File No PLC/1364

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

POLYMER OF LOW CONCERN PUBLIC REPORT

Polymer in Priolube 1847-LQ-(GD)

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Australian Government Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Australian Government Department of the Environment.

This Public Report is available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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Director
NICNAS

August 2016

Table of Contents

SUMMARY

The following details will be published in the NICNAS *Chemical Gazette:*

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
PLC/1364	Croda Singapore Pte Ltd trading as Croda Australia	Polymer in Priolube 1847-LQ-(GD)	No	≤ 100 tonnes per annum	Component of lubricating oils

CONCLUSIONS AND REGULATORY OBLIGATIONS

Human Health Risk Assessment
Based on the assumed low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the health of workers and the public.

Environmental Risk Assessment
Based on the low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Health and Safety Recommendations

- 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 (M)SDS should be easily accessible to employees.

- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling are not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Storage

- The following precautions should be taken by workers regarding storage of the notified polymer:
  - Store in original container.
  - Keep container tightly closed in a dry and well-ventilated area.

Emergency Procedures

- Spills and/or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Secondary Notification

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the polymer under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified polymer, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 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 Section 64(2) of the Act; if
- the function or use of the notified polymer has changed from a component of lubricating oils, or is likely to change significantly;
- the amount of notified polymer being introduced has increased, or is likely to increase, significantly;
- the notified polymer has begun to be manufactured in Australia;
- additional information has become available to the person as to an adverse effect of the notified polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

(Material) Safety Data Sheet

The (M)SDS of the product containing the notified polymer was provided by the applicant. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

Applicants
Croda Singapore Pte Ltd trading as Croda Australia (ABN: 34 088 345 457)
Suite 102, Level 1,447 Victoria St
WETHERILL PARK NSW 2164

Exempt Information (Section 75 of the Act)
Data items and details claimed exempt from publication: chemical name, CAS number, molecular and structural formulae, molecular weight, polymer constituents, residual monomers/impurities and use details.

2. IDENTITY OF POLYMER

Marketing Name
Priolube™ 1847-LQ-(GD) (product containing the notified polymer at up to 100% concentration)

3. PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met*
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20 °C and 101.3 kPa	Light yellow liquid
Pour Point	-24 °C
Density	900 kg/m^3
Water Solubility	Insoluble
Dissociation Constant	Expected to be ionised under environmental conditions (pH 4-9)
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

Maximum Introduction Volume of Notified Chemical (100%) Over Next 5 Years

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	100	100	100	100	100

Use
The notified polymer will not be manufactured in Australia.

The notified polymer will be imported into Australia at up to 100% concentration for reformulaton into automobile oils, chain lubricants and metal working fluids. The formulated oils containing the notified polymer at up to 98% concentration will be sold to both industrial and public consumers.

6. HUMAN HEALTH RISK ASSESSMENT

No toxicological data were submitted. The notified polymer meets the PLC criteria and is therefore assumed to be of low hazard. The risk of the notified polymer to occupational and public health is not considered to be unreasonable given the assumed low hazard and the assessed use pattern.

7. ENVIRONMENTAL RISK ASSESSMENT

Anionic polymers are generally of low toxicity to fish and daphnia; however, they are known to be moderately toxic to algae. The mode of toxic action is over-chelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone, which is not expected to apply to the notified polymer.

This is supported by results from ecotoxicological investigations conducted on the notified polymer, which are summarised in the table below. The actual concentrations of the notified polymer in the test media were not determined, as no effects were observed at the highest nominal concentration tested. The results of these studies are considered reliable as the validity criteria for all of the tests were satisfied.

Endpoint	*Results*	*Assessment Conclusion*	*Reference*
Aquatic Invertebrate Toxicity			
Daphnia magna	48 h EL50 > 1,000 mg/L (WAF*)	Not harmful to aquatic invertebrates up to water solubility limit	Chemex (2005a)
Algal Toxicity			
Pseudokirchneriella subcapitata	72 h E_rL50 > 1,000 mg/L (WAF*)	Not harmful to algae up to water solubility limit	Chemex (2005b)

* Water accommodated fraction

Based on the above ecotoxicological endpoints for the notified polymer, it is not expected to be harmful to aquatic life up to the limit of its solubility in water. Therefore, under the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), the notified polymer is not formally classified for acute and chronic toxicities.

The notified polymer will be imported neat or as a component of a solution, for reformulation into automotive oils, chain lubricants and metal working fluids. Release of the notified polymer during transport and storage is expected to be limited to accidental spills and leaks, and residues in import containers. It is estimated by the notifier that < 1% of the import volume of the notified polymer (or up to 1,000 kg) may be released from accidental spills, leaks and container residues during reformulation processes. These releases are expected to be collected and disposed of in accordance with local government regulations, most likely to landfill.

