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May 2008

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

**FULL PUBLIC REPORT**

**Polymer in Solsperse 46000**

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, Water, Heritage and the Arts.

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 Solsperse 46000****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT(S)

Orica Australia Pty Ltd (ABN 99 004 117 828)  
1 Nicholson Street  
Melbourne VIC 3000

## 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, Use Details and Import Volume.

## 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

USA

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME(S)

Solsperse 46000 (50% notified polymer in aqueous solution)

## MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) > 10000 Da

## REACTIVE FUNCTIONAL GROUPS

The notified polymer contains only low concern functional groups.

**3. PLC CRITERIA JUSTIFICATION***Criterion*

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

*Criterion met*

Yes  
Yes  
Yes  
Yes  
Yes  
Yes  
Yes

The notified polymer meets the PLC criteria.

#### 4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	Clear brown-yellow sticky solid
Boiling Point	110°C (value for a 50% aqueous solution form technical data sheet)
Density	1010 kg/m <sup>3</sup> (value for a 50% aqueous solution form technical data sheet)
Water Solubility (based on the analogue polymer)	At pH 1: Miscible in all proportion At pH 7: Miscible in all proportion At pH 10: Miscible in all proportion Based on visual inspection after mixing thoroughly and vigorously shaking. A log P of 0.15 was also estimated based on an n-octanol solubility of 13.2% w/w.
Dissociation Constant	Contains potentially anionic group expected to have pKa ~ 4 and will be ionised throughout the environmental pH of 4-9.
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

The notified polymer contains groups that might hydrolyse under severe conditions, but is expected to be stable under normal environmental conditions (pH 4-9).

#### 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>
Tonnes	10-30	10-30	10-30	10-30	10-30

##### Use and Operation description

The notified polymer will be used as a component of UV curable ink.

The notified polymer will be used in highly pigmented resin-free dispersions and has applications in water based paints (automotive and industrial) and water based inks. The typical dosage levels will typically be 2.5 mg of the notified polymer per square metre of pigment surface area. Paints containing the notified polymer will be applied by brush, roller and spray painting methods. Spray painting will be conducted at industrial sites where spray booths are expected to be used. Application of inks containing the notified polymer will be a largely automated process using the flexographic method. However, manual processes such as connection/disconnection of hoses for transferring ink, occasional measuring of ink by hand and daily washing of the equipment using recycled solvent will occur.

The drums containing the notified polymer will be transported to the notifiers warehouse prior to being transported to paint and ink reformulation sites throughout Australia.

At the reformulation site the drums containing the notified polymer in a 50% aqueous solution will be attached to vacuum hose lines and the contents pumped into a blender under exhaust ventilation. Most reformulation will be carried out in a closed system, however, occasionally batch mixers may occur where the addition of the solution containing the notified polymer will be semi-automated. The reformulated paint or ink product will be sampled for quality control purposes and then filtered and packaged. Filtration, drum and pail filling will be automated and will not require worker intervention unless the filling line requires adjustment.

##### Mode of Introduction and Disposal

Solsperse 46000 containing the notified polymer at a 50% concentration in an aqueous solution will be imported through the port of Melbourne in 25 or 200 kg plastic drums.

#### 6. HUMAN HEALTH IMPLICATIONS

##### Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. This is supported by toxicological endpoints observed in testing conducted on an analogous polymer.

<i>Endpoint</i>	<i>Result</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
1. Rat, acute oral	LD50 > 2500 mg/kg bw	no	OECD TG 401 OECD TG 423
2. Rabbit, skin irritation	non-irritating	no	OECD TG 404
3. Rabbit, eye irritation	slightly-irritating	yes	OECD TG 405
6. Skin sensitisation – LLNA.	no evidence of sensitisation.	no	SPL Standard Test Method 595.10
8. Genotoxicity – bacterial reverse mutation	non mutagenic	no	OECD TG 471

All results were indicative of low hazard.

In the acute eye irritation test in the rabbit all three of the test subjects showed moderate conjunctival irritation one hour after treatment. One test subject showed minimal conjunctival irritation 24 hours after treatment with the other two test subjects showing no signs of irritation. At 48 hours after treatment no signs of eye irritation were seen in any of the test subjects.

### **Occupational Health and Safety Risk Assessment**

Although exposure to the notified polymer could occur during reformulation, as well as application of paints and inks, the risk to workers is considered to be low due to the assumed low hazard of the notified polymer and engineering controls employed.

### **Public Health Risk Assessment**

The notified polymer will not be available to the public. Members of the public may make dermal contact with paints and inks containing the notified polymer. However, the risk to public health will be minimal because the notified polymer is assumed to be of low hazard, and is present at low concentrations.

## **7. ENVIRONMENTAL IMPLICATIONS**

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. This is supported by environmental endpoints observed in testing conducted on the notified polymer.

<i>Endpoint</i>	<i>Result</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
Daphnia Toxicity	EC50 > 100 mg/L	no	SOP, Brixham Environmental Laboratory

The 48 hour EC50 based on nominal concentration of the notified polymer was > 100 mg/L.

The results indicate that the notified polymer is not harmful to *Daphnia magna*.

The notified polymer is water soluble, expected to be hydrolytically stable and not expected to be readily biodegradable. On the basis of water solubility, the notified polymer is likely to be mobile in soils, and may work its way into the grass root zone and below. The notified polymer is expected to slowly degrade into oxides of carbon, nitrogen and water. The notified polymer's high molecular weight will preclude absorption across biological membranes and thus it is unlikely to bioaccumulate.

The notified polymer will be used as a component of UV curable inks. Once these inks have been cured the notified polymer is expected to remain within the product matrices. Hence, the majority of the notified polymer will share the fate of the articles into which it is incorporated. It is anticipated that these will be disposed of to landfill or incinerated at the end of their useful lifetime. In landfill it is expected that the notified polymer will remain immobile within the soil. Incineration of the notified polymer will result in the formation of water vapour and oxides of carbon and nitrogen.

A worst case PECs from equipment washing and recycling of paper are 0.19 and 0.97 µg/L, respectively, well below toxic levels.

Based on the proposed use and available data the risk to the environment is considered low.

## 8. CONCLUSIONS AND RECOMMENDATIONS

### Human health risk assessment

Under the conditions of the occupational settings described and when used in the proposed manner, the notified polymer is not expected to pose an unreasonable risk to workers and the public.

### Environmental risk assessment

Based on the reported use pattern, the notified polymer is not considered to pose a risk to the environment.

### Recommendations

#### CONTROL MEASURES

##### Occupational Health and Safety

- Specific engineering controls, work practices or personal protective equipment 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 *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.

##### Disposal

- The notified polymer should be disposed of to landfill.

##### Storage

- Store in a cool, dry well ventilated area.

### Regulatory Obligations

#### *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 UV curable ink, or is likely to change significantly;
  - the amount of notified polymer being introduced has increased from 30 tonnes per annum, or is likely to increase, significantly;
  - if 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 chemical 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.

No additional secondary notification conditions are stipulated.

#### *Material Safety Data Sheet*

The MSDS of product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.