

File No PLC/695

8 March 2007

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

FULL PUBLIC REPORT

AQUALOC HW-1B

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**Director
NICNAS**

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FULL PUBLIC REPORT**Aqualoc HW-1B****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Grace Australia Pty Ltd (41 080 660 117)

1126 Sydney Road

Fawkner VIC 3060

NOTIFICATION CATEGORY

Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name

CAS Number,

Molecular and Structural Formulae

Molecular Weight

Polymer Constituents

Residual Monomers/Impurities

Use Details

Import Volume

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

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

Melting point

Dissociation constant

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

No

NOTIFICATION IN OTHER COUNTRIES

Canada 2006; Japan 2000; China 2004; Korea 2003; USA 2005

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

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3. PLC CRITERIA JUSTIFICATION

<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
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
Melting Point/Glass Transition Temp	>200 °C
Density	1090 kg/m ³ at 20°C value for 45% polymer solution
Water Solubility	> 2g/L 200 and 2000 mg of notified polymer were added to 1 L distilled water. After stirring at 35-40°C, the solutions were equilibrated at 25°C ± 2°C for 24 h. Solubility was determined by the change in weight before and after the test.
Dissociation Constant	Not determined. However, the pKa of a homopolymer similar to the notified polymer is 6.8.
Particle Size	Not applicable. Polymer will only be imported as a solution.
Reactivity	Stable under normal environmental conditions. The results of a stability test indicated that the notified polymer was stable at pH 1.2, 4.0, 7.0 and 9.0. 1 g/L was tested at 40°C for 2 weeks and analysed by GPC (weight change) and by IR.
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>	10-100	10-100	100-300	100-300	100-300

USE AND MODE OF INTRODUCTION AND DISPOSAL

Mode of Introduction

The notified polymer will be imported as 45% aqueous solution in 205 L containers. It will be transported by road to six of the notifier's plants through Australia for storage and reformulation.

Reformulation/manufacture processes

Reformulation will occur at the notifier's sites. The imported solution of the notified polymer will be mixed in a tank with other ingredients. The mixing tank will be flushed with water which will be reused into the next mix. The reformulated product will be packed in 1000 L totes and transported by road to customer concrete plants.

At the customer sites the reformulated product will be pumped into a bunded holding tank and dispensed into a concrete mix at concentration of 0.0003%. The emptied totes will be returned to the notifier's reformulation site for recycling.

Use

Concrete additive

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

OCCUPATIONAL EXPOSURE

Workers involved in reformulation of the imported mixture containing 45% of the notified polymer may have dermal and ocular exposure to the notified polymer. However, significant exposure to the notified polymer will be limited given the use of engineering controls and personal protective equipment by workers.

Dermal and ocular exposure may also occur during certain processes such as mixing of the reformulated product containing the notified polymer with the concrete. Inhalation exposure is possible if aerosols are formed. However exposure to significant amounts of the notified polymer is limited because the cement mix will be enclosed and personal protective equipment, overalls, gloves and protective footwear, is worn while adding to the mix is performed.

The final concentration of the notified polymer in the concrete mixture is low (0.0003%), so no significant exposure is expected for workers applying the concrete mixture.

PUBLIC EXPOSURE

The notified polymer is intended only for use in industry and as such public exposure to the notified chemical is not expected except in the case of accidental spillage during transport. When the notified polymer is incorporated into the matrix of the concrete it is not expected to be bioavailable, therefore the public is not likely to be exposed to the notified polymer.

6.2. Toxicological 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 the notified polymer and analogue* polymer that contains same monomers.

<i>Endpoint</i>	<i>Result</i>	<i>Classified?</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
1. Rat, acute oral *	LD50 >2000 mg/kg bw	no	no	OECD TG 423
2. Rat, acute dermal *	LD50 >2000 mg/kg bw	no	no	OECD TG 402
4. Rabbit, skin irritation	non-irritating	no	yes ^a	OECD TG 404
5. Rabbit, eye irritation	slightly irritating	no	yes ^b	OECD TG 405
8. Genotoxicity - bacterial reverse mutation (TA98 and TA100 strains) *	non mutagenic	no	no	Japanese standards for Toxicity Investigations; 1988 and 1997

^a Erythema grade 1 in 1/3 1h post application.

