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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Optidose 2000

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Optidose 2000

1. APPLICANT

Rohm & Haas Australia Pty Ltd of 969 Burke Rd CAMBERWELL VIC 3124 has submitted a limited notification statement in support of their application for an assessment certificate for Polymer in Optidose 2000.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact concentration in imported product and end use applications have been exempted from publication in the Full Public Report and the Summary Report.

Method of Detection and Determination: Infrared (IR) spectrum

Number-Average Molecular Weight (NAMW): 3 200

Weight-Average Molecular Weight: 3 980

Molecular Weight Species

Molecular Weight < 500: 6%

Molecular Weight < 1 000: <14%

3. PHYSICAL AND CHEMICAL PROPERTIES

The physical and chemical properties were stated by the notifier to be for a QRXP-1488 (a synonym for the notified polymer) polymer solution containing 52.4% solids. The description given below is for this solution unless otherwise stated.

Appearance at 20°C & 101.3 kPa: Clear colourless liquid

Boiling Point: 100°C (measured for water)

Specific Gravity: 1.2 (measured for water)

Vapour Pressure:	3.17 kPa (17 mmHg) at 20°C (measured for water)
Water Solubility:	Not determined (see comments below)
Partition Co-efficient (n-octanol/water):	K_{oc} = 4.5 x 10^7 (based on Quantitative Structure Activity Relationship - QSAR)
Hydrolysis as a Function of pH:	A functional group in the notified polymer may undergo hydrolysis under extreme temperature and pH.
Adsorption/Desorption:	The notified polymer is expected to bind strongly to organic matter in soil and sediments
Dissociation Constant:	Identity of functional groups and dissociation constants was supplied and exempted from publication.
Flash Point:	Non combustible
Flammability Limits:	Not flammable
Autoignition Temperature:	Not expected to undergo autoignition
Particle size:	Not applicable as the notified polymer is in solution
Reactivity/Stability:	Polymer degrades @ > 230°C (see comments below)

Comments on Physico-Chemical Properties

The notified polymer is never isolated and the notifier supplied the following information for QRXP-1488 that is an aqueous solution of the notified chemical.

The boiling point and vapour pressure of QRXP-1488 were not determined but stated by the notifier to be that of water, ie 100ºC and 17 mmHg at 20ºC, respectively. The notifier indicates and it is accepted that the notified polymer with a Number Average Molecular Weight of 3 200 would have low volatility.

The water solubility of the notified polymer was not determined. The notifier states that the polymer is imported as an aqueous solution contained in the product Optidose 2000 at a concentration of less than 10%. The notified chemical contains carboxylic acid functionality and sodium salts of organic acids which would be expected to be fully dissociated and make the notified chemical highly soluble in water.

The hydrolytic stability of the notified polymer was not determined. The notifier states that the polymer contains a functional group that may undergo hydrolysis under extreme temperature and pH. It is accepted that hydrolysis is unlikely under environmental conditions (4<pH< 9).

The notifier did not determine the partition coefficient log P_{OW} of the notified polymer between *n*-octanol and water. Rather, the notifier determined the adsorption coefficient log K_{OC} to be 7.65 by QSAR computer modelling (Meylan & Howard, 1992). It is noted that the notifier carried out the computer modelling on a series of free parent acids going from lower to higher molecular weight and not their sodium salts. It is also noted that the polyanionic nature of the notified polymer indicates that it will bind strongly to soils and sediments and therefore will have a low mobility in soil in spite of high water solubility (Boethling & Nabholz, 1997).

The value for the log P_{ow} of the notified polymer was estimated to be –7.93 from the physical property software package from the Syracuse Research Corp (Syracuse Research Corporation). Similar calculations show that the free parent acid of the notified polymer has a log P_{ow} of –2.6. As expected, the notified polymer may be considered as very hydrophilic (Lyman et al., 1982).

The dissociation of the notified polymer was not determined. The notifier indicates that the notified polymer contains inorganic acid groups and that the pKa for these acids is expected to be between 1 and 5. It is agreed that the notified polymer has acid functionality and would be expected to have typical acidity and dissociate to a large extent.

