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

FULL PUBLIC REPORT

Polymer in Rucostar

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**Director
Chemicals Notification and Assessment**

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

APPLICANT(S)

Robert A Piesse
4 Seafarer Court
PATTERSON LAKES VIC 3197

NOTIFICATION CATEGORY

Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

- Chemical identity
- Means of identification
- Molecular weight data

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

OTHER NAME(S)

- Polymer in Rucostar
- Polymer in Rucodry
- Polymer in Product ZP9237

MARKETING NAME(S)

Polymer in Rucostar

MOLECULAR WEIGHT

Number Average Molecular Weight (NAMW) > 1000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

| Functional Group | Category | Equivalent Weight (FGEW) |
|-----------------------------|----------|--------------------------|
| Carboxylate | Low | N/a |
| Isocyanate, alcohol blocked | Low | N/a |

| <i>Criterion</i> | <i>Criterion met (yes/no/not applicable)</i> |
|--|--|
| Molecular Weight Requirements | Yes |
| 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 Hazard 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

| <i>Year</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
|---------------|----------|----------|----------|----------|----------|
| <i>Tonnes</i> | 3.0 | 5.0 | 20.0 | 30.0 | 50.0 |

USE

The notified polymer will be applied to textiles such as outdoor wear and sportswear, to produce water-repelling properties.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer is imported as emulsions at a concentration of approximately 12-15% in 120 L polyethylene drums or in 600 L or 1000 L polyethylene IBCs. The notified polymer will be distributed to commercial textile facilities where it is applied to the textiles via padding, dipping, and exhaustion processes.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

The notified polymer will not be manufactured in Australia and the notified polymer will not be available for use by the public.

Environmental exposure to the products containing the notified polymer during importation, transport and storage is not expected except in the event of an accident where the packaging may be breached.

Emptied containers containing the notified polymer emulsion are likely to be disposed of to recycling facilities for cleaning and reuse or sent to landfill for disposal. Container cleaning wastewaters are expected to be sent to sewer for treatment and disposal.

During application to textiles using solutions containing 80-150 g/L of formulated product, wet pick up on textile materials is approximately 60-80%. Details on wastewater management at commercial textile application facilities were not made available. Furthermore, no information was provided on leachability of the notified polymer or expected environmental release of the notified polymer from treated textile items during washing operations (eg. domestic washing machines washing clothing) apart from the claim that 'durability should be better than 10 washes'. Once dried, the notified polymer becomes semi-permanently cross linked within the fibres of the textiles and therefore not readily bioavailable while in this textile matrix.

Due to its expected very low water solubility, the notified polymer is unlikely to be mobile in soils and landfill since the majority will be bound to textiles in an inert matrix. If the polymer does enter the leachate it will be present at very low concentrations and unlikely to be mobile. The notified polymer will eventually degrade through abiotic and biotic processes.

Incineration of treated textiles and waste product will destroy the notified polymer.

The notified polymer is not expected to bioaccumulate due to its high molecular weight.

6.2. Summary of Occupational Exposure

Exposure to the emulsion containing the notified polymer may occur at the facility where the application of the polymer to the textiles takes place. The highest risk of exposure exists during the dosing of the liquor with the polymer emulsion. At some facilities, dosing is an automated process, however, at those facilities where dosing is done manually with beakers, workers may be exposed by skin contact. Exposure may also occur to a lesser extent during the cleaning of machinery and the use of hoses and pumps in the transfer of liquids to and from the application machinery. The use of similar products is common in the industry and the employment of personal protective equipment such as gloves, safety goggles, and protective clothing during the handling of textile auxiliaries is well established.

Once dried, the polymer becomes semi-permanently cross linked within the fibres of the textiles and is therefore not readily bioavailable.

6.3. Summary of Public Exposure

The notified polymer will not be available to the public. Members of the public may come into contact with garments containing the small amounts of the notified polymer bound within the fibres, however, the notified polymer is not expected to be released from the garment during wear.

7. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| Appearance at 20°C and 101.3 kPa | The emulsion containing the notified polymer is a white opaque liquid. |
| Glass Transition Temp | ≥ 60°C |
| Density | 1080 kg/m ³ at 20°C (polymer emulsion) |
| Water Solubility | Not determined. Stated by the notifier to be a waxy solid that is insoluble in water. This is supported by its non-polar, hydrophobic constituents. |
| Dissociation Constant | Not determined. There are no dissociable groups. |
| Particle Size | Not applicable as polymer exists only in emulsion. |
| Reactivity | None expected. |
| Degradation Products | None expected. |

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data was submitted:

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

The following ecotoxicological studies were submitted:

| <i>Endpoint</i> | <i>Result and Conclusion</i> |
|------------------------|------------------------------|
| Ready Biodegradability | Not readily biodegradable |
| Fish Toxicity | LC50 = 98 mg/L |

9.1.1. Discussion of Observed Effects

Ready Biodegradability Product ZP 9237 containing the notified polymer was not readily biodegradable (ie. 38% degradation in 28 days) when incorporated into activated sewage sludge and CO₂ monitored. The test was performed by LAUS GmbH (2004a), Germany following OECD TG 301 B (CO₂ Evolution Test) at 20 mg C/L. Test temperature: 21±1°C. Abiotic degradation reached 36% after the 28 d test period, indicating most of the biodegradation was attributed to abiotic processes. Degradation reached 67% in a toxic control (test material plus reference substance – chemical not described); however, insufficient details were reported to determine the validity of the study.

