File No: LTD/1391

July 2009

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Solsperse 65000

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:

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
NICNAS

TABLE OF CONTENTS

FULL PUBLIC REPORT

Polymer in Solsperse 65000

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Orica Australia Pty Ltd (ABN: 99 004 117 828)
1 Nicholson Street
MELBOURNE VIC 3000

NOTIFICATION CATEGORY
Limited: Synthetic polymer with Mn ≥ 1000 Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical name, Molecular Formula, Structural Formula, Spectral Data, Import Volume, Method of Determination and Detection, Molecular Weight, and Use Details

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows:
Vapour pressure; Partition coefficient; Adsorption/Desorption; Dissociation Constant; Flammability

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
USA

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Solsperse 65000 (containing 75-85% notified polymer)

MOLECULAR WEIGHT
>1000 Da

ANALYTICAL DATA
Reference NMR, IR, ESI-MS, MALDI-MS, GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY >85%

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
Stable under normal conditions of use and thus the loss of any monomers, other reactants, additives and impurities is not expected.

DEGRADATION PRODUCTS
None under normal conditions of use. Under extreme heat conditions eg. fire, the coatings and ink containing the notified polymer will burn emitting noxious fumes including oxides of carbon and aldehydes.

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: Dark orange viscous liquid

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Liquid at room temperature
Boiling Point	143°C at 101.3 kPa	Measured (test report not available)
Density	900 kg/m^3 at 15.6°C (for Solsperse 65000).	MSDS. Expected to be similar for notified polymer.
Vapour Pressure	< 1.3x10^{-9} kPa	Estimated based on high molecular weight (> 1000 Da) (USEPA, 2007).
Water Solubility	>10 g/L at 40°C (pH 7)	Measured using the flask method.
Hydrolysis as a Function of pH	Not determined	A pH stability test over 2 weeks indicated slight changes in the number-average molecular weight and the infrared spectra of the notified polymer. The results were measured by GPC and FT-IR.
Partition Coefficient (n-octanol/water)	Not determined	Expected to partition to the aqueous phase since it is readily soluble in water and has potentially ionisable terminal groups.
Adsorption/Desorption	Not determined	Not expected to partition to soil or sewage sludge based on presence of potentially ionisable terminal groups in the environmental pH range and high water solubility.
Dissociation Constant	Not determined	Contains terminal groups that are expected to dissociate in the environmental pH range (4 - 9). Expected to be anionic in this range.
Particle Size	Not determined	Liquid at room temperature
Flash Point	>101 °C (for Solsperse 65000)	From MSDS. MSDS indicates that Solsperse 65000 is a C1 combustible liquid, suggestive of a flash point <150 °C. Expected to be similar for notified polymer.
Flammability	Not determined	Not expected to be flammable
Autoignition Temperature	Not determined. Expected to be >101 °C (for Solsperse 65000).	Estimated based on flash point of Solsperse 65000
Explosive Properties	Not expected to be explosive	Contains no groups with known explosive properties.

DISCUSSION OF PROPERTIES
For full details of tests on physical and chemical properties, please refer to Appendix A.

Reactivity
Contact with reactive chemicals should be avoided. The hydrolysis test on the notified polymer indicated that some chemical transformation occurred, though any break down products were not identified.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be introduced at concentrations of 75-85%.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	10-30	10-30	10-30	10-30	10-30

PORT OF ENTRY
Melbourne

IDENTITY OF MANUFACTURER/RECIPIENTS
Orica Australia Pty Ltd

TRANSPORTATION AND PACKAGING
The notified polymer will be imported in 20 and 180kg steel drums and stored at the notifier's warehouse in Laverton Victoria for distribution to customers. The products containing the notified polymer will be formulated by various companies at a number of sites located throughout Australia and packaged into 1 L, 4L, 10L and 20L steel cans or pails.

USE
The notified polymer will be used as a dispersant in universal tinters for paints.

The notified polymer will be imported at concentrations of 75-85% and formulated into tinters (less than 10% notified polymer) which will be incorporated in paints at levels of notified polymer of less than 2%. It is estimated that 50% of the paints will be used in domestic settings by do-it-yourself (DIY) enthusiasts and professionals, and 50% will be used in industrial settings.