4. PURITY OF THE CHEMICAL

Degree of Purity: > 99%

Hazardous Impurities: None

Non-hazardous Impurities (> 1% by weight): < 0.3%; details supplied and exempted from publication

Maximum Content of Residual Monomers: < 0.3%; details supplied and exempted from publication

Additives/Adjuvants: None

5. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia, but will be imported by sea in 200 L open head steel drums as a component (< 10%) of Optidose 2000. The polymer in Optidose 2000 will be reformulated at a single site into a water treatment solution to be used in industrial water treatment applications, such as corrosion and scale inhibitors in cooling towers and boilers. The Polymer in Optidose 2000 will not be sold to the public and will not be used in domestic water supplies.

Approximately 5 tonnes of the notified polymer will be imported in the first year increasing to 20 tonnes/year after 5 years.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in an aqueous solution in 200 L drums and reformulated into a water treatment solution in 1 000 L Intermediate Bulk Containers (IBCs)

which are in turn shipped to customers who will connect them to a closed system containing the water to be treated.

Transport and storage
The notifier estimates that transport and storage of 200 L drums containing the imported polymer emulsion and the IBCs containing the water treatment formulation will occupy workers for 1 – 2 hours/day, 10 – 20 days/year. Exposure is likely only in the event of a spill.

Reformulation
Following transport of the 200 L drums to a single customer, they are opened and hoses connected by 2 plant operators working 3 – 4 hours/day, 10 – 30 days/year. The contents of the drums are pumped to a 500 – 10 000 L mixing vessel which is vented to the outside atmosphere to remove any vapours. Five to ten tonnes of water treatment solution are made per batch, the dilution factor is 1:3 – 1:10 and 1 – 2 batches will be made per month for the first 12 months. After mixing is complete, the water treatment product is pumped through a hard piped system to the 1 000 L IBCs. The notifier states that local and general ventilation is located in all areas of the plant.

Exposure of plant operators mainly will be dermal from residues in lines and on couplings and from any spills. Protective neoprene gloves, safety glasses and coveralls will be worn by workers.

Use at water treatment plants
The water treatment solution in the IBCs will be received by 10 operators at 3 – 5 large industrial plants. The solution may be decanted to smaller vessels or used straight from the IBC. In both cases a pump is used to automatically meter the product to a closed system containing the water which is continuously reused. Exposure (mainly dermal) of plant operators is for 0.5 hours/day, 50 – 100 days/year and may result from spills and residues in lines and on couplings when decanting and pumping the product.

7. PUBLIC EXPOSURE

Exposure of the general public as a result of reformulation, transport and disposal of the product containing the notified polymer is assessed as being negligible. Products containing the notified polymer will only be used in industrial situations. They will not be used by the general public in domestic situations. Therefore public exposure is unlikely as a result of the industrial uses of products containing the notified polymer.

8. ENVIRONMENTAL EXPOSURE

Release

After importation by sea the notified polymer will be transported *via* road without repackaging in the closed 200 L steel drums; potential release would only be through accidental spills. The Material Safety Data Sheet details adequate procedures to protect the environment in these cases. Once received and stored by the notifier in an undercover area protected by bunding, the drums will be periodically transported to the formulator's site. Potential release would only be through accidental spills. Formulated water treatment solution containing < 5% of the notified chemical will also be transported in 1000 L IBCs *via*

road to customers.

The notifier indicates that there is potential for spillage of the notified polymer during formulation and estimates that a maximum of 0.5% of the notified polymer may be lost during formulation, equal to 25 kg in the first year increasing to 100 kg by year five.

The notifier estimates that approximately 1% of the notified polymer will remain as residues in the importation drums, equal to a loss of 50 kg in the first year increasing to 200 kg by year five. It is noted that IBCs would be washed and drained thoroughly before reuse.

The notified polymer will be used for the treatment of water contained in closed systems at the end user's site. During the water treatment, the efficacy of treatment chemical diminishes and new water treatment solution is continually added to the system. A continual bleeding and discharge of the treated water compensates replenishment of the chemical in the system. The majority of the notified polymer will be released to the environment in this way as well as when cooling systems undergo either short-term manual system blowdown (BD) or total shut-down and cleaning.

