

5.6. Public exposure

The public will be intentionally exposed to personal care products containing approximately 1% notified chemical. Exposure levels will depend on the nature of the product and can include hair shampoos, conditioners and colourants and toiletries such as bath, shower and shaving products.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa Yellow liquid.

Pour Point < 24°C

METHOD OECD TG 102 Melting Point/Melting Range.
EC Directive 92/69/EEC A.1 Melting/Freezing Temperature.
TEST FACILITY Huntingdon Life Sciences (2003a).

Boiling Point 265.4°C at 101.3 kPa

METHOD OECD TG 103 Boiling Point.
EC Directive 92/69/EEC A.2 Boiling Temperature.
TEST FACILITY Huntingdon Life Sciences (2003a).

Density 940 kg/m^3 at 20ºC

METHOD OECD TG 109 Density of Liquids and Solids.
EC Directive 92/69/EEC A.3 Relative Density.
Remarks Determined using a pycnometer.
TEST FACILITY Huntingdon Life Sciences (2003a).

Vapour Pressure 4.08 x 10^{-6} kPa at 25ºC

METHOD OECD TG 104 Vapour Pressure.
EC Directive 92/69/EEC A.4 Vapour Pressure.
Remarks Determined with vapour pressure balance.
TEST FACILITY Huntingdon Life Sciences (2003a).

Water Solubility < 1.169 mg/L at 20ºC

METHOD OECD TG 105 Water Solubility (Flask method).
EC Directive 92/69/EEC A.6 Water Solubility
Remarks The flask method was modified to include light scattering assessment to test if a solution or a suspension was formed.

A preliminary test with visual assessment indicated that an intractable suspension was formed with shaking, indicating a microsuspension rather than a true solution was formed.

Concentrations of 1.169, 0.5845 and 0.1169 mg/L were analysed by UV/Visible spectrometry using distilled water as the blank. The results obtained at the two lowest concentrations were inconclusive due to baseline shifts. At the concentration 1.169 mg/L there was a displacement above the baseline. Thus indicating that a suspension had been formed and that the water solubility was less than 1.169 mg/L.

This result indicates that the test substance is slightly water soluble.
TEST FACILITY Huntingdon Life Sciences (2003a).

Surface Tension 29.18 mN/m at 1000 mg/L and 19ºC
29.92 mN/m at 500 mg/L and 19ºC
72.16 mN/m at 1 mg/L and 19ºC

METHOD OECD TG 115 Surface Tension of Aqueous Solutions (Harmonised ring method).
EC Directive 92/69/EEC A.5 Surface Tension.
Remarks Since the results below 60 mN/m indicate surface activity, the test substance is surface active at 1000 and 500 mg/L but not at 1 mg/L.
TEST FACILITY Huntingdon Life Sciences (2003a).

Hydrolysis as a Function of pH
Remarks Not attempted due to the low water solubility and complex composition of the notified chemical. While the notified chemical contains a hydrolysable functionality, this is unlikely to occur under ambient environmental conditions.

Partition Coefficient (n-octanol/water) log Pow = 3.7 to > 6.2 at 21ºC

METHOD OECD TG 117 Partition Coefficient (n-octanol/water).
Remarks HPLC Method.

Six reference substances with log Pow between 1.0 and 6.2 were used. The test substance chromatograph showed a series of peaks, with some components having a log P_{ow} greater than 6.2.

These results indicate that the test substance is hydrophobic and will partition into the organic phase.
TEST FACILITY Huntingdon Life Sciences (2003a).

Adsorption/Desorption Estimated log K_{oc} = 3.856

METHOD EPI estimation software package PCKOWIN v 1.65.
Remarks The estimation is based of the structure of the major component of the notified chemical.

This result indicates that the test substance will adsorb strongly to soil and sediments.
TEST FACILITY Not provided.

Dissociation Constant Not determined.

Remarks No acidic or basic functional groups are present.

Particle Size Not determined.

Remarks Notified chemical is a liquid.

Flash Point > 170°C at 102.5 kPa

METHOD EC Directive 92/69/EEC A.9 Flash Point.
Remarks Pensky-Martens closed cup apparatus.
TEST FACILITY Huntingdon Life Sciences (2003a).

Flammability Limits Not determined.

Remarks Not expected to be flammable.

Autoignition Temperature 387°C at 102.9 kPa.

METHOD 92/69/EEC A.15 Auto-Ignition Temperature (Liquids and Gases).
TEST FACILITY Huntingdon Life Sciences (2003a).

Explosive Properties Not explosive.

METHOD EC Directive 92/69/EEC A.14 Explosive Properties.
Remarks Koenen apparatus used to determine thermal sensitivity and an impact hammer to determine mechanical sensitivity.
TEST FACILITY Huntingdon Life Sciences (2003a).

Reactivity No oxidising properties.

Remarks The notified chemical is expected to be stable under normal environmental conditions.

7. TOXICOLOGICAL INVESTIGATIONS

Toxicological investigations for the notified chemical were conducted only for acute oral toxicity and bacterial mutagenicity in vitro. A close analogue, Promidium CO, was previously assessed as NA/908 and the relevant toxicological data are included here.

Endpoint and Result	*Assessment Conclusion*
Rat, acute oral LD50 > 2000 mg/kg bw (Promidium IS)	low toxicity
Rat, acute dermal LD50 > 2000 mg/kg bw (Promidium CO)	low toxicity
Rabbit, skin irritation (Promidium CO)	moderately irritating
Rabbit, eye irritation (Promidium CO)	moderately irritating
Guinea pig, skin sensitisation – adjuvant test (Promidium CO)	no evidence of sensitisation.
Rat, repeat dose oral toxicity – 28 days (Promidium CO)	NOAEL = 1000 mg/kg/day
Genotoxicity – bacterial reverse mutation (Promidium IS)	non mutagenic
Genotoxicity – in vitro chromosomal aberration test (Promidium CO)	unlikely to be genotoxic
Genotoxicity – in vivo rat hepatocyte DNA repair test (Promidium CO)	non genotoxic
Genotoxicity – in vivo mouse bone marrow micronucleus test (Promidium CO)	non genotoxic

7.1. Acute toxicity – oral

TEST SUBSTANCE — Notified chemical.