OPERATION DESCRIPTION
Tinter formulation
Solsperse 65000 containing 75-85% of the notified polymer will be weighed with other components and added directly into a mixing pot. This may be performed using a pump. The mixing pot will be transferred to a mixing station where it will be mixed with pigments in an enclosed system. The pigment dispersion (ie. tinter, containing < 10% notified polymer) will then be passed through a bead mill where it will be finely ground then deaerated to remove entrapped air before being packaged into 1 L, 4L, 10L and 20L steel cans or pails via automated filling lines. Laboratory staff for quality control testing will take samples of the dispersion. Maintenance and cleaning of equipment will occur on a regular basis.

Paint formulation from tinters
At paint formulation plants, the tinters (<10% notified polymer) will be weighed and mixed with other components in large mixing vessels to give the finished paints (<2% notified polymer).

Alternatively, at retail trade depots, shop assistants will fill canisters on dispensing machines that release required amounts of the tinter into the paint base. The resultant paint will then be mixed by shaking. The finished paints will contain <2% of the notified polymer.

End use
In industrial settings, paints containing the notified polymer (at < 2%) will be applied to various substrates (including wood, plaster, metal articles such as handrails, skirting boards, interior walls, etc) by spray (~75%), roller (~15%) or brush (~10%). Some spray painting is expected to be conducted using spray booths. When applied outside of spray booths, spray painting will be performed in areas of commercial buildings where local exhaust ventilation will be used.

In domestic settings, professional painters and DIY enthusiasts will apply the paints containing the notified polymer to a variety of surfaces such as internal walls. This will involve opening of containers, stirring the paint, and applying the paint using rollers or brush.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

Category of Worker	*Number*	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport workers	5	2	6
Warehouse	>6	4	40

Process Workers – Tinter formulation	3-4	15-20 minutes/day	55
Quality Control – Tinter formulation	2	30	55
Maintenance and cleaning – Tinter	2-3	3-4	55
R&D chemists	3-4	6	12
Paint formulation using tinter	30-40	Not known	Not known
Retail Workers	100-200	30-60 minutes/day	260
Professional Painters	>1000	4	260

EXPOSURE DETAILS

Transport and storage

Exposure of worker to the notified polymer during transport and storage is not expected except in the event of spillages or accidental discharge.

Tinter formulation

Dermal and ocular exposure to the notified polymer (at 75-85%) may occur during weighing and charging of the mixing tanks, obtaining and testing quality control samples, connecting filling lines and maintenance and cleaning of equipment. The enclosed nature of many of these processes should help to minimise exposure, together with the use of appropriate personal protective equipment (PPE).

Paint formulation from tinters

Dermal and ocular exposure to the notified polymer (at up to 10%) may occur during weighing and charging of the tinters to the mixing vessels, and connecting filling lines at paint formulation plants. Exposure to the notified polymer should be lowered by the use of PPE.

Dermal and ocular exposure to the notified polymer (at up to 10%) may also occur at retail trade depots during charging of dispensing machines, and formulation of custom shades of paints. Exposure to the notified polymer should be reduced by the use of PPE that will typically include gloves and safety glasses.

End use

Professional painters working in industrial settings may come into contact with the notified polymer (at up to 2%) through dermal, inhalation (during spray application) and ocular routes. The risk of inhalation exposure will be lowered where spray painting is conducted within a ventilated spray booth. At other times (spray application outside booths and brush or roller application), exposure will be lowered through the use of local exhaust ventilation and the use of PPE such as gloves, coveralls, safety glasses.

When used in domestic settings by professional painters, dermal and ocular exposure to the notified polymer (up to 2%) may occur and workers are expected to use little or no personal protective equipment to minimise such exposure.

After application and once dried, the paint containing the notified polymer will be cured into an inert matrix and hence will be unavailable for exposure.

6.1.2. Public exposure

Paints containing the notified polymer will be available for the public to purchase for DIY applications (estimated to be >1000 people who use these products for approximately 4 hr/day and 50 days/year). DIY users will be exposed to the notified polymer at concentrations <2% in such paints, mainly via dermal and ocular routes. Such users are expected to use little or no personal protective equipment in order to minimise such exposure.

Members of the public may come into contact with articles that have been coated with the paints. However, exposure will be negligible because the notified polymer will be bound within an inert paint matrix.

6.2. Human health effects assessment

The results from toxicological investigations conducted on the notified polymer are summarised in the table below. Details of these studies can be found in Appendix B.