^b Redness of the conjunctivae grade 1 in 2/3 and grade 2 in 1/3 animals and chemosis grade 1 in 1/3 animals 1h post application. Redness of the conjunctivae grade 1 2/3 animals 24h post application

All results were indicative of low hazard.

6.3. Human Health Risk Assessment

OCCUPATIONAL HEALTH AND SAFETY

Although dermal, ocular and inhalation exposure to maximum of 45% of the notified polymer could occur during mixing of the aqueous solution of the notified polymer with the concrete, the risk to workers is considered to be low due to the high molecular weight ($M_w > 1000$) and the intrinsic low hazard of the notified polymer.

Dermal and ocular exposure to the notified polymer is also possible during the cement application process. However, considering the intrinsic low hazard of the notified polymer, minimal concentrations (0.0003%), and the PPE used, the risk to application workers is considered to be low.

PUBLIC HEALTH

The notified polymer will not be available to the public. Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is of low hazard, and it will be incorporated into the matrix of the concrete so public is not expected to be exposed to the notified polymer except in the case of accidental spillage during transport.

Considering this low likelihood of exposure and the low toxicity of the notified polymer, there is a negligible risk for the public from the use of the notified polymer.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

Environmental release of the notified polymer is summarised in the following table.

Source of release	% Annual Volume	Released to
Accidental Spills	<<1%	Sewer
Residual from unloading and cleaning processes	<1%	Landfill
Concrete products containing the notified polymer.	>98%	Landfill

ENVIRONMENTAL FATE

The majority of the total imported volume of notified polymer is expected to be released to landfill. The majority of the total imported volume of notified polymer is expected to be released to landfill within hardened concrete. In this form, the notified polymer is expected to be immobile. Over time, as the concrete eventually degrades, the notified polymer is also expected to degrade via abiotic and biotic means to form simple organic compounds and simple salts.

Concrete trucks are usually rinsed at the end of the day after several batches. Approximately 1-4% * of the concrete adheres to the inside of the drums. If four batches are assumed between rinses then the amount of notified polymer in the excess concrete and water amounts to less than 1%. These washings from delivery trucks on return to batch plant are expected to be contained in a wash water system, which is recycled for future concrete manufacture to the extent practicable. Some of the wastewater may be associated with the waste concrete and be allowed to evaporate as the concrete cures, with the notified polymer becoming associated with the waste concrete. Any excess concrete is expected to be transferred to dumpsters where the concrete is allowed to cure with subsequent disposal in authorised landfill.

In the unlikely event of an uncontained spill, release to sewer is possible. In the aquatic environment, the notified polymer is expected to remain in the aquatic compartment and degrade via abiotic and biotic means to form simple organic compounds and metal salts.

*Abdol Chini S. and Mbwanbo W. J., *Environmentally Friendly Solutions for the Disposal of Concrete Wash Water from Ready Mixed Concrete Operations*, CIB W89 Beijing International Conference, 21-24 October, 1996.

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 overchelation of nutrient elements needed by algae for growth. The highest toxicity occurring when the acids are on alternating carbons of the polymer backbone. Whether this will apply to the notified polymer is unclear. However, the toxicity to algae is likely to be reduced due to the presence of calcium ions, which will bind to the functional groups.

7.3. Environmental Risk Assessment

The notified polymer is used in concrete, and will be bound up in the hardened concrete matrix. Release to the environment is expected to be minimal. Therefore, it is not possible to predict the Predicted Environmental Concentration (PEC) or Predicted No Effect Concentration, and thus, a PEC/PNEC calculation cannot be undertaken. However, based on exposure arguments the PEC will be very low, and the probable non-hazardous nature of the notified polymer to the aquatic environment, the risk of use of this notified polymer is expected to be acceptable.

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**

- 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.

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 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.