File No EX/47 (NA/842)

Date January 2004

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)

FULL PUBLIC REPORT

Z-38

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Z-38

1. APPLICANTS

Original Holder of Assessment Certificate (First Applicant)
An Assessment Certificate for the notified polymer known by the name Z-38 was granted to Lubrizol International Inc. (ACN 002 747 944) of 28 River Street, Silverwater, NSW 2128.

The Assessment Report for Z-38 is identified by the sequence number NA/842 (Limited Notification).

Second Applicant
Since granting of the abovementioned Assessment Certificate, 3M Australia Pty Ltd (ACN 000 100 096) of 2-74 Dunheved Circuit, St Marys, NSW 2760 has submitted a notification statement in support of their application for an extension of the original Assessment Certificate for Z-38. Lubrizol International Inc. has agreed to this extension.

Information submitted by 3M Australia Pty Ltd pertains to the introduction of the notified polymer for use in an aerosol-cleaning product for automotive engines. Introduction volumes will be up to 100 kg per year, imported as the finished product.

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 import volume and customers have been exempted from publication in the Full Public Report and the Summary Report.

Other Names:	OS 144262
Marketing Name:	Z-38
Method of Detection and Determination:	Infrared, Ultraviolet, NMR and GPC analyses were used for detection and determination of Z-38.
Spectral Data:	Infrared, Ultraviolet and Nuclear Magnetic Resonance (Proton and Carbon) spectra were provided for the notified polymer.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C & 101.3 kPa:	Golden, slightly viscous liquid.
Boiling Point:	The boiling point could not be determined as the polymer decomposed from approximately 454 ± 0.5°K at 102.41.
Pour Point:	< - 20 ± 3°C
Relative Density:	0.955 at 20.0 ± 0.5°C.
Vapour Pressure:	7.5 x 10^{-8} kPa at 25°C.
Water Solubility:	2.12 x 10^{-3} g/L at 20 ± 0.5°C
Partition Co-efficient (n-octanol/water):	log P_{ow} > 6.2
Hydrolysis as a Function of pH:	Test not performed.
Adsorption/Desorption:	Test not performed.
Dissociation Constant:	Test not performed.
Flash Point:	210 ± 2°C.
Flammability Limits:	Test not performed.
Autoignition Temperature:	394 ± 5°C
Explosive Properties:	This chemical type is not expected to have explosive properties and in handling has not demonstrated any explosive properties.
Reactivity/Stability:	The notified polymer is not an oxidiser.

3.1 Comments on Physico-Chemical Properties

The boiling point of the notified chemical was not determined as it thermally decomposes from approximately 454°K.

Attempts to measure the vapour pressure using a vapour pressure balance produced a great deal of scatter in the data. Vapour pressure was estimated from some of the more reliable measured data coupled with a regression slope considered to give realistic estimates, although the method used was predicted to overestimate the vapour pressure. Using this methodology, the vapour pressure at 25°C for the polymer was determined to be less than 7.5 x 10^{-8} kPa. A low vapour pressure is expected for a high molecular weight polymer.
The water solubility of the notified polymer was low, as determined using the flask method.

Due to the low water solubility of the notified polymer, analytical testing for hydrolysis was

not feasible as the analytical techniques used do not have the required sensitivity to detect small decreases in concentration over time. However, the polymer contains no linkages susceptible to hydrolytic cleavage under usual environmental conditions of pH 4 - 9, and hydrolytic degradation is considered unlikely.

The determination of the adsorption/desorption coefficient of the notified polymer was not undertaken. However, it has a low water solubility and will largely partition into *n*-octanol rather than water. Due to its low water solubility and high log P_{ow}, the notified polymer is expected to associate with the organic component of soils and sediments.

No dissociation constant data was provided for the notified polymer. However the polymer contains a primary amine group and such functionalities typically have pK_a between 9.5 and 10. Consequently, the polymer will be protonated in an aqueous environment, and this may contribute to the water solubility.

4. PURITY OF THE CHEMICAL

Degree of Purity: 85%

Hazardous Impurities: None.

Non-hazardous Impurities (> 1% by weight): 15% polyether alcohol.

Maximum Content of Residual Monomers: None.

Additives/Adjuvants: None.