Endpoint	*Result and Assessment Conclusion*
Rabbit, skin irritation	Slightly irritating

Rabbit, eye irritation	Causes serious eye damage

Limited data are available on the toxicological properties of the notified polymer.

No information was available on the toxicokinetics of the notified polymer. A small portion of the notified polymer may be absorbed dermally following skin contact, particularly some of the low molecular weight species (due to the high water solubility).

Generally, systemic toxicity resulting from the notified polymer is not expected, given that only a small portion is likely to be absorbed across biological membranes.

Insufficient information is available to ascertain the likely absorption and behaviour of the notified polymer following inhalation.

The notified polymer showed some minor irritancy effects when tested on the skin of rabbits that was not sufficient to require classification. When tested on rabbit eyes, the notified polymer resulted in irreversible damage to the eyes, with corneal opacity remaining at the completion of the observation period. Irritancy effects are expected to be reduced upon exposure to lower concentrations of the notified polymer.

Health hazard classification
Based on the available data the notified polymer is classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004). The following risk phrase applies to the notified polymer:

Xi; R41 – Risk of serious damage to eyes

6.3. Human health risk characterisation

6.3.1. Occupational health and safety
The toxicological properties of the notified polymer have not been fully investigated. However, it has been shown to cause serious eye damage in animal studies. It is noted that irritancy effects are likely to be reduced at lower concentrations and classification for such effects is not necessary at concentrations <5%. However, some eye irritancy may occur at levels below this concentration.

Dermal and ocular exposure to the highest concentration of the notified polymer (85%) may occur during the formulation of tinters and associated quality control processes. At such concentrations, the risk of serious eye damage exists. However, exposure during these procedures is expected to be reduced by the control measures in place such as the enclosed nature of the processes and the use of PPE. Exposure to these concentrations could also occur if spillages or accidental discharge occurred during transport or storage. The risk of adverse effects on workers would be reduced by following appropriate first aid and clean up protocols.

Dermal and ocular exposure to the notified polymer at concentrations < 10% may occur during the formulation of paints and dispensing of tinters at retail outlets. The risk of eye irritation exists at these concentrations. Exposure during these procedures is expected to be lowered by the use of PPE.

Dermal and ocular exposure to the notified polymer at concentrations < 2% may occur during end use of the paints in industrial (spray, brush or roller) and domestic settings (brush or roller). At such concentrations, the potential for eye irritation may exist but is expected to be reduced by the low concentration of the notified polymer in paints. Exposure is expected to be reduced by the use of ventilation systems, as well as PPE. However, workers who apply the paints by brush or roller in domestic settings are not expected to wear eye protection.

Inhalation exposure to the notified polymer may occur during end use spray operations (at concentrations less than 2%), particularly when conducted outside of a spray booth. Exposure during such operations is expected to be reduced by compliance with the National Guidance Material for Spray Painting (NOHSC, 1999), including the use of local exhaust ventilation and PPE.

In conclusion, the occupational health and safety risk associated with the notified polymer is not considered to be unacceptable under the conditions described.

6.3.2. Public health

Dermal and ocular exposure of members of the public to the notified polymer (<2% concentration) may occur during DIY applications when applying paints using brush or roller. At such concentrations, there is a low potential for eye irritation. DIY users are not expected to wear PPE to minimise their potential for such exposure to occur, however, the risk of eye irritation is low.

Following application, the notified polymer will become trapped within a film and will not be bioavailable. Other members of the public may come into contact with such articles, however, the risk from such exposure is considered to be low.

In conclusion, the risk to the public from exposure to the notified polymer is not considered to be unacceptable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer will not be manufactured in Australia so there will be no release of the notified polymer due to this process. It will be reformulated into universal tinters at several sites around Australia. The tinter is then incorporated into the water and solvent based paints at the paint manufacture sites or in retail outlets.

At the tinter formulator's site, release to the environment may occur in the unlikely event of an accident during transport or an accidental leak. It is estimated that a maximum of 1.5% of the notified polymer (~ 450 kg per year of notified polymer) would be lost due to spillage, including from the line-filling machine and at the weighing station. Spills are to be prevented from entering drains or watercourses and are to be contained and soaked up with inert absorbent material (e.g. sand or soil) and placed in a sealable, labelled container for disposal in accordance with local regulations. It is expected it will be disposed to landfill. A further 3% loss (900 kg per year) of notified polymer is expected from cleaning operations and is expected to be thermally decomposed.