For example, the notifier indicates that the volume of purge or BD from a small site with a BD of 0.5 tonnes per hour with only one cooling tower would be approximately 4.5 ML/year. The quantity of lost notified polymer after on-site treatment would be < 2 kg/year. A large cooling plant system would have a BD of 21 tonnes per hour, equivalent to 170 ML/year. This equates to a release of approximately < 50 kg/year of the notified polymer after on-site treatment.

The notifier indicates that most cooling towers operate with a maximum drift of 0.002% of the recirculation rate. The recirculation rate in a small site cooling tower may be 900 tonnes/hour. Assuming a < 5 ppm concentration of notified polymer in the cooling tower, < 90 mg/hour or 0.79 kg/year would be lost due to drift. In a larger system the recirculation rate maybe 9000 tonnes/hour and this would result in < 7.9 kg/year of notified chemical being released due to drift.

Fate

Empty drums and their residues will be sent to either licensed drum reconditions or the drums may be disposed of directly to a licensed landfill site. Drum reconditioners will also dispose of solid residue from drums to licensed waste landfill sites.

After each batch of water treatment solution is produced at the formulation site, the first washings from pipes and mixing equipment are transferred to a holding tank for use in the next batch. Subsequent washings as well as any spills are transferred to the formulator's on-site effluent treatment plant.

During use feed rate of product will be adjusted to maintain a concentration of up to < 5 ppm of the active notified polymer in the cooling water system. The cooling tower concentrations of the notified polymer are therefore expected to be less that < 5 ppm.

Typically cooling water represents about 60% of the total effluent volume discharged from a facility. The remaining water comes from boiler and process streams. The concentration of notified polymer in the plant effluent would therefore be < 3 ppm. The two customers

located in Sydney and Brisbane that will use the notified polymer are claimed to have treatment plants that consist of dissolved air flotation cells, biological contactors and water purifiers. At both sites the notifier estimates that treatment would involve a ten-fold dilution with 90% of the notified polymer removed through the waste treatment facilities as sludge and disposed to landfill. Discharge from the plant would therefore contain < 0.03 ppm of the notified polymer. Subsequent treatment at local sewage treatment plants would further dilute and remove the notified polymer to very low concentrations.

The majority of notified polymer is assumed to find its way to landfill where it will be expected to be immobile and adsorbed to soil and sediment due to its polyanionic nature. It should not bioaccumulate even though it is water soluble.

The notifier has supplied no biodegradation information concerning the notified polymer. However, the polymer is likely to biodegrade slowly over time.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were available for the notified polymer. However, summary data were available on solutions of acceptable analogues. One of the analogues contains an additional monomer and the other analogue has a monomer removed from one end. These were screening studies only and were stated to comply with GLP standards but no mention of study protocols was made. TFM 2876A solution, containing the above first mentioned analogue, was approximately 40% solids and TFM 2876B was approximately 38% solids, compared to less than 10% solids for the imported solution of the notified polymer. The results for each of the analogue solutions were the same. Therefore only a single tabulation is included in sections listed below.

9.1 Acute toxicity of polymer solutions TFM 2876A and TFM 2876B, which are analogues of the notified polymer in Optidose 2000 (< 10% notified polymer).

Summary of the acute toxicity of TFM 2876A and TFM 2876B

Test	*Species*	*Outcome*	*Reference*
acute oral toxicity	rat	LD_{50} > 500 mg/kg	(Gingrich & Parno, 1995; Lutz & Parno, 1995)
acute dermal toxicity	rat	LD_{50} > 1 000 mg/kg	"
skin irritation	rabbit	Non-irritating	"
eye irritation	rabbit	Slightly irritating	"

9.1.1 Oral Toxicity (Gingrich & Parno, 1995; Lutz & Parno, 1995)

Species/strain: Rat/Crl:CD®BR

Number/sex of animals: Six males

Observation period:	14 days
Method of administration:	Single oral (gavage) dose of 500 mg/kg bw (undiluted)
Test method:	Not stated
Mortality:	None
Clinical observations:	None
Morphological findings:	None
LD_{50}:	> 500 mg/kg bw
Result:	Analogues of the notified polymer are at most of low toxicity via the oral route in rats.

