

File No PLC/710

August 2007

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in ZINPOL 146

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

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also 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**

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FULL PUBLIC REPORT**Polymer in ZINPOL 146****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Lubrizol International Inc. (52 073 495 603)

28 River Street

Silverwater NSW 2128

NOTIFICATION CATEGORY

Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, Other Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, Import Volume

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Boiling point

Density

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

No

NOTIFICATION IN OTHER COUNTRIES

USA (1993)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in ZINPOL 146

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >10000

REACTIVE FUNCTIONAL GROUPS

Not applicable

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	N/A
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	The water dispersion of the polymer that will be imported in Australia is a hazy transparent liquid. The polymer is never isolated from solution.
Boiling Point	100°C - Information from MSDS for the water dispersion of the polymer.
Density	1000 kg/m ³ - Information from MSDS for the water dispersion of the polymer.
Water Solubility	Not determined. The notified polymer is manufactured and supplied as an aqueous dispersion. The notified polymer contains anionic groups which could be expected to give it some water solubility, but the notifier claims it is not soluble and their presence simply aids dispersion.
Dissociation Constant	Not determined. The notified polymer contains partially neutralised anionic groups and it is likely to exhibit typical acidity.
Reactivity	Stable under normal environmental conditions. There is some hydrolysable functionality, but hydrolysis is unlikely to occur within the typical environmental pH range under ambient abiotic conditions (pH 4-9).
Degradation Products	None under normal conditions of use.

5. INTRODUCTION AND USE INFORMATION

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

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	10-30	10-30	10-30	10-30	10-30

USE AND MODE OF INTRODUCTION AND DISPOSAL

Mode of Introduction

Polymer in Zinpol 146 will not be manufactured in Australia. It will be imported by ship through ports in Sydney and Melbourne and possibly by air. The imported product will arrive in Australia in sealed 205L drums or totes, containing 35% of the notified polymer, which will be transported to the customers by road.

Reformulation/manufacture processes

Once at the customer site the notified polymer will be blended into finished products such as inks containing <35% of the notified polymer. The blended products containing the notified polymer will be packed into 4L plastic or metal (lined) containers or 200L drums and delivered to end user site by track.

At the end user sites the formulated products paints containing <35% of the notified polymer will be applied to the surfaces by using highly automated process (flexography) that involves roller application in a printing press. The product will only be used in a professional industrial setting.

Use

The notified polymer will be used as a component of metallic inks in commercial printing applications.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

OCCUPATIONAL EXPOSURE

Dermal and ocular exposure to up to 35% of the notified polymer may potentially occur during reformulation and repackaging processes. However, exposure to significant amounts of the notified polymer is limited because of the semi-automated processes, the engineering controls in place, and personal protective equipment worn by workers.

Dermal and accidental ocular exposure to < 35% of the notified polymer may also occur during loading of the printing ink into the printing system. However, exposure would be limited by the use of personal protective equipment including protective gloves, long sleeve shirts and safety glasses.

PUBLIC EXPOSURE

The notified polymer is intended only for use in industry and as such public exposure to the notified chemical is not expected.

The public will only come into contact with products (paper and corrugated boxes) printed with ink containing the notified polymer, which is dried, cured, and bond to the substrate. Thus the exposure to the public to the notified chemical is considered negligible.

6.2. Toxicological Hazard Characterisation

No toxicological data were submitted. The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

The notified polymer is, however, a high molecular weight (10000 Daltons), insoluble polymer and the inhalation of respirable particles of this class of polymer (although determined for polymers with Mw >70000) has been linked with irreversible lung damage (US EPA, 2006). This lung damage has been attributed to 'lung overloading' and impaired clearance of the lungs. However the notified polymer will be introduced in a product dispersed in water and hence lung overloading is not likely.

6.3. Human Health Risk Assessment

OCCUPATIONAL HEALTH AND SAFETY

Dermal and ocular exposure to maximum of 35% of the notified polymer is possible during the transfer of the dispersion containing the notified polymer into the blending tank. However such exposure is unlikely as the process involves pumping of the dispersion directly from the drums in which it is imported into the blending tank. Inhalation exposure is possible if aerosols are formed, however this is not likely if the transfer is done by direct pumping.

The end users of the printing ink may be exposed to a maximum of 32% of the notified polymer in the printing inks, however such exposure is expected to be limited or unlikely as the printing process will be highly automated and done by professionals that are expected to apply standard engineering controls (such as local exhaust ventilation) and PPE (such as gloves, safety glasses and respirators where ventilation is not sufficient).

