File No PLC/455

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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Z-54

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Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888.
Website:	www.nicnas.gov.au

Director
Chemicals Notification and Assessment

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Lubrizol International Inc (ABN: 52 073 495 603)
28 River Street
SILVERWATER NSW 2128

NOTIFICATION CATEGORY
Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Other names
Structural formula
Number Average Molecular Weight
Weight Average Moleculare Weight
Weight percentage of species MW<1000 and MW<500
Polymer constituents
Residual monomers and impurities
Reactive functional groups
Manufacture or import volume

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows:
Particle size distribution
Melting point
Flammability limits

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
Korea (2003), Canada (2003), USA (2003)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
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CAS NUMBER
None allocated

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met (yes/no/not applicable)*
Meets Molecular Weight Requirements	Yes
Meets Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Not Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Not a Hazardous Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	1-3	3-10	<1000	<1000	<1000

USE

The notified polymer is used as detergent in passenger car and heavy-duty diesel engine oils.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer will not be manufactured in Australia. The notified polymer will be imported in sealed isotainers, 330 gallon IBC containers and 55 gallon drums, as a component of a fuel additive package. Levels of the notified polymer in the fuel additive packages will range from 5 to 15%.

The isotainers and drums will be transported directly to oil companies. The fuel additives will be pumped directly from the isotainers and drum into blending tanks, where it is diluted with oil and possibly other additives to form the final product. The process will be highly automated and will usually involve 1-2 workers. Typically the level of the notified polymer in the final product will range from 0.5 to 2.5%. The size and type of the end use containers will vary from oil company to oil company.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

Release of Polymer During Formulation

Products containing the notified polymer will not be manufactured in Australia. The additive package will be imported to customers in Australia directly. These will add a calculated amount of the product containing the polymer to passenger car or heavy duty diesel oil formulation that would yield an effective treatment rate of 0.5 to 2.5% by weight of the notified polymer. A typical operation would involve pumping the product containing the polymer directly from an isotainer or 55-gallon drum to a blend tank where it will be blended with mineral oil and other additives. All these operations are expected to be carried out automatically or semi-automatically in a closed system. Diluent oil is used

to flush the isotainer or drum and the flushings are added to the blend. Residual product remaining in the container are expected to be small (approximately 1%) and is easily removed by washing with mineral oil and disposed of at a reconditioning facility or incinerated.

Release of Polymer During Use
There will be some loses on adding oil to vehicles, but the greatest potential for exposure is through disposal of oil product wastes containing the notified polymer. A survey by the Australian Institute of Petroleum (AIP 1995) indicates that of the annual sales of automotive engine oils in Australia, some 60% are potentially recoverable (ie not burnt in the engines during use). This report also indicates that around 86% of oil changes take place in specialised automotive service centres, where old oil drained from crankcases could be expected to be disposed of responsibly - either to oil recycling or incineration. The remaining 14% are removed by "do it yourself" (DIY) enthusiasts, and in these cases some of the used oil would be either incinerated, left at transfer stations where it is again likely to be recycled, or deposited into landfill. A recent report estimated that DIY activities account for between 7 to 10% of the unaccounted for used oil (MEINHARDT 2002). On the other hand changing of heavy duty engine oils is only likely to be carried out by specialists with less irresponsible disposal.

According to a survey tracing the fate of used lubricating oil in Australia (Snow 1997) only around 20% of used oil removed by enthusiasts is collected for recycling, approximately 25% is buried or disposed of in landfill, 5% is disposed of into stormwater drains and the remaining 50% is used in treating fence posts, killing grass and weeds or disposed of in other ways.

Consequently, assuming that oil removed by professional mechanics is disposed of appropriately (ie burning as workshop heating oil or sent for recycling), negligible release of the notified polymer should result from these professional activities. Assuming a worst case scenario of 14% of the used oil removed by the DIY enthusiasts it is possible to have 20, 25, 5 and 50% of this oil to be collected for recycling, buried or disposed of in landfill, and disposed into stormwater drains and used in treating fence posts, to kill weeds or disposed of in other ways, respectively.