9.1.2 Dermal Toxicity (Gingrich & Parno, 1995; Lutz & Parno, 1995)

Species/strain:	Rat/Crl:CD®BR
Number/sex of animals:	Six males
Observation period:	14 days
Method of administration:	A single dose of 1 000 mg/kg bw was applied undiluted to shaved intact skin under occlusive dressing for 24 hours. The dressing was removed and the skin wiped with paper towels saturated with tap water.
Test method:	Not supplied; similar to OECD TG 402
Mortality:	None
Clinical observations:	No signs of systemic toxicity were observed.
Morphological findings:	Red stained fur around the eyes and muzzle was noted during the study. No gross changes were observed following necropsy.
LD_{50}:	> 1 000 mg/kg
Result:	Analogues of the notified polymer are at most of moderate toxicity via the dermal route in rats.

9.1.3 Skin Irritation (Gingrich & Parno, 1995; Lutz & Parno, 1995)

Species/strain:	Rabbits/New Zealand White
Number/sex of animals:	3 males

Observation period:	72 hours
Method of administration:	0.5 mL of undiluted test substance was applied onto a gauze lined patch, which was placed onto shaved intact skin under semi-occluded dressing for 4 hours. The dressing was removed and the skin wiped with paper towels saturated with tap water.
Test method:	Not supplied; similar to OECD TG 404
Comment:	No signs of skin irritation were observed (all Draize scores were zero).
Result:	Analogues of the notified polymer were non-irritating to the skin of rabbits.

9.1.4 Eye Irritation (Gingrich & Parno, 1995; Lutz & Parno, 1995)

Species/strain:	Rabbit/New Zealand White
Number/sex of animals:	3 males
Observation period:	72 hours
Method of administration:	0.1 mL was instilled into the rabbit eyes (one serving as control).
Test method:	Not supplied; similar to OECD TG 405
Comment:	Conjunctival effects were observed in two animals treated with polymer solution TFM 2876B (but not with TFM 2876A) at one hour after instillation, which cleared by 24 hours. No other signs of irritation or inflammation were observed.
Result:	Analogues of the notified polymer were slightly irritating to the eyes of rabbits.

9.2 Overall Assessment of Toxicological Data

Solutions of analogues of the notified polymer (at a concentration of approximately 40% solids) were at most of low toxicity via the oral route (LD_{50} > 500 mg/kg) and at most of moderate toxicity via the dermal route (LD_{50} > 1 000 mg/kg) in rats, were not irritating to the skin of rabbits but may be slightly irritating to the eyes.

On the basis of the above data, the notified polymer can not be classified as a hazardous substance according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a) in terms of acute oral or

dermal toxicity or skin or eye irritancy.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The notifier has supplied the following ecotoxicity studies for two structurally related analogues to the notified polymer designated as TFM 2876A and TFM 2876B. The analogue TFM 2876B appears to be less toxic than TFM 2876A analogue. The tests were carried out according to OECD Test Methods.

TFM 2876A

Test	*Species*	*Test concentrations (nominal) mg/L*	*Results (nominal) mg/L*
Acute Toxicity[1] - (Static Test) (OECD TG 203)	Rainbow Trout *(Oncorhynchus mykiss)*	0, 0.1, 1.0, 10, 100 & 1 000	96 h LC_{50} > 1 000
Acute Toxicity[2] - Immobilisation (Static Test) (OECD TG 202)	Water Flea (*Daphnia magna*)	0, 0.1, 1.0, 10, 100 & 1 000	48 h EC_{50} = 320
Growth Inhibition[3] - (Static Test) (OECD TG 201)	Green Algae (*Selenestrum capricornutum*)	0, 0.1, 1.0, 10, 100 & 1 000	96 h EC_{50} = 20 96 h NOEC = 10

[1] (Ward et al., 1995a); [2] (Ward et al., 1995c); [3] (Ward et al., 1995e)