For the tinters used by paint companies, accidental release could occur as a result of damage of the tinter containers during the unlikely event of an accident during transport or at the paint company site. The spills are to be contained, collected and disposed probably via thermal decomposition. It is estimated that 1.5% (450 kg per year of notified polymer) will remain as residue in the containers and be disposed to landfill and 2.5% (750 kg per year) will be lost from the cleaning of mixing vessels which will be thermally decomposed.

For the tinters used at retail outlets, accidental release could occur as a result of damage of the tinter containers during the unlikely event of an accident during transport or at the retail outlet. It is estimated that a total of 3% (900 kg per year) of the notified polymer will be disposed to landfill from the cleaning of canisters and will be thermally decomposed when the metal cans are recycled.

RELEASE OF CHEMICAL FROM USE

The notifier has indicated that the paints containing the notified polymer will be used for interior applications to plaster, wood and metal surfaces. The paints containing the notified chemical will be applied by spray, roller and brush. Residual paint containing the notified polymer may be released to the environment from disposal of excess paint or from cleaning of equipment. It is expected 50% of the paint will be for industrial use (solvent based paints) and the remainder for domestic by DIY or professional painters (water based paints).

Residue from professional spray painting applications results in losses of up to 30% overspray which is captured in filters and disposed to landfill. Professional painters are expected to brush out excess paint onto newspaper or rags etc before rinsing brushes and rollers and capturing the rinse in a container. The waste paint/adhesive in the container will be allowed to cure before disposal as solid waste (2%). The excess paint in containers is expected to be stored for later use or disposed of to authority landfill.

DIY painters may follow the same practice as professional painters with rollers and brushes, however, it has

been estimated that between 10 and 15% of paint remains unused by householders at the end of a job. Much of this may be used for subsequent jobs but it is estimated that residue in used paint cans will account for approximately 5% of the paint containing the notified polymer. Incorrectly disposed of paints (containing the notified polymer) from waste and washing of equipment may be released to sewer, drains or ground (1%).

The fate of the paint cured on the substrate will be shared with the fate of the coated article, which ultimately is expected to be the majority to landfill and the remainder will be thermally decomposed during metal reclamation.

RELEASE OF CHEMICAL FROM DISPOSAL
The majority of the waste generated during application, which is not reused, is expected to be disposed to landfill and a minor amount to the sewer. Container residues will be disposed to landfill.

7.1.2 Environmental fate

No environmental fate data were submitted.

A significant proportion of the notified polymer is expected to be immobilised within the cured coatings on architectural structures or in overspray filters. The ultimate fate of this portion of the notified polymer will be determined by the fate of building structures, domestic waste articles and the filters. In most cases this will involve disposal to landfill at the end of their useful lives. The notified polymer is expected to be degraded slowly in landfill by abiotic and biotic processes to oxides of carbon and water vapour.

A minor proportion of the notified polymer is expected to be released into the sewer through incorrect disposal of residual paints. The notified polymer is expected to initially remain in the aqueous phase due to its high solubility in water and its ionisable end groups. Chemical transformation of the notified polymer is expected to yield transformation products that do not possess the ionisable end groups and are more likely to partition to sewage sludge. It is expected the notified polymer and transformation products will slowly degrade by abiotic and biotic processes. Due to the high molecular weight of the notified polymer, it is expected bioaccumulation will not occur. Similarly, the transformation products also have high molecular weights and as such, bioaccumulation is not expected to occur.

A small proportion of the notified polymer is expected to be thermally decomposed to water vapour and oxides of carbon and nitrogen during metal reclamation of the painted metal substrates at the end of their useful lives as well as waste from the formulators' sites.