5. USE, VOLUME AND FORMULATION

Z-38 is as an additive for gasoline. Z-38 is blended with other components and is sold as a formulated product, at this time Lubrizol 9566 at a concentration up to 50% (see Material Safety Data Sheet (MSDS) in which the notified polymer is identified as polyether amine). This "polyether amine" contains an impurity (at 20%) which is the subject of an accompanying notification (PLC/185). The treatment rate for Z-38 in finished gasoline is approximately 85 - 170 parts per million (ppm).

Import volume of Z-38 is less than 1 000 tonnes per year for the first five years.

In addition, 3M Australia Pty Ltd will import the notified polymer at up to 100 kg per year. It will be imported as a component of an aerosol-cleaning product for automotive engines in 241g cans (at less than 5%).

6. OCCUPATIONAL EXPOSURE

The notified polymer is to be imported as a blended product containing up to 50% Z-38 (at this time, Lubrizol 9566).

The notified polymer will also be imported as a component of an aerosol-cleaning product for automotive engines in 241g cans.

Import, Transport and Storage

The notified polymer will be imported in ISO containers (capacity: approximately 19 000 – 38 000 L) and transferred to customer depots or terminals by road or rail. Occupational exposure of dockside or transport workers is not expected except in the event of a spill. No repackaging of ISO containers is required as these are delivered directly to the customer sites.

Refinery/Terminal Facilities

The fuel additive package containing the notified polymer is transferred from the isocontainer to the customer's storage tank. It is then automatically metered into gasoline as the gasoline is pumped into a tank truck. Despite the use of automated processes and dedicated delivery lines, worker exposure may occur during transfer of the additive from containers to a storage tank and during the transfer of the additive package from storage to fuel in tankers. Exposure is expected to be confined to dermal contamination with drips and spills during the connection and disconnection of transfer lines and equipment. Protective aprons, nitrile or neoprene gloves and boots are recommended by the notifier for workers when handling the additive package and the worker environment is expected to be well ventilated.

End Use - Service Stations

At service stations, the fuel plus additive will be transferred to underground tanks. Exposure of transport drivers, service station personnel and mechanics to 0.0085 – 0.017% notified polymer in the final fuel may occur due to spillage. Exposure is expected to be confined to dermal contamination with drips and spills during the connection and disconnection of transfer lines and dipping of tanks.

In all categories, estimated numbers of workers and duration of exposure were not provided by the notifier.

The aerosol-cleaning product containing the notified polymer will be sprayed into the throttle body of the automotive engine, where incidental skin contact and inhalation exposure may occur.

7. PUBLIC EXPOSURE

It is expected that during import, transport, storage, mixing with petrol, and replenishment at service stations, exposure of the general public to the notified polymer will be low, except in the event of an accidental spill. Public exposure to the notified polymer will occur during refuelling of vehicles at petrol stations, filling of petrol containers for storage and use in domestic petrol-engined equipment and where treated gasoline is used for the cleaning of equipment or parts by a home mechanic. Exposure is likely to be by the inhalation and dermal routes, with the possibility of ocular and oral exposure.

Incidental skin contact and inhalation exposure may occur when members of the public are using the aerosol-cleaning product containing the notified polymer.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

Formulation into petrol

The notifier indicates that the blending operations are to be performed at specially constructed sites (around 5 in Australia), all owned and operated by petroleum companies. The additive packages containing the notified polymer will be delivered to the blending facilities in iso tanks and pumped to on-site storage tanks. Due to the automated and self contained nature of the pumping and transfer equipment used, it is anticipated that very little of the additive package (containing up to 50% of the notified polymer) will be released during transfer to the storage containers, and a figure of 50 grams per unload is probably a realistic estimate. Import and unloading of 40 iso tanks per annum (maximum) equates to an annual release of 2 kg of additive, or (at up to 50% w/w in the additive package) up to 1.0 kg of the notified polymer.

The additive package will be blended into fuel sufficient to provide final concentrations of the notified polymer between 85 and 170 ppm. All transfer operations from the storage facility to the (closed) blending equipment (typically in-line mixers) would be under automatic control, and any spills incurred in the blending operations would be contained within concrete bunds and reclaimed or sent with other waste material to the on-site waste water treatment facilities at the refineries. Treatment technologies include oil/water separation, induced air flotation, sand filtration and possibly biological treatment. After treatment, water is discharged to either municipal sewage or receiving waters and the hydrocarbon material (including the notified polymer) is recovered into waste sludge. Sludge is usually incinerated or placed into landfill.