TFM 2876B

Test	*Species*	*Test concentrations (nominal) mg/L*	*Results (nominal) mg/L*
Acute Toxicity[1] - (Static Test) (OECD TG 203)	Rainbow Trout *(Oncorhynchus mykiss)*	0, 0.1, 1.0, 10, 100 & 1 000	96 h LC_{50} > 1 000
Acute Toxicity[2] - Immobilisation (Static Test) (OECD TG 202)	Water Flea (*Daphnia magna*)	0, 0.1, 1.0, 10, 100 & 1 000	48 h EC_{50} > 1 000
Growth Inhibition[3] - (Static Test) (OECD TG 201)	Green Algae (*Selenestrum capricornutum*)	0, 0.1, 1.0, 10, 100 & 1 000	96 h EC_{50} = 20 96 h NOEC = 10

[1] (Ward et al., 1995b); [2] (Ward et al., 1995d); [3] (Ward et al., 1995f)

Fish

The notifier carried out 96-hour static acute toxicity studies of TFM 2876A and TFM 2876B to rainbow trout. Six groups of 10 fish were exposed to nominal concentrations of 0, 0.1, 1.0,

10, 100 and 1 000 mg/L of TFM 2876A and TFM 2876B. The studies were performed in single replicates and accumulative mortality was recorded after 24, 48, 72 and 96 hours.

Exposure of rainbow trout to TFM 2876A for 96 hours resulted in at least 90% survival in all groups except the 1 000 mg/L group, which had a 60% survival rate. All surviving fish in the 1 000 mg/L group were affected however with either loss of equilibrium, change of colour, lying on the bottom of the test vessel or gasping at the surface. The 96 hour LC_{50} and no observed effect concentration (NOEC) values based on nominal test concentrations were determined by the notifier to be > 1 000 mg/L and 100 mg/L, respectively.

Exposure of rainbow trout to TFM 2876B for 96 hours resulted in 100% survival in all doses. No sub-lethal effects were observed. The 96 hour LC_{50} and NOEC values based on nominal test concentrations were determined by the notifier to be > 1 000 mg/L.

Aquatic Invertebrates

The notifier carried out 48-hour static acute immobilisation studies of TFM 2876A and TFM 2876B to *Daphnia magna*. Six groups of 10 daphnids were exposed to nominal concentrations of 0, 0.1, 1.0, 10, 100 and 1 000 mg/L of TFM 2876A and TFM 2876B. The studies were performed in single replicates and immobility and mortality was recorded after 4, 24 and 48 hours.

Exposure of daphnids to TFM 2876A for 48 hours resulted in 100% survival in all doses. In the 1000 mg/L group 50% of daphnids survived but all were immobilised. The 48 hour EC_{50} and NOEC based on nominal concentrations were calculated by the notifier to be 320 mg/L and 100 mg/L, respectively.

Exposure of daphnids to TFM 2876B for 48 hours resulted in 100% survival in all doses. No sub-lethal effects were observed at any dose. The 48 hour LC_{50} and NOEC values based on nominal test concentrations were determined by the notifier to be > 1 000 mg/L.

Algae

The notifier carried out 96 hour static inibition studies of TFM 2876A and TFM 2876B to *Selenestrum capricornutum*. Algae were exposed to nominal concentrations of 0, 0.1, 1.0, 10, 100 and 1 000 mg/L of TFM 2876A and TFM 2876B. The studies were performed in duplicate. The 96-hour LC_{50} and NOEC values based on nominal test concentrations were determined by the notifier to be 20 mg/L and 10 mg/L, respectively.

Conclusion

The ecotoxicity data for the analogues TFM 2876A and TFM 2876B indicate that the notified polymer is likely to be practically non-toxic to fish and aquatic invertebrates and slightly toxic to algae. The greater toxicity towards Algae is a reflection of the polyacrylic nature of the notified polymer (Nabholz et al., 1993).

