File No PLC/879

November 2009

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in ND-1

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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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Sika Australia Pty Ltd (ABN 12 001 342 329)
55 Elizabeth St
Wetherill Park NSW 2164

NOTIFICATION CATEGORY
Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical Name, Other name, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Use Details, 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
Japan, China, Korea, USA

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
ND-1 (contains < 50% notified polymer)

MOLECULAR WEIGHT (MW)
Number Average Molecular Weight (Mn) > 10,000 Da

REACTIVE FUNCTIONAL GROUPS
The notified polymer contains only low concern functional groups.

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:	White solid
Glass Transition Temp/Melting Point	Expected to be >200°C
Density	1100 kg/m^3 at 20°C for imported polymer solution
Water Solubility	2 g/L at 20°C determined experimentally and which is consistent with the notified polymer's structure.
Dissociation Constant	pKa ~5. (Not measured). The notified polymer contains anionic functionality that is expected to show typical acidity.
Particle Size	Not applicable as it is imported as a solution
Reactivity	Stable under normal environmental conditions. Tests were conducted at pH range of 1.2, 4.0, 7.0 and 9.0 at 40 ± 2°C. Some minor changes were evident from the IR and GPC when comparing the initial polymer with the polymer subjected to hydrolysis. Although these tests can only be considered indicative of changes to the polymer they showed that the polymer did not hydrolyse to any great extent.
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

Mode of Introduction
The notified polymer will be imported into Sydney as an aqueous solution (containing < 50% notified polymer) in 205 L drums and/or 1000 L IBC containers.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	100-150	100-200	200-250	300-350	300-400

Use
The notified polymer will be used as a superplasticiser for concrete.

The imported notified polymer (< 50% concentration) will be reformulated with other components to produce a mixture containing the notified polymer at < 30%. The mixture will then be further reformulated to produce concrete containing up to 0.04% notified polymer for use in the construction industry for ready-mix and precast concrete, and mining and tunnelling shotcretors.

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 a toxicological endpoint observed in testing conducted on the notified polymer.

Endpoint	*Result*	*Effects Observed?*	*Test Guideline*
Genotoxicity - bacterial reverse mutation	non mutagenic	no	Similar to OECD TG 471 Bacterial Reverse Mutation Test

The result was indicative of low hazard.

Occupational Health and Safety Risk Assessment
Dermal and ocular exposure may potentially occur during reformulation, quality control analysis, cleaning and repackaging of < 50% or <30% notified polymer. However, exposure to significant amounts of the notified polymer is limited because of the automated processes, enclosed system, engineering controls and personal protective equipment worn by workers.

Construction workers and end users may experience dermal and ocular exposure to the notified polymer (<0.04%) during application of the concrete. In addition, inhalation exposure may occur if aerosols are generated during shotcreting application where the concrete will be manually or machine-sprayed. Exposure to the notified polymer would likely be limited due to its low concentration in products, the use of personal

protective equipment and some automated procedures.

Although exposure could occur during reformulation, repackaging and application of the concrete mixture, the notified polymer is not considered to pose an unacceptable risk to the health of workers due to its assumed low hazard.

Public Health Risk Assessment
The notified polymer is intended only for use in industry and as such public exposure to the notified polymer is not expected. Members of the public may make dermal contact with finished concrete structures containing notified polymer at a maximum concentration of 0.04%. However, the notified polymer is assumed to be of low hazard and is bound within a matrix and not available for exposure. The notified polymer does not pose an unacceptable risk to public health.

7. ENVIRONMENTAL IMPLICATIONS

Hazard Characterisation
No ecotoxicological data were submitted. 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. This could 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.

Environmental Risk Assessment
The notified polymer is expected to be highly water soluble and as a result, would be mobile in both terrestrial and aquatic compartments. However, direct release to the aquatic compartment is not expected at any stage of the notified polymer's lifecycle within Australia and the vast majority of notified polymer will be entrapped within a concrete matrix limiting any significant environmental release. Concrete containing the notified polymer is expected to be eventually disposed of to landfill or be recycled as low-grade construction material such as road base. In landfill, it is expected that the notified polymer will eventually degrade by biotic and abiotic processes to oxides of carbon, water vapour and sodium salts. Therefore, the notified polymer is not expected to pose an unacceptable risk to the aquatic environment based on the proposed use pattern.

8. CONCLUSIONS AND RECOMMENDATIONS

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
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

- 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 *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.

Emergency procedures

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

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 in concrete, 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 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 notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.