The notifier estimated that a maximum of 1% of the additive packages may remain in the emptied iso containers. Assuming a maximum importation of 1 000 tonnes per annum, this equates to a total maximum release of 10 tonnes of polymer each year. The empty containers are steam cleaned at a reconditioning facility. The waste condensate containing the residual material is treated to remove the hydrophobic material in equipment similar to that used at refineries, and the waste sludge containing polymer residue would be either placed into landfill or be incinerated.

End use release

Finished petrol is transported to service stations by bulk rail or road tankers, and distributed to the general public from bowsers. It is estimated that total loss of petrol through transport and transfer operations would be a maximum of 1%. If it is assumed all this is spilt onto the concrete driveways of service stations, then following evaporation of the volatile hydrocarbons, a maximum 10 tonnes of the notified material could be left on the service station driveways per annum. It is likely that this would be washed into stormwater systems or sewers where it is expected to associate with sediments because of the anticipated high affinity for organic material.

8.2 Fate

The majority of the notified polymer will be burnt with the petrol with evolution of water vapour and oxides of carbon and nitrogen. Similarly, any material lost as a result of spills at refineries or blending facilities will be recovered into waste sludge and likely to be incinerated. The notifier indicates that use of the notified polymer as an additive for non-leaded fuels will not adversely effect the levels of hydrocarbon, CO, CO_2 or NO_x in exhaust emissions, and claims that use of the notified polymer will reduce these emissions through improved engine performance.

No information on biodegradation was provided, but any material released to the soil or water compartments through accidental spills or leaks from storage tanks would associate with the organic component of soils and sediments. It would be expected to undergo slow degradation and produce water, oxides of carbon and nitrogen through bacterial action, and methane and ammonia under anaerobic conditions.

Despite the high log P_{ow}, the low water solubility and high molecular weight of the polymer should preclude passage across biological membranes and bioaccumulation (Connell, 1989).

Effects of notified polymer on vehicle exhaust emissions

Future Commonwealth fuel quality legislation will require motor fuels to meet vehicle exhaust emission standards. The notifier was asked to supply documentation of the effects of the notified polymer on these emissions and provided a summary report (Dudek, 2000) on comparative tests conducted on a small vehicle with petrol containing an additive package similar to Lubrizol 9566.

The summary test report described how a single light passenger vehicle (Honda Accord) was run using base fuel, and a base fuel amended with approximately 200 ppm of an additive known as OS148467, reportedly similar to the notified polymer. Emission levels of CO, NO_x and hydrocarbons were measured and compared for both fuels. Although test details such as cleanliness of engine fuel intake port components and other parameters were not provided, the conclusions stated that the presence of the additive in the fuel resulted in no significant increase (or decrease) in exhaust levels of carbon monoxide, nitrogen oxides or emissions of hydrocarbons. A number of studies have examined the positive effects of similar additives (not necessarily containing the notified polymer) on aspects of vehicle exhaust emissions. Although the information contained within the studies made no specific reference to the notified polymer, the benefits accruing from the effects of these additives should be generic and not confined to the notified polymer alone. Nevertheless, the available evidence suggests that use of the notified polymer as a fuel additive is beneficial in respect of exhaust emissions (hydrocarbon, CO and NO_x). It is relevant that these additives also have significant positive impact on engine efficiency.

9. EVALUATION OF TOXICOLOGICAL DATA

The toxicological studies were conducted on Z-38 (which contains up to 20% Z-39, referred to as a polyether alcohol) or 50% Z-38 in petroleum naphtha using guidelines developed by the US EPA and in accordance with principles of Good Laboratory Practice. The acute oral toxicity and skin irritation studies were conducted on Z-38 and the eye irritation study on

50% Z-38 in petroleum naphtha. In the summary to the notification it is stated that the studies also conformed to the equivalent OECD guidelines.