METHOD — OECD TG 423 Acute Oral Toxicity – Acute Toxic Class Method.
EC Directive 96/54/EEC B.1tris Acute Oral Toxicity – Acute Toxic Class Method.

Species/Strain	Rat/Sprague-Dawley.
Vehicle	1% (w/v) aqueous methylcellulose.
Remarks - Method	None.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
1	3/sex	2000	0

LD50	> 2000 mg/kg bw
Signs of Toxicity	Loose faeces in all females from approximately 4 hours after dosing on day 1 with recovery complete by day 2.
Effects in Organs	None.
Remarks - Results	None.

CONCLUSION — The notified chemical is of low toxicity via the oral route.

TEST FACILITY — Huntingdon Life Sciences (2003b).

7.2. Acute toxicity - dermal

TEST SUBSTANCE — Promidium CO.

METHOD — OECD TG 402 Acute Dermal Toxicity – Limit Test.
EC Directive 92/69/EEC B.3 Acute Toxicity (Dermal) – Limit Test.

Species/Strain	Rat/Sprague-Dawley.
Vehicle	None.
Type of dressing	Occlusive.
Remarks - Method	None.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
1	5/sex	2000	0

LD50	> 2000 mg/kg bw
Signs of Toxicity - Local	Slight to well-defined dermal irritation (grade 1 or 2 erythema with or without oedema up to grade 2) was observed in four males and three females, resolving by day 9. Desquamation was observed in 2 females with localised spots and/or scabbing in one female. These were resolved by day 13.
Signs of Toxicity - Systemic	No mortalities occurred and all animals gained weight throughout the study. Vocalisation and hyperactivity were observed in one female on day 1.
Effects in Organs	None.
Remarks - Results	None.

CONCLUSION The analogue chemical is of low toxicity via the dermal route.

TEST FACILITY Huntingdon Life Sciences (1999a).

7.3. Irritation – skin

TEST SUBSTANCE Promidium CO.

METHOD OECD TG 404 Acute Dermal Irritation/Corrosion.
EC Directive 92/69/EEC B.4 Acute Toxicity (Skin Irritation).

Species/Strain	Rabbit/New Zealand White
Number of Animals	3
Vehicle	None.
Observation Period	14 days.
Type of Dressing	Semi-occlusive.
Remarks - Method	None.

RESULTS

Lesion	*Mean Score* Animal No.*			*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
	1	2	3			
Erythema/Eschar	1	1.33	2	2	14 days	1
Oedema	0	0	0	1	24 hours	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal.

Remarks - Results All animals gained weight and none displayed signs of toxicity or ill health during the study.

No irritation was observed in a single animal following 3 or 60 minute exposure. Following 4 hour exposure, thickening of the skin, desquamation and well-defined erythema with or without slight oedema were noted. Very slight erythema was still evident in two out of three animals at day 14. Persistence of irritation leads to the view that the notified chemical is moderately irritating.

CONCLUSION The analogue chemical is moderately irritating to the skin.

TEST FACILITY Huntingdon Life Sciences (1999b).

7.4. Irritation - eye

TEST SUBSTANCE Promidium CO

METHOD OECD TG 405 Acute Eye Irritation/Corrosion.
EC Directive 92/69/EEC B.5 Acute Toxicity (Eye Irritation).
Species/Strain Rabbit/New Zealand White
Number of Animals 3
Observation Period 14 days
Remarks - Method None.

RESULTS

Lesion	*Mean Score* Animal No.*			*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
	1	2	3			
Conjunctiva: redness	3	2	3	3	7 days	0
Conjunctiva: chemosis	2.33	1.67	2	4	7 days	0
Conjunctiva: discharge						
Corneal opacity	1	1.33	1.33	2	4 days	0
Iridial inflammation	0.33	0	0	1	14 days	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal.

Remarks - Results Corneal opacification was observed in all animals 24 hours after instillation of the test substance. In addition, diffuse red colouration of conjunctivae with eyelid swelling was also observed up to day 7. Iridal inflammation was observed up to day 14 in one animal.

No animal displayed signs of toxicity or ill health during the study.

CONCLUSION The analogue chemical is moderately irritating to the eye.

TEST FACILITY Huntingdon Life Sciences (1999c).

7.5. Skin sensitisation

TEST SUBSTANCE Promidium CO.

METHOD OECD TG 406 Skin Sensitisation – maximisation test.
EC Directive 96/54/EC B.6 Skin Sensitisation – maximisation test.
Species/Strain Guinea pig/Dunkin Hartley.
PRELIMINARY STUDY Maximum Non-irritating Concentration:
intradermal: 0.5% (v/v)
topical: 50% (v/v)
MAIN STUDY
Number of Animals Test Group: 10 Control Group: 5
INDUCTION PHASE Induction Concentration:
intradermal: 0.5% (v/v)
topical: 50% (v/v)
Signs of Irritation None due to test substance.
CHALLENGE PHASE
1st challenge topical: 5%, 10%
Remarks - Method None.

RESULTS

Remarks - Results No skin reactions were seen in either the test or control animals at 24 or

48 hours after patch removal.

CONCLUSION	There was no evidence of reactions indicative of skin sensitisation under the conditions of the test.
TEST FACILITY	Huntingdon Life Sciences (1999d).