Therefore, an amount less than 1% of the total import volume of the notified polymer could be expected to enter the aquatic environment via disposal into the storm water system. Since the use of the oil products will occur throughout Australia, release from use or disposal will be very diffuse.

6.2. Summary of Occupational Exposure

Dermal and ocular exposure can occur during certain formulation processes. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers.

6.3. Summary of Public Exposure

The final fuel additive products containing the notified polymer are for sale to the general public. Members of the public will make dermal contact and possibly accidental ocular contact with the products containing the notified polymer. However, exposure will be low because the notified polymer is present at low concentrations.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20^{o}C and 101.3 kPa	Brown, highly viscous liquid
Boiling Temperature	No boiling temperature could be determined as decomposition of the material occurred at 227^{o}C. The boiling temperature was calculated to be greater than 400^{o}C using an adaptation of the Stein and Brown Method The pour point was determined to be 65^{o}C.
Density	982 kg/m^{3} at 20^{o}C
Water Solubility	<1x10^{-3} g/L at 20^{o}C (determined through TOC analysis) <1.85x10^{-4} g/L at 20^{o}C (determined by GPC)

	The flask method (OECD TG 105) was used.
Dissociation Constant	Not determined; the notified polymer contains carboxylic acid groups, expected to have typical acidity.
Reactivity	Not an oxidiser.
Degradation Products	Carbon dioxide, carbon monoxide, aldehydes, and oxides of calcium will be formed.
Other Properties	Other data provided by the notifier include: Vapour Pressure $<4.0x10^{-5}$ Pa at 25°C. Partition Coefficient (2 major components present) logPow (1) <0.3 and (2) >9. Adsorption Coefficient (2 major components present) logKoc (1) <1.25 and (2) >5.63. Fat Solubility, soluble in all proportions at 37± 0.05°C.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

The following toxicological end-points were submitted:

Endpoint and Result	*Assessment Conclusion*		
Endpoint	*Result*	*Classified?*	*Effects Observed?*
Rat, acute oral LD50 >2500 mg/kg bw	low toxicity	no	no
Rat, oral repeat dose toxicity – 28 days.	NOEL = 1000mg/kg bw	no	yes
Genotoxicity - bacterial reverse mutation	non mutagenic	no	no
Genotoxicity – in vitro chromosomal aberration	non genotoxic	no	yes

All results were indicative of low hazard. In the 28 day repeat dose study changes in clinical observations, behavioural assessments, bodyweight, blood chemistry, organ weight, necropsy, and histopathology were observed but all the changes were deemed as being of no toxicological significance.

In the *in vitro* chromosome aberration test in CHL cells a slight increase in the frequency of polypoidy was observed at the cells treated at mid dose for 6 hours with metabolic activation only. This increase in polypoidy was deemed not to be of toxicological significance.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. The toxicological studies undertaken with notified polymer indicate that it has low acute oral toxicity and is not genotoxic nor mutagenic. No toxicological significant changes were observed in a subchronic repeat dose study.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

The aquatic toxicity of the notified polymer has not been measured. According to the MSDS the acute LC/EC50 towards fresh and saltwater fish, saltwater aquatic invertebrates, algae and bacteria is >1000 mg/L based on similar products. No test reports were provided.

According to the MSDS the biodegradability of the product using the test OECD 301 was shown to be moderate, with at least 25% of the components of the product being degraded. No test reports were provided.

9.2. Environmental Hazard Assessment

No test reports were included for toxicity towards fish, invertebrates, algae, bacteria and biodegradability. The hazard of the polymer to organisms in the environment is unclear, but likely to be low based on unspecified "similar products".