9.1 Acute Toxicity

Summary of the acute toxicity studies

Test	*Species*	*Outcome*	*Reference*
acute oral toxicity	rat	LD_{50} > 5 000 mg/kg	Kukulinski & Locke (1998a)
skin irritation	rabbit	slight to moderate irritant	Kukulinski & Locke (1998b)
eye irritation	rabbit	slight to moderate irritant	Patterson (2000)

9.1.1 Oral Toxicity (Kukulinski & Locke, 1998a)

Species/strain:	Rat/Sprague-Dawley
Number/sex of animals:	5/sex/group
Observation period:	14 days
Method of administration:	Oral (gavage), administered undiluted at 5 g/kg body weight.
Test method:	US EPA OPP Guideline 81-1.
Mortality:	None.
Clinical observations:	None.
Morphological findings:	None.
LD_{50}:	> 5 000 mg/kg
Result:	The notified polymer was of very low acute oral toxicity in rats.

9.1.2 Skin Irritation (Kukulinski & Locke, 1998b)

Species/strain:	Rabbit/New Zealand White
Number/sex of animals:	6 males.
Observation period:	72 hours.
Method of administration:	A dose of 0.5 mL was applied to the shaved left flank of each animal under an occlusive dressing for 4 hours.

Test method: US EPA OPP Guideline 81-5.

Draize scores:

Time after treatment (days)	***Animal #***					
	1	***2***	***3***	***4***	***5***	***6***
Erythema						
4.5 hours	1[a]	1	0	1	1	1
1	2	1	2	2	1	2
2	1	0	1	1	0	1
3	0	0	0	0	0	0
Oedema						
4.5 hours	0	0	0	0	0	0
1	1	0	1	1	0	1
2	0	0	0	0	0	0
3	0	0	0	0	0	0

[a] see Attachment 1 for Draize scales

Comment: Mean scores for erythema were 0.77 and for oedema, 0.22.

Result: The notified polymer was a slight to moderate skin irritant in rabbits.

9.1.3 Eye Irritation (Patterson, 2000)

Species/strain: Rabbit/New Zealand White

Number/sex of animals: 3/male

Observation period: 14 days.

Method of administration: 0.1 mL of 50% Z-38 in petroleum naphtha into the conjunctival sac of the right eye.

Test method: US EPA OPPTS Guideline 870.2400.

Draize scores of unirrigated eyes:

	Time after instillation						
Animal	***1 hour***	***1 day***	***2 days***	***3 days***	***7 days***	***10 days***	***14 days***
Cornea	No Draize scores above zero.						
Iris							

1	1			0			0			0			0			0			0		
2, 3	No Draize scores above zero.																			
Conjunctiva	***r***	***c***	***d***	***r***	***c***	***d***	***r***	***c***	***d***	***r***	***c***	***d***	***r***	***c***	***d***	***r***	***c***	***d***	***r***	***c***	***d***
1	2	1	1	1	1	0	1	1	0	1	0	0	1	0	0	1	0	0	0	0	0
2	2	1	1	2	1	0	1	1	0	1	1	0	1	0	0	0	0	0			
3	2	1	0	1	1	0	1	1	0	1	1	0	0	0	0						

[1] see Attachment 1 for Draize scales
o = opacity a = area r = redness c = chemosis d = discharge

Comment: Individual mean scores were redness: 1:1.3:1; chemosis: 0.66:1:1 with the cornea and iris scores all zero.

Result: The notified polymer was a slight to moderate eye irritant in rabbits.

9.2 Overall Assessment of Toxicological Data

Z-38 was of very low acute oral toxicity (LD_{50} > 5 000 mg/kg) in rats and was a slight to moderate skin irritant in rabbits. A 50% solution of Z-38 was a slight to moderate eye irritant in rabbits.

Although no skin sensitisation study was conducted the overseas supplier of Z-38 has assigned the risk phrase R43: May cause sensitisation by skin contact based on results with similar substances.

The notified polymer is not classified as a hazardous substance according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a) in relation to the toxicological data provided.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The notifier supplied a study on the toxicity of the notified polymer to green algae.

Test	Species	Results (nominal WAF) mg/L
Algal Growth Inhibition (OECD TG 201)	Green Algae *Selenastrum subspiticas*	72 h E_bC_{50} = 39.0 0-96 h E_rC_{50} = 59 NOEC = 25

WAF = water accommodated fraction

The tests on green algae *Selenastrum subspiticas* were performed in triplicate using Water Accommodated Fractions (WAFs) of the test material at nominal WAF loadings of 0 (control), 6.25, 12.5, 25, 50 and 100 mg/L over a 96 hour period at 24±1°C (Mead and Mullee, 2000). The WAFs were prepared by adding aliquots of test material to the algal culture medium and stirring in a vortex for 23 hours, allowing to stand for 1 hour then filtering through 0.2 μm membranes.