7.1.3 Predicted Environmental Concentration (PEC)

A small amount of paint containing the notified polymer may be released to sewer due to incorrect disposal of residual formulated product in cans or on rollers and brushes. As a worst case it is assumed that 6% of the formulated product containing the notified polymer may be released to the sewer nationwide per year with no degradation or removal in the STP. For this scenario the PEC may be calculated as follows:

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Total Annual Import/Manufactured Volume	30 000	kg/year
Proportion expected to be released to sewer	6%	
Annual quantity of chemical released to sewer	1800	kg/year
Days per year where release occurs	365	days/year
Daily chemical release:	4.93	kg/day
Water use	200.0	L/person/day
Population of Australia (Millions)	21.16	million
Removal within STP	0%	
Daily effluent production:	4 232	ML
Dilution Factor - River	1.0	
Dilution Factor - Ocean	10.0	
PEC - River:	1.17	µg/L
PEC - Ocean:	0.12	µg/L

STP effluent re-use for irrigation occurs throughout Australia. The agricultural irrigation application rate is assumed to be 1000 L/m^2/year (10 ML/ha/year). The notified chemical in this volume is assumed to infiltrate and accumulate in the top 10 cm of soil (density 1500 kg/m^3). Using these assumptions, irrigation with a hypothetical worst case concentration of 1.165 µg/L may potentially result in a soil concentration of approximately 7.77 x 10^{-3} mg/kg. Assuming accumulation of the notified chemical in soil for 5 and 10 years under repeated irrigation, the concentration of notified chemical in the applied soil in 5 and 10 years may be approximately 3.88 x 10^{-2} mg/kg and 7.77 x 10^{-2} mg/kg, respectively.

7.2. Environmental effects assessment

Anionic polymers are known to be moderately toxic to algae. The mode of toxic action is overchelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone (Nabholz *et al*. 1993). This is unlikely to apply to the notified polymer due to its chemical structure. An algal toxicity study report for the notified polymer was submitted by the notifier. The results are summarised in the table below. Details of this study can be found in Appendix C.

Endpoint	*Result*	*Assessment Conclusion*
Algal Toxicity	E_rC50 70 mg/L	Harmful

The results of the algal toxicity test indicated the notified polymer is harmful to algae.

7.2.1 Predicted No-Effect Concentration

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
E_rC50	70	mg/L
Assessment Factor	1000	
PNEC:	70	µg/L

7.3. Environmental risk assessment

Using the PEC and PNEC values calculated above, the risk quotient Q has been calculated as follows:

Risk Assessment	PEC µg/L	PNEC µg/L	Q
Q - River	1.17	70	**0.017**
Q - Ocean	0.12	70	**0.002**

The majority of the notified polymer is expected to remain cured with the paint in which it is incorporated. There will be limited release to the environment from the use of the notified polymer when used for its intended purpose. Incorrect disposal of paint products may lead to limited aquatic environmental exposure. However, on the basis of the Risk Quotient (Q = PEC/PNEC), the risk is acceptable.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the available data the notified polymer is classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)]. The following risk phrase applies to the notified polymer:

Xi; R41 Risk of serious damage to eyes

and

As a comparison only, the classification of the notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

	Hazard category	*Hazard statement*
Irreversible effects	1	Causes serious eye damage
Acute hazards to the aquatic environment	3	Harmful to aquatic life

Human health risk assessment
Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unacceptable risk to the health of workers.

When used in the proposed manner the notified polymer is not considered to pose an unacceptable risk to public health.

Environmental risk assessment
On the basis of the PEC/PNEC ratio and the reported use pattern, the notified polymer is not considered to pose a risk to the environment.

Recommendations

REGULATORY CONTROLS
Hazard Classification and Labelling

- Safe Work Australia should consider the following health hazard classification for the notified polymer:
  - Xi; R41 Risk of serious damage to eyes

- Use the following risk phrases for products/mixtures containing the notified polymer:
  - Conc ≥10%: R41
  - 5% ≤ conc < 10%: R36

CONTROL MEASURES
Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer as introduced:
  - Enclosed mixing vessels, where possible.

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer during spray application:
  - Use of spray paints containing the notified polymer should be in accordance with the National Guidance Material for Spray Painting (NOHSC, 1999).

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
  - Avoid contact with eyes.
  - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
  - Ready access to eye wash facilities.

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced, when formulating tinters and paints, or when dispensing tinters:
  - Wear eye/face protection

- Safety goggles
- Coveralls
- Gloves

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.

Public Health

- Suppliers of paints containing the notified polymer and available to the public should consider labelling such products with the following precautionary statements, or similar:
  - Avoid contact with eyes.
  - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Disposal

- The notified polymer should be disposed of to landfill.

Storage

- As the notified polymer is expected to be a C1 combustible liquid, it should be stored in accordance with the *National Standard for the Storage and Handling of Workplace Dangerous Goods* (NOHSC 2001).