10. RISK ASSESSMENT

10.1. Environment

The main environmental exposure is expected to result from inappropriate disposal of waste lubricant product by DIY enthusiasts, which will be however widespread across Australia. Most of the improperly released notified polymer due to DIY activities is likely to become associated with soils or sediments, as will the notified polymer released to landfill including as container residues. Incineration of waste polymer will generate water vapour and oxides of carbon.

The amount released to stormwater drains (less than 1% of the import volume) and entering the aquatic compartment could also be expected to become associated with suspended organic material, settle out into the sediments and slowly degrade due to the biotic and abiotic processes.

It is difficult to estimate the Predicted Environmental Concentration (PEC) of the notified polymer released into the stormwater drains, which have the potential to directly enter the aquatic environment. However, a worst case estimated PEC may be calculated if it is assumed that all of the 1% of the notified substance (i.e. 10 tonne) expected to be released into the stormwater drains in a single metropolitan area with a geographical footprint of 500 square kilometres, an average annual rainfall of 50 cm. With a maximum annual release into this localised stormwater system of 10 tonne and the annual volume of water drained from this region estimated to be approximately 250 X 10^6 m^3, the resultant PEC is approximately 40.0 μg/L. It should be stressed that this result is very much a worst case scenario, furthermore, that in reality releases of the chemical would be very much more diffuse than indicated here, and also at significantly reduced levels.

A preliminary predicted no effect concentration (PNEC) for aquatic ecosystems of > 1 mg/L (1000 μg/L) has been derived by dividing the LC50 values provided (which were based on similar products, however, no test reports were included) by an uncertainty (safety) factor of 1000. While this value should be viewed with extreme caution the tentative PEC/PNEC ratio is <0.04, suggesting an adequate safety margin.

10.2. Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be present in formulations containing hazardous ingredients. If these formulations 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.

10.3. Public health

The notified polymer will not be available to the public. Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is present at low concentrations.

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

11.1. Environmental risk assessment

Reading across from the data on similar chemicals, some of the components of the notified polymer are shown to be not toxic to fish, daphnia or algae. Therefore, the worst-case PEC is significantly below possible toxic levels and the resulting risk quotient (Q = PEC/PNEC) is significantly below 1. Further, the low water solubility of the notified polymer and its limited release to the aquatic environment (mainly via stormwater drainage) can expect to reduce the possibility of sufficient amounts to remain in solution to cause acute toxicity. The notified polymer's ability to become associated with the sediments and moderate biodegradation will further reduce the risk to the aquatic life. Overall, the polymer is not considered to pose a risk to the environment based on its reported use pattern.

11.2. Human health risk assessment

11.2.1. Occupational health and safety

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

11.2.2 Public health

There is Low Concern to public health when used in as described in the notification.

12. MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

  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 polymer 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.

Disposal

- The notified chemical will be a component of waste oil. It should be disposed of by recycling as waste oil or incinerated in accordance with approved State or Territory waste management regulations. Emptied containers (1-4 L) should be sent to landfill for disposal. Emptied drums should be sent to drum recyclers for steam cleaning prior to re-use, with wastewater treated and oil component concentrated prior to recycling as waste oil by licensed waste contractors. Every effort should be made to prevent the notified chemical from entering waterways.

Emergency procedures

- Spills/release of the notified chemical should be handled by stoping the source of the spill where possible. Then containing the release to prevent further contamination of soil, surface water or ground water. Clean up spill as soon as possible by applying non-combustible adsorbent materials in disposable containers and dispose of in a manner consistent with government regulations.

13.1. 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 subsection 64(1) of the Act; if
the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

(2) Under subsection 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.

14. REFERENCES

AIP (1995) AIP Survey of Used Oil. Australian Institute of Petroleum Ltd.

MEINHARDT (2002) Used Oil in Australia. Prepared by MEINHARDT Infrastructure & Environment Group for Environment Australia.

Snow R (1997) Used Oil Management. Paper presented at the Used Oil Management Conference, Brisbane, August 1997, Queensland Dept. Environment.