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The intended use pattern of the notified polymer is expected to result in the majority of the

chemical being eventually released to the environment. However, the notified polymer contained within the water treatment solution released from cooling towers will be diluted to a low concentration. The company expects further dilution as well as adsorption will occur at on-site treatment plants. Discharge from the on-site treatment sites is expected to contain notified polymer at < 0.03 ppm. Subsequent treatment at local sewage treatment plants would further dilute and remove the notified polymer to very low concentration expected to be < 1.5 ppb. Should a lower level of adsorption occur and without taking into account any degradation, ecotoxicological safety margins are still expected to be at least 1000.

Waste notified polymer residues from imported drums and formulation would be disposed to landfill and be immobile. Even though the notified polymer is soluble in water, it has a high molecular weight and is polyanionic and is expected to be adsorbed to soil and sediment.

Given the above, environmental exposure and the overall environmental hazard from the notified polymer is expected to be low. If the notified polymer is used at other sites that may not have on-site treatment plants, environmental exposure from the chemical is still expected to be low since the chemical is expected to be used at a maximum concentration of < 5 ppm.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Assessment of toxicological hazard

The acute toxicity data (acute oral LD_{50} > 500 mg/kg, acute dermal LD_{50} > 1 000 mg/kg in rats) supplied suggest that the notified polymer is not classified as hazardous according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a). The content of residual monomers in the polymer is low (less than 1%). However, the level of low molecular weight species is high (maximum14% with MW < 1000) and may contribute to a certain level of toxicity. From the toxicological profiles of the constituent monomers, the notified polymer is unlikely to be a skin sensitiser or genotoxin.

Skin and eye irritation studies in rabbits suggest that the notified polymer is a slight eye irritant but would not be classified as a skin or an eye irritant according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a).

Occupational Health and Safety

The notified polymer is imported in a solution at a low concentration (less than 10%). Given that the polymer is likely to exhibit a low hazard, the hazard presented by the emulsion solely from the polymer content is expected to be low.

Transport and storage
The imported polymer solution and the reformulated water treatment product are transported in 200 L drums or 1 000 L IBCs, respectively. Given that accidental spillage is likely to be rare and the hazard from the polymer low, the risk of adverse health effects to workers is low.

Reformulation

The imported polymer solution is transferred to a large mix tank and the product transferred to the IBCs for transport to customers. Exposure to spills is possible while connecting, disconnecting or flushing lines. However, these operations are likely to be of short duration and exposure should be low. Given the likely low hazard of the polymer solution coupled with low exposure, the risk to workers should be low. The worksite is bunded and typically workers would be wearing protective gloves and clothing which would be sufficient protection.

Use at water treatment plants
Ten operators at the treatment facilities may be exposed to the water treatment product through spillage during decanting, connecting or disconnecting lines or flushing the system. The low hazard presented by the water treatment product from the polymer content (less than 5%) suggests that the risk of adverse health effects to workers is low. Nevertheless, workers at these plants will normally wear protective neoprene gloves, safety glasses and coveralls which should prevent exposure to the water treatment product.

Similar intermittent low level exposure with negiglible risk of adverse health effects will be experienced by maintenance workers at either the reformulation or water treatment plants.

Public Health

Exposure of the general public as a result of reformulation, transport and disposal of the product contianing the notified polymer is assessed as being negligible. The product containing the notified polymer is for industrial use only. It will not be used by the general public in domestic situations. The risk to public health is considered to be minimal since public exposure is unlikely as a result of the industrial uses of products containing the notified polymer.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Optidose 2000 the following guidelines and precautions should be observed:

- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); industrial clothing should conform to the specifications detailed in AS 2919 (Standards Australia, 1987); neoprene gloves should conform to AS/NZS 2161.2 (Standards Australia/Standards New Zealand, 1998); all occupational footwear should conform to AS/NZS 2210 (Standards Australia/Standards New Zealand, 1994);

- 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.

14. MATERIAL SAFETY DATA SHEET

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

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 may be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

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Attachment 1

The Draize Scale (Draize, 1959) 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 (Draize *et al*., 1944) 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.
		Swelling with lids half-closed	3 mod.		
Diffuse beefy red	3 severe	Swelling with lids half-closed to completely closed	4 severe	Discharge with moistening of lids and hairs and considerable area around eye	3 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