Based on the results of a ready biodegradability test (conducted in accordance with OECD TG 301 B guidelines; Institut Fresenius, 1998), the notified polymer is not considered to be readily biodegradable (≥ 55% in 28 days), but is expected to be ultimately biodegradable. Based on its high molecular weight and ultimate biodegradability, the notified polymer is not expected to cross biological membranes, and is therefore not expected to be bioaccumulative.

The majority of the notified polymer used in automotive oils is expected to be used within closed systems, and is expected to be consumed and thermally decomposed during use. The major release of

the notified polymer to the environment from this use will come from inappropriate disposal of used oils. Oil products containing the notified polymer will be poured into engines at automotive service centres or by do-it-yourself (DIY) consumers. A survey by the Australian Institute of Petroleum (AIP, 1995) indicates that around 86% of oil changes take place in specialised automotive service centres where old oil is disposed of responsibly (e.g. oil recycling), and negligible release of the notified polymer is expected. The remaining 14% of oil is used by DIY consumers. According to a survey tracing the fate of used lubricating oil in Australia (Snow, 1997), approximately 20% of oil used by DIY consumers is collected for recycling, approximately 25% is buried or disposed of to 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. As a worst case scenario, the entire import volume of the notified polymer is assumed to be used in automotive oils. Of the 14% of oil used by DIY consumers, up to 0.7% (14% × 5% stormwater disposal) of the total import volume of the notified polymer (or 700 kg) may enter the aquatic environment via disposal to stormwater drains. Since the use of the engine oils will occur throughout Australia, all releases resulting from use or disposal of used oil is expected to be very diffuse.

The notified polymer used in chain lubricants will be used in enclosed systems, which will require initial loading and top-up. At the end of their useful life, lubricants containing the notified polymer will be drained from the machinery for disposal through licensed waste management services. Some of the residual oil within the machinery will share the fate of the machinery, which is expected to be recycled as scrap metal or disposed of to landfill.

Metal working fluids containing the notified polymer will be used at a single site in Australia. It is estimated by the notifier that < 3% of the import volume of the notified polymer (or up to 3,000 kg) will be used in metal working fluids. Metal working fluids will be used in enclosed industrial systems which will require initial loading into the machinery; spent fluids may be disposed of directly to sewer. Up to 50% of the notified polymer is expected to adsorb to sludge and sediment during sewage treatment plant (STP) processes, based on its high molecular weight and anionic properties (Boethling and Nabholz, 1997). Sludge will eventually be disposed of to landfill, or re-used for soil remediation. The predicted environmental concentration (PEC) has been calculated to assume a worst case scenario, with 100% release of the notified polymer used in metal working fluids (i.e. 3,000 kg) and no removal in STP. Release will be at a single site producing 115 ML of effluent daily (stated by the notifier) across 260 working days per annum.

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Total Annual Import/Manufactured Volume	100,000	kg/year
Proportion expected to be released to sewer	3%	
Annual quantity of chemical released to sewer	3,000	kg/year
Days per year where release occurs	260	days/year
Daily chemical release	11.538	kg/day
Individual sewage treatment plant average daily effluent production	115	ML
Removal within STP	0%	
Dilution Factor – River	1.0	
Dilution Factor – Ocean	10.0	
PEC – River	100.334	µg/L
PEC – Ocean	10.033	µg/L

STP effluent re-use for irrigation occurs throughout Australia. The agricultural irrigation application rate is assumed to be 1,000 L/m^2/year (10 ML/ha/year). The notified polymer in this volume is assumed to infiltrate and accumulate in the top 10 cm of soil (density 1,500 kg/m^3). Using these assumptions, irrigation with a concentration of 100.33 µg/L may potentially result in a soil concentration of approximately 668.9 µg/kg. Assuming accumulation of the notified polymer in soil for 5 and 10 years under repeated irrigation, the concentration of the notified polymer in the applied soil in 5 and 10 years may be approximately 3.34 mg/kg and 6.69 mg/kg, respectively.

The predicted no-effects concentration (PNEC) has not been calculated, as the notified polymer is not expected to be harmful to aquatic life up to the limit of its solubility in water.

A Risk Quotient (RQ = PEC/PNEC) has not been calculated for the notified polymer, as a PNEC is not available. Although the notified polymer is not considered readily biodegradable, it is expected to be ultimately biodegradable and is not expected to be bioaccumulative. In both surface waters and in landfill, the notified polymer is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon. Therefore, on the basis of its low hazard and assessed use pattern in automotive oils, chain lubricants and metal working fluids, the notified polymer is not considered to pose an unreasonable risk to the environment.

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