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.
- Appropriate first aid procedures should be used if worker exposure occurs as a result of spillage.

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 chemical 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 chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical 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 concentration of the notified polymer in end use paint products exceeds 5%.

or

(2) Under Section 64(2) of the Act; if

- the function or use of the chemical has changed from a dispersant in universal tinters for paints, or is likely to change significantly;
- the amount of chemical being introduced has increased from 30 tonnes per annum, or is likely to increase, significantly;
- the chemical 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.

Material Safety Data Sheet
The MSDS of the 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.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Water Solubility >10 g/L at 40°C

Method	OECD TG 120 Solution/Extraction Behaviour of Polymers in Water.
Remarks	Flask Method. Two samples were tested at pH 2, 7 and 9. Analysis was by total organic carbon (TOC). The notified polymer is readily soluble in water.
Test Facility	Korea Polymer Testing & Research Institute Ltd (2008)

Hydrolysis as a Function of pH pH Stability Test results (over 2 weeks):
1a. Change in %Mw ranged 6.0 – 13.3% over environmental pH (4 – 9).
1b. Change in %Mn ranged 25.1 – 40.0% over environmental pH.

2a. Disappearance of strong carbonyl absorption band at 1688 cm^{-1} over environmental pH.
2b. Change in absorption pattern 1071 – 947 cm^{-1} over environmental pH.

Method A pH stability test was performed using the flask method with modifications, based on OECD TG 120
1. GPC measurements – OECD Guideline 118
2. FT-IR measurements.

pH	*Change in %Mw*	*Change in %Mn*	*Change in IR*
4	6.0	25.1	1. Appearance of bands at 1071, 1042, 971 & 947 cm^{-1} 2. Disappearance of bands at 1687, 1036, 986 & 951cm^{-1}
7	13.3	40.0	1. Appearance of bands at 1039 (or shift from 1036) & from 996 - 947 cm^{-1} 2. Disappearance of bands at 1687, 1036 (or shift to 1039), 986 & 951cm^{-1}
9	9.4	40.0	1. Appearance of bands at 1039 (or shift from 1036) & 947 cm^{-1} 2. Disappearance of bands at 1687, 1036 (or shift to 1039), 986 & 951cm^{-1}

Remarks	An increase in the change in the percentage of number-average molecular weight (Mw) combined with a slight overall increase in the change in the percentage of weight-average molecular weight (Mw) as well as changes in the IR spectrum (in particular the disappearance of a carbonyl absorption band) indicates some chemical transformations of the notified polymer are occurring over environmental pH.
Test Facility	Korea Polymer Testing & Research Institute Ltd (2008)

APPENDIX B: TOXICOLOGICAL INVESTIGATIONS

B.1. Irritation – skin

TEST SUBSTANCE: Notified polymer

METHOD
- Species/Strain: Rabbit/New Zealand White
- Number of Animals: 3
- Vehicle: None
- Observation Period: 72 hr
- Type of Dressing: Semi-occlusive.
- Remarks - Method: The test substance was placed in contact with the skin for 3 min or 1 hour (one animal), and 4 hours (3 animals).

RESULTS

Lesion	*Mean Score* Animal No.*			*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
	1	2	3			
Erythema/Eschar	0	0.67	0	1	<72 hr	0
Oedema	0	0.33	0	1	<48 hr	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal (4 hour exposure).

Remarks - Results: No skin reactions were observed following the 3 minute and 1 hour exposure. Only mild skin reactions were observed following the 4 hour exposure, with all reactions absent at the 72 hour observation.

CONCLUSION: The notified chemical is slightly irritating to the skin.

TEST FACILITY: MB Research (2008)

B.2. Irritation – eye

TEST SUBSTANCE: Notified polymer

METHOD
- Species/Strain: Rabbit/New Zealand White
- Number of Animals: 1
- Observation Period: 21 days
- Remarks - Method: Only one test animal was used due to the severity of the observed reactions.

RESULTS

Lesion	*Mean Score**	*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
Conjunctiva: redness	3	3	<14 days	0
Conjunctiva: chemosis	3	3	<14 days	0
Conjunctiva: discharge	2	2	<14 days	0
Corneal opacity	1.3	2	>21 days	2
Iridial inflammation	1	1	<7 days	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for the test animal.