7.6. Repeat dose toxicity

TEST SUBSTANCE	Promidium CO.
METHOD	OECD TG 407 Repeated Dose 28-day Oral Toxicity Study in Rodents. EC Directive 96/54/EC B.7 Repeated Dose (28 Days) Toxicity (Oral).
Species/Strain	Rat/CD BR.
Route of Administration	Oral – gavage.
Exposure Information	Total exposure days: 28 days; Dose regimen: 7 days per week.
Vehicle	Water.
Remarks - Method	None.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw/day*	*Mortality*
I (control)	5/sex	0	0
II (low dose)	"	15	0
III (mid dose)	"	150	0
IV (high dose)	"	1000	0

Clinical Observations

Transient post-dosing salivation was observed occasionally for all animals receiving 1000 mg/kg/day and for 4 males receiving 150 mg/kg/day and 2 females receiving 15 mg/kg/day.

All animals gained weight during the study. Body weight gain for all animals receiving 1000mg/kg/day and females receiving 150 mg/kg/day was slightly lower over the first 4 days of treatment compared to controls. A slight non dose-related decrease in weight gain compared to controls was observed in females receiving 1000 and 150 mg/kg/day. In males, however, receiving the highest dose, weight gain was comparable to that of controls.

Laboratory Findings – Clinical Chemistry, Haematology, Urinalysis

No treatment-related changes in blood chemical or haematological parameters were observed compared to controls. Urine specific gravity was increased significantly in animals of both sexes receiving 1000 mg/kg/day. Urine volume decreased and urine pH increased in high dose males. Urine phosphorus also decreased in high dose males. Urine potassium decreased in high dose animals of both sexes and females receiving 150 mg/kg/day.

Effects in Organs

Absolute and relative thymic weights for females receiving 1000 and 150 mg/kg/day were reduced slightly compared to controls. These were non dose-related in degree and without parallel pathological changes (see below). All other organ weights were similar for treatment groups compared to controls.

In kidneys of male rats receiving 1000 mg/kg/day, focal basophilic cortical tubules were present in 3 out of 5 rats and in 2 rats this was associated with interstitial inflammation. The confinement of lesions to a single focus in each animal suggested that changes were unlikely to be treatment-related.

Remarks – Results

Changes in urinary parameters were not reflected by any pathological changes. No histopathological changes were observed in the thymus to account for decreased thymic weights. In addition, no histopathologic changes were observed to account for increased urinary pH in high dose males.

CONCLUSION
The No Observed Adverse Effect Level (NOAEL) for the analogue chemical was established as > 1000 mg/kg bw/day in this study, based on the fact that changes seen at this dosage were not considered to be toxicologically significant.

TEST FACILITY Huntingdon Life Sciences (1999e).

7.7. Genotoxicity – bacteria

TEST SUBSTANCE Notified chemical.

METHOD OECD TG 471 Bacterial Reverse Mutation Test.
EC Directive 2000/32/EC B.13/14 Mutagenicity – Reverse Mutation Test using Bacteria.
US EPA Health Effects Test Guidelines. OPPTS 870.5100 No L 136/57.
Japanese Ministry of Agriculture, Forestry and Fisheries. Test Data for Registration of Agricultural Chemicals, 12 Nohsan No. 8147, Agricultural Production Bureau, November 2000.
Joint Directives of JEPA, JMHW and JMITI. Kanpoan No. 287, Eisei No. 127 and Kikyoku (31 October 1997).
JMHW Genotoxicity Testing Guideline, PAB Notification No. 1604 (1 November 1999).
Plate incorporation procedure.

Species/Strain	*S. typhimurium*: TA1535, TA1537, TA98, TA100. *E. coli*: WP2*uvr*A (pKM101).
Metabolic Activation System	Aroclor 1254 induced rat liver S9 fraction.
Concentration Range in Main Test	a) With metabolic activation: 5 - 5000 µg/plate. b) Without metabolic activation: 5 - 5000 µg/plate.
Vehicle	DMSO.
Remarks - Method	None.

Remarks - Results No substantial increases in revertant colony numbers over control counts were obtained with any of the strains at any concentration in the presence of absence of S9 fraction. Positive controls demonstrated the sensitivity of the test.

CONCLUSION The notified chemical was not mutagenic to bacteria under the conditions of the test.

TEST FACILITY Huntingdon Life Sciences (2003c)

7.8. Genotoxicity – in vitro

TEST SUBSTANCE Promidium CO.

METHOD OECD TG 473 In vitro Mammalian Chromosome Aberration Test.

Cell Type/Cell Line	Human lymphocytes.
Metabolic Activation System	Aroclor 1254 induced rat liver S9 fraction.
Vehicle	Distilled water.
Remarks - Method	

Metabolic Activation	*Test Substance Concentration (µg/mL)*	*Exposure Period*	*Harvest Time*
Absent			
Test 1	62.5, 125, 250	3 hours	21 hours
Test 2	62.5, 100, 125	21 hours	21 hours
Present			

Test 1	125, 250, 300		
Test 2	300, 400, 500	3 hours	21 hours
Test 3	450, 500	3 hours	21 hours

Remarks - Results: Cytotoxicity was observed at and above 125 µg/mL without S9 and at and above 300 µg/mL with S9.

Precipitation was observed in culture medium in both the presence and absence of metabolic activation at concentrations of 250 µg/mL and above.

In test 1, in the presence or absence of metabolic activation, the test substance produced no statistically significant increase in the proportion of metaphase figures containing chromosomal aberrations at any dose level. This negative result was also observed in the confirmation test in the absence of metabolic activation. However, with metabolic activation in two confirmation tests, the test substance induced a statistically significant increase in the proportion of metaphase figures containing chromosomal aberrations at 450 and 500 µg/ml.