The growth in biomass was determined at 24, 48, 72 and 96 hours after commencement of the test using a Coulter counter to measure cell densities. After 24 hours, significant inhibition of algal growth was observed for the WAF loadings of (nominally) 50 and 100 mg/L. The 72 hour E_bC_{50} (biomass) was determined as 39 mg/L (nominal WAF loading), while the 0-96 hour E_rC_{50} was 59 mg/L nominal WAF. The 96 hour NOEL was determined as 25 mg/L WAF.

Although the study did not mention suspended material in the WAF preparations, chemical analysis (HPLC) of the test media at 0 and 96 hours indicated that actual concentrations were below the analytical Level Of Quantification of the apparatus of 0.42 mg/L. This finding was presumably due to assimilation of the polymer into the biomass, and adsorption to the glass surfaces of the test vessels.

The results indicate that the notified polymer shows some toxicity to the species of algae tested.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The environmental hazard from the notified polymer is low when it is blended into petrol and used in the manner indicated by the notifier.

There is little potential for significant release of the notified polymer during blending operations which will be performed at dedicated petrochemical facilities. A maximum of 10 tonnes may be released each year as a result of cleaning the iso containers, and most of this is expected to be recovered into waste sludge and incinerated or placed into landfill.

Some release is inevitable as a result of petrol spills during distribution to motorists. Release estimated as a maximum of 10 tonnes per annum, will be widespread and very diffuse.

Although no specific information is available, it is probable that the notified polymer is ultimately biodegradable. It has low water solubility and due to the high hydrocarbon content

is expected to have high affinity for the organic component of soils and sediments. Any material released to the soil compartment (eg. from petrol spills) would associate with the organic component of the soil, and in this situation is expected to be slowly mineralised to water and oxides of carbon and nitrogen through biological processes. The same fate is expected for any polymer placed into landfill in waste sludge from refineries.

The notified polymer will be used as a component of engine deposit control additives for non leaded petrol. There is considerable evidence that modern motor vehicles running on fuel containing such additives show significant improvements in exhaust emission of hydrocarbons, CO and NO_x compared with vehicles using un-supplemented fuel. However, the formation and control of engine deposits, and effects on fuel combustion efficiency and on the composition of exhaust emissions is a very complex subject. Factors influencing these engine operating parameters may include the composition of the base fuel (eg. presence/ absence of olefins) and the presence and concentration of control additives in the fuel. Nevertheless, the available evidence suggests that the use of the notified polymer as a fuel additive has no significant deleterious effects on the quality or quantity of noxious or toxic vehicular exhaust emissions, and use of the polymer as intended should be beneficial and not pose a hazard to the environment.

The majority of the imported polymer is expected to be completely destroyed by combustion within the engine, resulting in oxides of carbon, nitrogen and water vapour.

Ecotoxicity data was only provided for green algae, and the results provided a 72-hour E_bL_{50} of 39 mg/L nominal WAF and 96-hour NOEL of 25 mg/L, indicating that the notified polymer shows some toxicity to this species. However, except in the case of a transport accident, release to the water compartment is unlikely and the high octanol/water partition coefficient indicates that if released to the soil or water compartments the polymer would be expected to bind to, and associate with the organic component of soils and sediments. This will mitigate any toxic potential of the material.

Bioaccumulation is considered to be unlikely.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Hazard Assessment

Z-38 was of very low acute oral toxicity in rats and was a slight to moderate skin irritant in rabbits. A 50% solution of Z-38 in petroleum naphtha was a slight to moderate eye irritant in rabbits. The notified polymer cannot be determined to be a hazardous substance on the basis of the limited data provided, under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a). However, the MSDS and label for Z-38 and the additive package Lubrizol 9566 contain the risk phrase: May cause sensitisation by skin contact, on the basis of data from similar substances.