Remarks - Results: Moderate corneal opacity, slight iritis and severe conjuctival irritation were observed in the treated eye. The iritis and conjuctival irritation

	cleared by day 14, whilst the corneal opacity was present at the completion of the observation period (day 21).
CONCLUSION	The notified polymer causes serious damage to the eye.
TEST FACILITY	MB Research (2008)

APPENDIX C: ENVIRONMENTAL FATE AND ECOTOXICOLOGICAL INVESTIGATIONS

C.1. Ecotoxicological Investigations

C.2.1. Algal growth inhibition test

TEST SUBSTANCE	Notified polymer
METHOD	OPPTS 850.5400 Algal Toxicity, Tiers I and II
Species	*Pseudokirchneriella subcapitata* strain: CCAP 278/4
Exposure Period	96 hours
Concentration Range	Nominal: 3.2, 10, 32, 56, 100 mg/L
Auxiliary Solvent	None
Water Hardness	Not provided
Analytical Monitoring	The algal cells were examined microscopically during the determination of the cell concentration and to detect if any cells displayed morphological abnormalities.
Remarks - Method	A range-finding test was performed. The definitive study was performed under static conditions with an initial cell density of ~ 10^4 cells/mL in the OECD growth media. Standard protocol for OPPTS 850.5400 was followed except for the species of algae used. Three replicates were tested for each of the test substance concentrations and six replicates for the control. The reference substance used was potassium dichromate. The E_bC50 and E_rC50 values after 96 hours were determined by the Maximum Likelihood-Probit Method and the 95% confidence limits were calculated according to the methods of ToxCalc Version 5.0 (1994). NOEC values were determined by the Bonferroni T test.

RESULTS

Biomass		*Growth*	
E_bC50 mg/L at 96 h	*NOEC mg/L*	*E_rC50 mg/L at 96 h*	*NOEC mg/L*
3.2 (95% CI: 1.5 – 5.1)	<3.2	70 (95% CI: 47 - 122)	<3.2

Remarks - Results	The range finding test indicated that the 96 h EC50 value was in the range 10 – 100 mg/L. In the definitive test, the cell density in the control cultures increased exponentially over the 96 h test period (increased by a factor of 249). The E_rC50 values were estimated as > 100 mg/L after 48 and 72 hours.
CONCLUSION	The notified polymer is harmful to algae
TEST FACILITY	Chemex Environmental International Ltd (2009)

BIBLIOGRAPHY

Chemex Environmental International Ltd (2009) The Growth Inhibition of Notified Polymer to the Alga *Pseudokirchneriella subcapitata* over a 96 hour Exposure Period (January 2009). Unit J, Broad Lane Industrial Estate, Cottenham, Cambridge CB24 8SW, UK, Chemex Environmental International Ltd (Unpublished report submitted by notifier).

Korea Polymer Testing & Research Institute Ltd (2008) Molecular Weights, Water Solubility and Stability Test of Polymer Under Acidic and Basic Conditions (Supplied as Notified Polymer) (9 October 2008). Korea Polymer Testing & Research Institute Ltd (Unpublished report submitted by notifier).

MB Research Laboratories (2007) Acute Dermal Irritation in Rabbits, MB Research Project MB 07-16122.03 , November 2007, Pennsylvania USA. (Unpublished data submitted by notifier).

MB Research Laboratories (2008) Primary Eye Irritation/Corrosion in Rabbits, MB Research Project MB 08-17245.04 , September 2008, Pennsylvania USA. (Unpublished data submitted by notifier).

Nabholz J V, Miller P and Zeeman M (1993), Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act (TSCA) Section Five. In: Landis, Hughes, Lewis. Environmental Toxicology & Risk Assessment. American Society for Testing and Materials, Philadelphia PA, p 50.

NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (1999) National Guidance Material for Spray Painting. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2001) *NOHSC National Standard for the Storage and Handling of Workplace Dangerous Goods* [NOHSC:1015(2001)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2nd edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

ToxCalc™ Version 5.0 (1994) Comprehensive Toxicity Data Analysis and Database Software

United Nations (2003) Globally Harmonised System of Classification and Labelling of Chemicals (GHS). United Nations Economic Commission for Europe (UN/ECE), New York and Geneva.

US EPA (2007). Interpretative Assistance for the Assessment of Polymers. United States Environmental Protection Agency.