These non-reproducible increases in frequencies of chromosomal aberrations were observed only at cytotoxic levels of test substance (causing approximately 50% reduction in mitotic index). Effects may be related to surfactant activity rather than a genotoxic mechanism.

CONCLUSION: The analogue chemical may be clastogenic to human lymphocytes treated in vitro under the conditions of the test.

TEST FACILITY: Huntingdon Life Sciences (1999f)

7.9. Genotoxicity – in vitro

TEST SUBSTANCE: Promidium CO.

METHOD: OECD TG 486 Unscheduled DNA Synthesis (UDS) Test with Mammalian Liver Cells *In vivo*.

Cell Type/Cell Line: Rat liver primary hepatocytes from Hsd/Ola Sprague-Dawley rats.

Vehicle: Water.

Remarks - Method: Five rats were treated with 0, 600 or 2000 mg/kg and hepatocytes isolated at 2 or 14 hours post-treatment.

Remarks - Results: A preliminary toxicity test showed that a maximum dose of 2000 mg/kg was not accompanied by clinical signs other than mild piloerection.

No statistically significant increases in hepatocyte total or net nuclear grain counts were observed for either 2 or 14 hour exposure to the test substance.

CONCLUSION: The analogue chemical was not genotoxic in vivo under the conditions of the test.

TEST FACILITY: Huntingdon Life Sciences (2000).

7.10. Genotoxicity – in vivo

TEST SUBSTANCE: Promidium CO.

METHOD

OECD TG 474 Mammalian Erythrocyte Micronucleus Test.
EC Directive 2000/32/EC B.12 Mutagenicity - Mammalian Erythrocyte Micronucleus Test.
US EPA Health Effects Test Guidelines. OPPTS 870.5395 Mammalian Erythrocyte Micronucleus Test EPA 712-C-98-226.

Species/Strain: Mouse/CD-1.
Route of Administration: Intraperitoneal.
Vehicle: Distilled water.
Remarks - Method: A preliminary toxicity test for doses up to 2000 mg/kg was conducted using 2 males and 2 females per dose. Severe clinical signs were observed in both sexes with 1500 and 2000 mg/kg.

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Sacrifice Time hours*
I (vehicle control)	10 males	0	24, 48
II (low dose)	5 males	250	24
III (mid dose)	"	500	24
IV (high dose)	10 males	1000	24, 48
V (positive control, mitomcycin C)	5 males		24

RESULTS

Doses Producing Toxicity: At 1000 mg/kg at 24 hours.
Genotoxic Effects: None.
Remarks - Results: For tested doses up to 1000 mg/kg, no statistically significant increases in the frequency of micronucleated immature erythrocytes at 24 and 48 hours after treatment were observed compared to controls. A decrease in the frequency of micronucleated immature erythrocytes at 1000 mg/kg was ascribed to the surfactant nature of the test substance.

CONCLUSION

The analogue chemical was not clastogenic under the conditions of this in vivo mouse bone marrow micronucleus test.

TEST FACILITY

Huntingdon Life Sciences (1999g)

8. ENVIRONMENT

8.1. Environmental fate

8.1.1. Ready biodegradability

TEST SUBSTANCE: Notified chemical.

METHOD: OECD TG 301 B Ready Biodegradability: CO_2 Evolution Test (Modified Sturm Test).

Inoculum	Activated sludge from STP which predominantly treats domestic waste
Exposure Period	28 days.
Auxiliary Solvent	None.
Analytical Monitoring	Titration of residual barium hydroxide after running the air outlet from each reaction vessel to three Dreschel bottles in series, each containing 0.025 N barium hydroxide (100 mL).
Remarks - Method	Reference substance – Sodium benzoate Treatments: 1. Controls: medium and inoculum in duplicate. 2. Reference: inoculated medium and sodium benzoate. 3. Test concentration: inoculated medium and test substance (10 mg C/L) in duplicate. 4. Toxicity control: inoculated medium, sodium benzoate and test substance. The pH was measured at the beginning and end of the study. Airflow was maintained in the range 30 to 100 mL/min. On day 24 it exceeded 100 mL/min but this should not have affected the results. At the start of the study the pH was 7.5 to 7.6 and ranged from 7.4 to 7.5 by the end. Temperature was maintained in the range 21.4 to 22.7ºC.

RESULTS

Promidium IS		Sodium benzoate		Toxicity control	
Day	*Degradation as % of TCO_2*	*Day*	*Degradation As % of TCO_2*	*Day*	*Degradation as % of TCO_2*
1	0	1	9	1	9
2	6	2	29	2	28
5	23	5	61	5	54
6	29	6	68	6	62
12	45	12	80	12	
16	54	16	83	16	
20	62	20	86	20	
28	68	28	87	28	
29	71	29	88	29	

Remarks - Results: On day 5, the reference substance had degraded by 61% and on day 28 it reached 87% degradation, thus satisfying the 60% degradation by day 14 criteria.

In treatment 4 (toxicity control) the sodium benzoate reached 62% degradation by day 6 and the test was stopped. This result indicated that there were no toxic effects on the inoculum organisms.

CONCLUSION: While the degradation of test substance exceeded 60% the 10 day window (60% degradation within 10 days of reaching 10%) was not achieved. Therefore the test substance cannot be classified as readily biodegradable.

TEST FACILITY Huntingdon Life Science Ltd (2003d)

8.1.2. Bioaccumulation

Remarks Test not conducted. The notified chemical is unlikely to bioaccumulate due to its biodegradability.

8.2. Ecotoxicological investigations

A close analogue, Promidium CO, previously assessed as NA/908, was used in the chronic ecotoxicity studies.

8.2.1. Acute toxicity to fish

TEST SUBSTANCE Notified chemical.