The notifier has indicated that a typical additive package in which the notified polymer may be imported contains 42% petroleum naphtha including 17% trimethylbenzene isomers, 3.2% xylene, 2.1% cumene. According to NOHSC *List of Designated Hazardous Substances* (National Occupational Health and Safety Commission, 1999b), the additive package may

cause lung damage if swallowed as a result of the petroleum naphtha content and is harmful if inhaled and irritating to eyes, respiratory and skin as a result of the trimethylbenzene isomer content. The additive package also should be considered flammable as a result of the trimethylbenzene isomer content.

Occupational Health and Safety

The notified chemical is to be imported at up to 50% in an end use additive product Lubrizol 9566. During import and transport of the notified polymer, worker exposure to the notified polymer is unlikely except in the event of a spill. Exposure after a spill would be controlled by use of the recommended practices for spillage clean up outlined in the MSDS supplied by the notifier.

At refineries and terminals, the handling of fuel additive packages may cause slight to moderate eye irritation and slight to moderate skin irritation from exposure to the notified polymer if adequate precautions are not taken. The solvent content can cause toxic effects via inhalation and eye, skin and respiratory irritation. Trimethylbenzene has a NOHSC exposure standard of 25 ppm and cumene, 50 ppm and xylene 80 ppm (TWA) (National Occupational Health and Safety Commission, 1995). Employers are responsible for maintaining workplace airborne concentrations below these limits. The MSDS for Lubrizol 9566 recommends that workers wear a faceshield and protective apron and use nitrile or neoprene gloves and boots to control exposure. Respiratory protection (full face respirator) is recommended if exposure limits are exceeded and self-contained breathing apparatus for entry into confined spaces, poorly ventilated areas or large spill clean-up sites. Engineering controls and personal protective equipment for handling the solvent components of the additive package are sufficient to limit exposure to the notified polymer.

The use of automatic, dedicated transfer lines and enclosed, automated injection into fuel will reduce the likelihood of exposure to the additive package. Therefore, the health risk expected for refinery and terminal workers would be assessed as low.

Tanker drivers, service station workers and mechanics will receive negligible exposure to the notified polymer because of the very low concentration (0.0085 – 0.017%) present in the final fuel. Therefore, the risk of adverse health effects for these workers arising from exposure to the notified polymer is negligible.

Given the low volume of automotive aerosol-cleaning product imported and the low concentration of notified polymer in the product, the health risk to workers from this use is low.

Public Health Effects

Public exposure to the notified polymer will predominantly occur from inhalation, dermal and, to a lesser extent, ocular and oral exposure when refuelling vehicles and/or the filling of petrol containers for domestic use at petrol stations and where treated gasoline is used for the cleaning of equipment or parts by a home mechanic. The notified polymer is a slight to moderate eye irritant, but is present at low concentrations in petrol (0.0085 – 0.017%). Consequently, the irritant risk to the public is likely to be no greater than that of untreated petrol. The potential risk to the public from storage, transport, formulation and commercial operations is considered to be low.

Given the low volume of automotive aerosol-cleaning product imported and the low concentration of notified polymer in the product, the health risk to the public from this use is low.

13. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer, the following guidelines and precautions should be observed:

- Spillage of the notified polymer should be avoided. Spillage 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.

Safety goggles, chemical resistant industrial clothing including an apron and footwear and impermeable gloves (nitrile or neoprene) should be used during occupational use of the additive packages containing the notified polymer; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used.

- Guidance in selection of goggles may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c). Other internationally accepted standards may also be used in the selection and use of PPE.

If products containing the notified polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Employers should ensure that NOHSC exposure standards for all components of additive packages are not exceeded in the workplace.

The notified polymer will need to be tested to ensure that it will meet the criteria in the upcoming Australian Standard, *Evaluation of Devices and Additives which Claim to Improve Vehicle Performance*, to be AS 4430.2.

14. MATERIAL SAFETY DATA SHEET

The MSDS for a fuel additive package and an aerosol-cleaning product for automotive engines containing the notified polymer were 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 were provided by the applicant as part of the notification statements. They are reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicants.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, the director must be informed if any of the circumstances stipulated under subsection 64(2) of the Act arise, and secondary notification of the notified polymer may be required. 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.	Discharge with moistening of lids and hairs and considerable area around eye	3 severe
Diffuse beefy red	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

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