Fish toxicity An acute fish toxicity test was performed with zebra fish (*Danio rerio*) exposed to product ZP 9237 containing the notified polymer. The test was performed by LAUS GmbH (2004b), Germany using OECD TG 203 (static). Analytical monitoring included: Temp: 23±1°C. pH 8.2 (180 mg/L). Seven fish were placed in each of seven 1 L test vessels (chlorine-free tap water) and monitored for mortality over a 96 h period. Test concentrations (nominal) included 0, 32, 56, 100 and 180 mg/L. Preparation of stock and test solutions was not described. The 96 h LC50 was 98 mg/L, the NOEC was 56 mg/L and the LC100 180 mg/L. The data were analysed using sigmoidal fit, and consequently no confidence limits can be determined. There was only one test concentration used between 0% and 100% mortality and a more accurate approach could not be used.

9.2. Environmental Hazard Assessment

The notified polymer is considered harmful to fish and potentially harmful to other aquatic organisms based on a fish aquatic toxicity test.

10. RISK ASSESSMENT

10.1. Environment

The use pattern indicates that environmental release to the aquatic compartment may occur through the sewage treatment route.

As a worst case scenario, if it is assumed that all of the maximum import volume of the notified polymer is used and discharged to sewer, a maximum sewer effluent discharge concentration of 0.035 mg/L is estimated. The model assumes widespread use pattern, and a total wastewater volume in Australia of 4 GL/d, based on a consumption rate of 200 L/p/d and 20 million people. Adsorption to textile items (estimated at 60-80% uptake and with textiles mostly disposed of to landfill) and sewerage treatment plant attenuation processes (eg. biodegradation, abiotic degradation, sedimentation as sludge) are likely to reduce the exposure concentration in the aquatic environment receiving treated effluent.

Based on ecotoxicity data from a fish acute toxicity test in which a 96 h LC50 value of 98 mg/L was obtained, a predicted no effect concentration (PNEC) for the notified polymer of 0.1 mg/L has been derived by dividing the lowest available LC50 value by a safety factor of 1000. A value of 1000 is used due to the limited aquatic toxicity data available. Using the above estimates, a PEC/PNEC ratio of ~0.4 is obtained for the notified polymer in the aquatic compartment. However, losses due to use and treatment processes are likely to reduce this risk quotient value and consequently risks to the environment are considered low. For example, if it is assumed that 60% adheres to textiles, the PEC/PNEC ratio is 0.16.

10.2. Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low during dosing and application of the emulsion containing the notified polymer due to the low hazard of the polymer and the small quantities used. Additionally, workers employ the use of personal protective equipment to minimise exposure.

10.3. Public health

Members of the public will only come into contact with the notified polymer through the handling and wearing of garments which have been treated with the notified chemical. In this form the polymer is bound within the fibres of the textile and is not bioavailable. The risk to public health associated with the notified polymer is therefore assessed as low.

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

11.1. Environmental risk assessment

The polymer is not considered to pose a risk to the environment based on its reported use pattern and acceptable PEC/PNEC ratio.

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 negligible concern to public health when used in the proposed manner.

12. MATERIAL SAFETY DATA SHEET

12.1. 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.

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 polymer should be disposed of by incineration in accordance with State/Territory waste management regulations. Textile products containing low quantities of the notified polymer may be sent to landfill for disposal in accordance with State/Territory waste management regulations.

Emergency procedures

- Spills/release of the notified polymer should be handled by absorbing with liquid-binding material (eg. sand, diatomite, acid binders, universal binders, sawdust). Collect spilled material and containerise for appropriate disposal. Do not allow to enter sewers, waterways or groundwater.

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. BIBLIOGRAPHY

LAUS GmbH. (2004a). Study Report following OECD 301B: Biodegradability of ZP 9237 (33472). Jan. 22 2004. LAUS GmbH, Mandelring 47, D-67433 Neustadt/W., Germany. 5 pp.

LAUS GmbH. (2004b). Study Report following OECD 203/DIN38412 L15 96-hr Toxicity of ZP 9237 (33472) against *Danio rerio* Hamilton Buchanan. Jan. 22 2004. LAUS GmbH, Mandelring 47, D-67433 Neustadt/W., Germany. 3 pp.