METHOD OECD TG 203 Fish, Acute Toxicity Test – semi-static.
EC Directive 92/69/EEC C.1 Acute Toxicity for Fish - semi-static

Species Rainbow trout (*Oncorhynchus mykiss*)
Exposure Period 96 hours
Auxiliary Solvent None
Water Hardness 138 to 174 mg $CaCO_3$/L
Analytical Monitoring Reversed-phase HPLC with spectrophotometric detector.
Remarks – Method Five test concentrations and control were prepared by stirring measured aliquots of the test substances in the dilution water for 30 minutes. This process was repeated for the duplicate set of test concentrations. In both sets of concentrations the dispersions (see water solubility above) appeared stable with no visual settlement of material.

There was daily renewal of test medium to ensure near nominal concentrations.

During the study a photoperiod of 16 hours light was maintained and there was no supplementary aeration. Temperature, dissolved oxygen and pH were monitored daily. Temperature ranged from 13 to 14ºC, dissolved oxygen ranged from 8.4 to 9.1 mg/L and pH ranged from 7.0 to 7.3. These variations are within acceptable limits.

RESULTS

Concentration mg/L		*Number of Fish*	*Mortality*					
Nominal	*Actual*		*0.25 h*	*6 h*	*24 h*	*48 h*	*72 h*	*96 h*
Control	-	20	0	0	0	0	0	0
4.6	3.0	20	0	0	0	0	0	0
10	6.0	20	0	0	0	0	0	0
22	13	20	0	0	0	0	1	1
46	33	20	0	0	0	0	2	11
100	72	20	0	0	0	14	17	19

LC50 31 mg/L geometric mean measured at 96 hours (95% CI 25 to 39 mg/L).
NOEC (or LOEC) 3.0 mg/L measured at 96 hours.
Remarks – Results LC50 values were calculated via a logistic model (Ashton, 1972) and confidence interval estimated by likelihood ratio method (Williams, 1986).

Sub-lethal effects were observed at 10, 22, 46 and 100 mg/L and included loss of equilibrium, fish lying at the bottom of the tank, fish swimming at the water surface, fish swimming vertically and increased pigmentation.

CONCLUSION Under the test conditions, the test substance is harmful to fish (United Nations, 2003).

TEST FACILITY Huntingdon Life Science Ltd (2004a)

8.2.2. Early-life Stage Toxicity Test to fish

TEST SUBSTANCE Promidium CO.

METHOD OECD TG 210 Fish, Fish, Early-life Stage Toxicity Test – continuous flow conditions.
EPA Environmental Effects Testing Guidelines 40 CFR, Part 794.1600.
EPA Ecological Test Guidelines OPPTS 850.1044.

Species: Fathead minnow (*Pimephales promelas*).
Exposure Period: 28 days.
Auxiliary Solvent: Dimethylformamide.
Water Hardness: 153 mg $CaCO_3$/L mean (range 138 to 166 mg $CaCO_3$/L).
Analytical Monitoring: Reversed-phase HPLC with spectrophotometric detector.
Remarks – Method: Stock solution of the test substance was prepared by dissolving measured amounts of the test substance in the solvent, dimethylformamide. Aliquots of the stock solution were then used to prepare the 5 test concentrations. Filtered, dechlorinated and softened tap water was used as the dilution water. The dispersions appeared stable with no visual settlement of material.

The test vessels (30 x 20 x 20 cm) were fitted with two suspended egg chambers and had a surface overflow 14.7 cm above the bottom of the vessel. Approximately 15 eggs were placed in each chamber (ie 30 eggs per vessel and 60 per concentration).

During the study a photoperiod of 16 hours light was maintained and there was no supplementary aeration. Temperature, dissolved oxygen and pH were monitored daily.

RESULTS

Concentration mg/L		*Number of Fish Eggs*	*Number viable eggs*	*Total number hatched larvae*	*Total number surviving fry Day 28*	*Post hatch survival*	*Overall survival*
Nominal	*Actual*					*%*	*%*
Solvent control	-	60	61	61	45	74	74
Control	-	60	63	63	52	83	83
0.067	0.070	60	59	58	42	73	71
0.21	0.20	60	60	60	53	88	88
0.68	0.63	60	62	51	15	49	40
2.2	2.0	60	60	60	0	0	0
7.0	5.7	60	60	34	0	0	0

LC50: 0.767 mg/L (measured) at 28 days.
NOEC: 0.20 mg/L (measured)
Length of individuals: Fish exposed to 0.63 mg/L test concentration were significantly ($p < 0.01$) shorter than those in control.
Weight of individuals: No significant differences at 0.07, 0.20 and 0.63 mg/L (measured).
Remarks – Results: Temperature (24ºC), dissolved oxygen (6.8 to 7.4 mg O_2/L) and pH (6.9 to 7.1) remained with acceptable limits.

Sub-lethal effects were observed in 2.0 and 5.7 mg/L (measured).

The solvent control gave a hatching success rate of 100% and a post

hatching survival rate of 74%. The control gave a hatching success rate of 100% and a post hatching survival rate of 83%. These both met the study validity criteria of ≥ 66% hatching success rate and ≥ 70% post hatching survival rate.

CONCLUSION Under the test conditions the test substance is slightly toxic to the early life stages of fish (Mensink, 1995).

TEST FACILITY Huntingdon Life Science Ltd (2004b)

8.2.3. Acute toxicity to aquatic invertebrates

TEST SUBSTANCE Notified chemical.

METHOD OECD TG 202 Daphnia sp. Acute Immobilisation Test and Reproduction Test – static conditions.
EC Directive 92/69/EEC C.2 Acute Toxicity for Daphnia - static conditions.