No special controls are required during use of the notified polymer as it has Mw >1000 and fulfils the PLC criteria to be considered of low hazard. However, use of PPE for work with other materials that are part of the imported mixture containing the notified polymer and that will be subsequently mixed with the notified polymer should be used as appropriate.

All workers are expected to be trained in appropriate chemical handling and have access to the Material Safety Data Sheet.

PUBLIC HEALTH

The public is not expected to be exposed to the notified polymer, as it will only be used for automated

printing in a professional setting.

Due to the low hazard of the notified chemical and the unlikely exposure of the general public, health risk for the public from the use of the products containing the notified polymer is considered low.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

The notified polymer will be imported into Australia as a 35% aqueous dispersion. In the event of spills, the Material Safety Data Sheet (MSDS) for the notified polymer recommends that entry into sewers and waterways be prevented and the free liquid be picked up for recycling, or for disposal after adsorption to inert material.

Residual amounts of the notified polymer may remain in the drum after transfer to the blending tank. Residual amounts in drums are estimated to be <1% by volume of the polymer dispersion, ie <0.35% of the polymer (<105 kg notified polymer/year). The drums would likely be rinsed with water, the water and any residual amounts of polymer collected and disposed of according to local regulations. Waste water would be treated at waste water treatment facilities on site, or collected and transported to a treatment facility off site. The notified polymer is likely to partition mainly to sludge during waste water treatment as it has high molecular weight and is claimed to have low water solubility. Any residual amounts not rinsed from drums are expected to dry out and become a hard inert substance. Drums would be sent to a reconditioning facility.

No releases are anticipated during reformulation or blending activities as these procedures are expected to be automated or semi-automated, with no waste streams generated. Any minor spills during transfer are expected to be collected in drip pans or overflow basins. Any residual amounts of the notified polymer left in the blend tank will be collected via washing with water and the washings collected and disposed of as described above.

Finished products such as inks containing <35% of the notified polymer will be applied to surfaces using a highly automated process (flexography) that involves roller application in a printing press. Thus the product will only be used in a professional industrial setting in a highly efficient process with limited releases. The notifier comments that the inks are water based and there is expected to be much less than 1% residue remaining in containers, hence <0.35% or <105 kg/annum of the notified polymer. The containers may be rinsed out with water and the waste collected and disposed of along with the empty containers according to local regulations. Empty containers would be either sent to a reconditioning facility (drums) or disposed of to landfill. Dried ink remaining inside containers would be expected to become hard and generally inert.

The ink containing the notified polymer will be applied to paper or corrugated cardboard boxes and once applied to the substrate goes through a drying or curing process. Once dried, the notifier states that the likelihood of the ink washing off is minimal.

ENVIRONMENTAL FATE

Any dried residues in containers will contain the notified polymer in an immobilised form, as part of a hard, inert material. The notified polymer will similarly be immobilised in a hard, inert material on coated articles. It is unlikely that the notified polymer would leach from the cured coating after disposal to landfill of empty containers or coated articles, given its high molecular weight and claimed low water solubility. The notified polymer is expected to degrade slowly in landfill, and if incinerated, to degrade to simple oxides of carbon and nitrogen, and to water.

7.2. Environmental Hazard Characterisation

No ecotoxicological data were submitted. Anionic polymers 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. This is unlikely to apply to the notified polymer. However, the toxicity to algae is likely to be further reduced due to the presence of calcium ions, which will bind to the functional groups.

7.3. Environmental Risk Assessment

The notified polymer is a component of a coating applied to paper or corrugated cardboard boxes. Significant release to the aquatic environment is not expected at any point in formulation, use or ultimate disposal. Small amounts of the notified polymer in its original dispersion formulation or in manufactured inks may enter specialist wastewater treatment facilities, where they would be expected to mainly partition to sludge. Therefore, the risk to the environment under the proposed use pattern is expected to be low.

8. CONCLUSIONS**8.1. Level of Concern for Occupational Health and Safety**

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

8.2. Level of Concern for Public Health

There is Negligible Concern to public health when used in the proposed manner.

8.3. Level of Concern for the Environment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

9. MATERIAL SAFETY DATA SHEET**9.1. 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.

10. RECOMMENDATIONS**CONTROL MEASURES****Occupational Health and Safety**

- If aerosols are formed during the use of the notified polymer, engineering and PPE controls should be used to prevent inhalation exposure.
- Other engineering controls, work practices or personal protective equipment may be required and should be selected on the basis of all ingredients in the formulation containing the notified polymer.

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 *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)], workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

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

10.1. 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.