Species	*Daphnia magna*
Exposure Period	48 hours
Auxiliary Solvent	Dimethylformamide
Water Hardness	Not stated.
Analytical Monitoring	Previously used analysis method (the reversed-phase HPLC with spectrophotometric detector) had insufficient sensitivity or selectivity to detect the test substance at the low levels used in this study. However, the stock solution was analysed by this method.
Remarks - Method	Stock solution of the test substance was prepared by dissolving a measured amount of the test substance in the solvent, dimethylformamide. Aliquots of the stock solution were then used to prepare the 5 test concentrations. Softened Elendt M4 culture medium was used as the dilution water. The dispersions appeared stable with no visual settlement of material. During the study a photoperiod of 16 hours light was maintained and there was no supplementary aeration. Temperature, dissolved oxygen and pH were monitored daily. Temperature (19°C), dissolved oxygen (8.7 to 9.4 mg O_2/L) and pH (6.9 to 7.1) remained with acceptable limits. A reference study was undertaken with potassium dichromate.

RESULTS

Concentration mg/L		*Number of D. magna*	*Number Immobilised*	
Nominal	*Actual*		*24 h*	*48 h*
Solvent control		20	0	0
Control		20	0	0
0.063		20	0	0
0.13		20	0	0
0.25		20	0	0
0.5		20	4	4
1.0		20	7	16

EC50	0.71 mg/L at 48 hours (95% CI 0.25 to 0.87 mg/L).
NOEC	0.25 mg/L at 48 hours.
Remarks - Results	EC50 values were calculated via a logistic model (Ashton, 1972) and confidence interval estimated by likelihood ratio method (Williams, 1986). EC50 for potassium dichromate was 0.49 mg/L. This validated the test

conditions

CONCLUSION Under the test conditions, the test substance is highly toxic to Daphnia (United Nations, 2003).

TEST FACILITY Huntingdon Life Science Ltd (2004c)

8.2.4. Chronic toxicity to aquatic invertebrates

TEST SUBSTANCE Promidium CO.

METHOD OECD TG 211 Daphnia magna, Reproduction Test – semi-static conditions

Species *Daphnia magna*
Exposure Period 21 days.
Auxiliary Solvent None.
Water Hardness 234 to 247 mg $CaCO_3$/L.
Analytical Monitoring Reversed-phase HPLC with spectrophotometric detector.
Remarks - Method Stock solution of the test substance was prepared by dissolving a measured amount of the test substance in the culture medium solvent, softened Elendt M4. Aliquots of the stock solution were then used to prepare the 5 test concentrations. Softened Elendt M4 culture medium was used as the dilution water. There were ten replicates of the test concentrations and 20 of the control each with a single Daphnid. The dispersions appeared stable with no visual settlement of material.

The medium was renewed three times a week (Monday, Wednesday and Friday). During the study a photoperiod of 16 hours light was maintained and there was no supplementary aeration. Temperature, dissolved oxygen and pH were monitored daily. The Daphnia were fed daily. Daily observations were recorded regarding mortality, general health, sub-lethal effects, and presence, number and condition of eggs. Temperature (20°C), dissolved oxygen (7.9 to 8.0 mg O_2/L) and pH (7.3) remained with acceptable limits

RESULTS

Concentration mg/L		*Number of daphnia*	*Adult survival Day 21 %*
Nominal	*Actual*		
Control	-	20	95
0.21	0.045	10	90
0.47	0.068	10	50
1.0	0.095	10	60
2.3	0.25	10	30
5.0	4.3	10	0

LC50 Adult survival: EC50 = 0.137 mg/L (measured) (95% CI 0.061 to 0.361 mg/L) at 21 days.

Reproduction: EC50 >0.25 mg/L (measured).

Growth: EC50 >0.25 mg/L (measured) at 21 days.

NOEC (or LOEC) Adult survival: 0.045 mg/L (measured) at 21 days.

Reproduction: 0.25 mg/L (measured) at 21 days.

Remarks - Results The actual/measured concentration was the geometric mean of fresh and expired test solutions. The actual values are very low for all concentrations except 5 mg/L.

CONCLUSION Under the test conditions the test substance is slightly toxic to the long term survival of daphnia (Mensink, 1995).

TEST FACILITY Huntingdon Life Science Ltd (2004d)

8.2.5. Algal growth inhibition test

TEST SUBSTANCE Notified chemical.

METHOD OECD TG 201 Alga, Growth Inhibition Test.
EC Directive 92/69/EEC C.3 Algal Inhibition Test.

Species	*Selenastrum capricornutum*
Exposure Period	96 hours.
Concentration Range	
Nominal	0.016, 0.031, 0.063, 0.13, 0.25 and 0.5 mg/L.
Auxiliary Solvent	Dimethylformamide
Water Hardness	Unknown.
Analytical Monitoring	Reversed-phase HPLC with spectrophotometric detector.
Remarks - Method	Stock solution of the test substance was prepared by dissolving measured amounts of the test substance in the solvent, dimethylformamide. Aliquots of the stock solution were then used to prepare the 6 test concentrations. Filtered, dechlorinated and softened tap water was used as the dilution water. The dispersions appeared stable with no visual settlement of material. The cell density at the start of the study was 10^4 cells/mL. The test vessels were incubated for 96 hours under continuous illumination and shaking, with no medium renewal. Temperature and pH were measured at the start and end of the study. Temperature was maintained between 22.9 and 25.1°C. While the pH ranged from 7.4 to 9.6 it is not likely to have affected the study.

RESULTS

Biomass		*Growth*	*NOEC*
E_bC_{50} *mg/L at 96h*	*95% CI mg/L*	E_rC_{50} *mg/L at 96h*	*mg/L*
0.37	0.31 – 0.44	>0.50	0.13

Remarks - Results All results are based on nominal concentrations.

In the control cell counts increased by a factor of 16 within 72 hours. This validated the test conditions.

Those cultures that were inhibited were recultured to determine if the inhibitory effect was algicidal or algistatic. The findings indicated that the test substance was algistatic.

CONCLUSION Under the test conditions the test substance is highly toxic to algae (United Nations, 2003).

TEST FACILITY Huntingdon Life Science Ltd (2004e)

8.2.6. Inhibition of microbial activity

TEST SUBSTANCE Notified chemical.

METHOD OECD TG 209 Activated Sludge, Respiration Inhibition Test.
EC Directive 88/302/EEC C.11 Biodegradation: Activated Sludge Respiration Inhibition Test

Inoculum	Activated sludge from STP predominantly treating domestic waste.
Exposure Period	3 hours
Concentration Range	
Nominal	0, 10, 32, 100, 320 and 1000 mg/L
Remarks – Method	Reference substance – 3,5-dichlorophenol. Measured amounts of test material were added to dechlorinated tap water and mixed by ultrasound for 10 minutes. Treatments: 1. Control: synthetic sewage, water and inoculum 2. test concentrations: test substance, synthetic sewage, water and inoculum in triplicate 3. Reference control: reference substance, synthetic sewage, water and inoculum 4. Toxicity control: test substance, reference substance, synthetic sewage, water and inoculum 5. Reference: reference substance, synthetic sewage, water and inoculum: Temperature and pH were measured at the beginning and end of the test. Initial pH ranged from 7.7 to 7.9, with final pH ranging from 7.7 to 8.5. This variation was acceptable. Flasks were aerated by shaking, since in preliminary tests foaming causing the displacement of sewage solids and the loss of the test substance, had occurred in air sparged mixtures at higher test concentrations.

RESULTS

Treatment	*Respiration inhibition (%)*	*Treatment*	*Respiration inhibition (%)*
Control	-	Reference substance	
Test Concentrations		- 3 mg/L	10
- 10 mg/L	3	- 10 mg/L	35
- 32 mg/L	0	- 32 mg/L	76
- 100 mg/L	0		
- 320 mg/L	0	Toxicity Control	-
- 1000 mg/L	1		

IC50	> 1000 mg/L
NOEC	≥ 1000 mg/L
Remarks – Results	Initial temperature ranged from 19.2 to 20.0ºC, with final temperature ranging from 21.6 to 22.0 ºC. This variation was acceptable. The EC50 for 3,5-dichlorophenol was 14.7 mg/L (95% CI 12.1 to 18.5 mg/L), showed that the test inoculum was sensitive to the inhibition and therefore validated the test conditions.

CONCLUSION The test substance inhibited respiration up to 3% (10 mg/L). Therefore the EC50 is > 1000 mg/L.

TEST FACILITY Huntingdon Life Science Ltd (2003e)

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The majority of the notified chemical (up to 9600 kg annually) will eventually be released into the environment via discharge into sewerage systems mainly during personal washing. It is expected that up to 200 kg per annum will remain in the consumer product containers and will be disposed of to landfill, along with 200 kg from end-user product formulation.

The notified chemical is not surface active at concentrations expected in the environment but has limited water solubility and has a high P_{ow}, therefore it is likely to become associated with sediment and sludge and be immobile in soil and sediment. It will not readily hydrolyse in natural waters at environmental pH values and is not readily biodegradable. However, the notified chemical is likely to be inherently biodegradable and will be degraded through biological and abiotic processes to water and oxides of carbon and nitrogen.

As the majority of the notified chemical in the personal care products will eventually be released into the aquatic environment via the sewerage systems the predicted environmental concentration (PEC) in the aquatic environment is estimated using a worst-case scenario assuming all the notified chemical is released to sewer, where there is no removal and it is used across Australia:

Amount released to sewer	10000 kg
Population	20 million
Water use per person	200 L
Number of days used	365
PEC_{sewer}	$\frac{10\ 000 \times 10^9}{365 \times 200 \times 20\ 000\ 000}$ = 6.8 µg/L
PEC_{inland} (dilution factor 1)	6.8 µg/L
PEC_{ocean} (dilution factor 10)	0.68 µg/L

The ready biodegradability test results showed that the notified chemical was biodegradable but not readily biodegradable since it did not satisfy the 10-day window. The SIMPLETREAT model (European Commission, 2003) for modelling partitioning and losses in sewage treatment plants (STP) was used to estimate the proportions of the chemical partition into the different environmental compartments under the provisions that it passed the 28 day biodegradation but not the 10 day criteria, the estimated log Henry's constant is 0 and the partition coefficient was a range (log P_{ow} 3.7 to 6)

	log P_{ow} = 3.7	log P_{ow} = 6.0
To air	1%	0%
To water	27%	11%
To sludge	17%	79%
Degraded	55%	11%
Removed from aqueous phase	73%	89%

The results indicate that when the chemical is released into the aqueous phase of a STP it is likely that some will partition into the water compartment and some to sludge and that there will be significant removal (partly due to degradation). Thus, if there is a minimum of 73% removal the above estimated PECs become 1.84 µg/L (inland) and 0.184 µg/L (ocean).

STP effluent re-use for agricultural irrigation occurs throughout Australia The following calculation is undertaken assuming an application rate of 1000 L/m^2/year (10 ML/ha/year) and that any notified chemical in the water is assumed to infiltrate and accumulate in the top 0.1 m of soil (density 1000 kg/m^3).

Concentration in effluent	1.84 µg/L

Soil concentration, PECsoil (mg/kg) (assumes no degradation in soil)

1 year	0.0184
5 years	0.092
10 years	0.184

There is potential for bioaccumulation but this is not likely, due to the biodegradability of the notified chemical.

9.1.2. Environment – effects assessment

The results of the acute aquatic toxicity tests are listed below.

Organism	*Duration*	*End Point*	*mg/L)*
Fish	96 h	LC50	31
Daphnia	48 h	EC50	0.71
Algae	96 h	EC50	0.37
Microbial activity	6 h	EC50	> 1000

Using the lowest EC_{50} of 0.37 mg/L for algae and a safety factor of 100 (OECD), since there is toxicity data for three trophic levels, a predicted no effect concentration (PNEC for aquatic ecosystems) of 0.0037 mg/L (3.7 µg/L) has been estimated (EC_{50}/100).

9.1.3. Environment – risk characterisation

The risk of the release of all the imported notified chemical can be estimated by determining the aquatic risk quotient (RQ = PEC/PNEC).

Location	PEC	PNEC	Risk Quotient (RQ)
Australia-wide STPs			
Aquatic			
Ocean outfall	0.184 µg/L	3.7 µg/L	0.05
Inland River	1.84 µg/L	3.7 µg/L	0.5

The RQ values are less than 1, indicating the proposed use does not represent a risk. The PEC takes into account mitigation as modelled by SIMPLETREAT, and therefore it is apparent that a doubling of import volume would bring RQ values for inland waterways to 1. However, for this import volume , the majority is expected to be discharged to the ocean, and considering a likely inland discharge of 25%, there would not be a high risk even at this volume.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

During formulation of personal care products or cleaning agents by batch processes the highest level of exposure for workers will be when weighing out and transferring the notified chemical to the mixing vessel. Inhalation exposure is unlikely as the notified chemical has a very low vapour pressure. Typically, in factories involved in manufacturing personal care or cleaning products on a large scale, local exhaust ventilation is employed and workers are provided with personal protective equipment such as gloves, goggles and protective clothing. Some limited exposure may be possible from quality control sampling, cleaning of equipment or machine maintenance. Filling of containers will normally be automatic and exposure will be limited. Some dermal exposure can occur to workers involved in quality control or cleaning of equipment although the concentration of notified chemical at this point is low (1%).

Exposure of transport and storage workers may occur in the event of an accident involving breach of containers, whether imported directly or coming from batch manufacturing processes. As the concentration of notified chemical is these containers is 1% or less, exposure is likely to be low even in the event of spillage.

9.2.2. Public health – exposure assessment

The maximum concentration of the notified chemical in personal care products is 1%. If it is assumed that each application is a maximum of 8 g, is applied once a day, is not washed off and dermal absorption of the notified chemical is complete, systemic exposure can be calculated as:

0.01 x 8 x 1000 (mg/g)/ 60 kg = 1.33 mg/kg/day.

9.2.3. Human health - effects assessment

Based on toxicological data for the notified chemical or for a close analogue the main effect of concern was moderate skin and eye irritation in rabbits. A weak clastogenic activity as suggested by induction of chromosomal aberrations in human lymphocytes was not supported by a range of other short term genotoxicity tests and may have resulted from the notified chemical's surfactant activity. Other tests suggested the notified chemical was of low acute and subchronic toxicity and was not an eye irritant or a skin sensitiser.

Based on the available data, the notified chemical is classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2002) in terms of skin and eye irritation.

9.2.4. Occupational health and safety – risk characterisation

The main health risk to workers is expected to be moderate skin and eye irritation when transferring the notified chemical from import containers to mixing vessels. Once the notified chemical is part of a product, skin or eye irritation is unlikely and therefore quality control, cleaning or maintenance workers are not at risk nor are workers involved in packaging final products, particularly as this process is expected to be automated. There may be a risk of skin and eye irritation to workers cleaning up the notified chemical in the event of an accident.

9.2.5. Public health – risk characterisation

For effects relevant to skin absorption, the no adverse effect level can be considered to be > 1000 mg/kg/day. The margin of safety, therefore, is > 1000/1.33 or > 750. Adding a safety factor of 100 reduces this to 7.5. Therefore, the risk of systemic effects from the notified chemical following prolonged use of personal care products containing the notified chemical is low. There is a low risk of skin and eye irritation from the content of the notified chemical in personal care products due to its low level of approximately 1%.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified chemical is classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*. The classification and labelling details are:

R36 Irritating to eyes
R38 Irritating to skin

or

As a comparison only, the classification of notified chemical using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations, 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes. Based of the available ecotoxicity data, the notified chemical would be classified Chronic Category 1: Warning. Based on the skin and eye irritancy data, the notified chemical would be classified as: Irritant (category 2).

10.2. Environmental risk assessment

On the basis of the PEC/PNEC ratio, the notified chemical is not considered to pose a risk to the

environment based on its reported use pattern and estimated volumes.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used as described.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of a product containing the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for a product containing the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

REGULATORY CONTROLS
Hazard Classification and Labelling

- The NOHSC Chemicals Standards Sub-committee should consider the following [health, environmental and physico-chemical] hazard classification for the notified chemical:

  - R36 Irritating to eyes
  - R38 Irritating to skin

- Use the following risk phrases for products/mixtures containing the notified chemical:

  - ≥ 20%: R36 Irritating to eyes
  - ≥ 20%: R38 Irritating to skin

CONTROL MEASURES
Occupational Health and Safety

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical as introduced:
  – Impervious gloves

  Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.

- If products and mixtures containing the notified chemical are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

- The following control measures should be implemented by reformulator to minimise environmental exposure during reformulation of the notified chemical:
  - Process areas should be bunded with all drains leading to a treatment plant or collection point

Disposal

- The notified chemical should be disposed of to landfill.

Emergency procedures

- Spills/release of the notified chemical should be contained, collected and placed in sealable labelled container. The material should be reused if not contaminated. If contaminated then it should be disposed of to landfill.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(2) of the Act:
- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

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