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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Amberlite IRC747

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Director
Chemicals Notification and Assessment

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FULL PUBLIC REPORT

Polymer in Amberlite IRC747

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Rohm and Haas Australia Pty Ltd (ABN 29 004 513 188) of 4th Floor, 969 Burke Road Camberwell VIC 3124.

NOTIFICATION CATEGORY
Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

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, Spectral Data, Polymer Constituents, Purity, Hazardous and Non-hazardous Impurities/Residual Monomers, Additives/Adjuvants, Import Volume, Identity of Importer/Recipients, and Process Description.

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

MARKETING NAME(S)
Amberlite IRC747 (≤65% notified polymer)

3. COMPOSITION

DEGREE OF PURITY
High

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
Import

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

USE
As an ion exchange resin for removing calcium ions from brine.

COMPOSITION OF THE IMPORT PRODUCT

Chemical Name	*CAS No.*	*Weight %*
Notified polymer	None assigned	60-65*
Water	7732-18-5	35-40*

* Varies batch to batch depending on the particle size of the beads.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY
Melbourne

TRANSPORTATION AND PACKAGING
The notified polymer will be transported by road and distributed as a component of an end-use product Amberlite IR 747 aqueous slurry in sealed 200 L plastic drums.

5.2. Operation description

The notified polymer will not be manufactured in Australia. It will be imported as a component of a finished product, Amberlite IRC747, which is an aqueous slurry of beads (particle diameter of 0.6-1 mm) for use in filter columns in production of caustic soda and chlorine. Details of this are claimed exempt from publication.

Once the notified polymer has reached the end of its serviceable life, the beads are removed either by gravity feed or pumping from the columns into drums prior to disposal at a licensed waste landfill site.

5.3. Occupational exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Waterside, transport and warehouse workers	12-17	--	--
Exchange resin column handlers	6-12	3 hours/day	30 days/year

Exposure Details

It is anticipated that waterside, transport and warehouse workers would only be exposed to the notified polymer in the event of an accidental spill. Should a spill occur, it is expected to be contained and collected into suitable containers for recovery or disposal in accord with the MSDS and official regulations.

Exchange resin column handlers will be potentially exposed to the notified polymer via skin and eye contact during loading/unloading the columns with the Amberlite bead slurry, handling pump hoses, and cleaning equipment or spillages. The workers will wear safety glasses, impervious gloves, coveralls, and safety boots, and exposure is expected to be minimal due to the physical form of the resin. Exposure to ground resin will be controlled with local exhaust ventilation at the point of dust generation, or use of suitable personal protective equipment (eg dust/mist air purifying respirators and safety goggles). Properly designed equipment will be focused if these resins are to be used in conjunction with strong oxidising agents such as nitric acid to prevent a rapid build-up of pressure and possible explosion. Copies of the MSDS will be readily accessible in all work areas.

5.4. Release

RELEASE OF CHEMICAL AT SITE
The notified polymer will not be manufactured or reformulated in Australia.

RELEASE OF CHEMICAL FROM USE
The notified polymer will be imported in a ready to use product in 200 L plastic drums. Product is a

slurry so in the event of an accidental leakage, clean-up procedures (containment and manual collection) are expected to efficiently remove the majority of the released notified polymer. Annually, it is estimated that 1 % will be lost due to spills during transport, handling and filling of filter columns, ie maximum 300 kg. Any spilt material will be collected and placed in sealed containers ready for disposal to landfill.

The spent polymer resin from filter columns will be drummed and disposed of to landfill. The filter columns are not cleaned between emptying and refilling with resin, so no waste cleaning stream is created.

Empty import drums will be retained for filling with spent resin (including notified polymer), and once full disposed of to landfill. The notified polymer has a low water solubility and, as a result, will be immobile in both the terrestrial and aquatic compartments.

The notified polymer is not expected to cross biological membranes due to its high molecular weight and low water solubility and is therefore not expected to bioaccumulate (Connell 1989).

5.5. Disposal

All of the notified polymer will eventually be disposed of to landfill (from spills 1% and spent resin 99%). Any of the notified polymer that is released from the disposed drums/containers is expected to associate with the soil matrix and sediments and slowly degrade through abiotic and biotic processes to water vapour, sodium ions and oxides of carbon and phosphorous.

5.6. Public exposure

The notified polymer is intended only for use in industry and will not be sold to the public.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa Beige solid beads wetted with water to form a slurry

Melting Point >100°C

Remarks Test report not provided. The notified polymer will decompose before reaching boiling point.

Density 1200 kg/m^3

Remarks Test report not provided.

Vapour Pressure Not determined

Remarks The notified polymer is not volatile due to high molecular weight and cross-linking.

Water Solubility <$5x10^{-3}$ g/L at 20°C

METHOD In-house method
Remarks Water solubility of the notified polymer was determined based on the monitoring of total organic carbon (TOC) in the test sample (1 g notified polymer stirred with 900 mL water) over 7 days.
TEST FACILITY RHC (2003b)

Hydrolysis as a Function of pH Not determined

Remarks Test was not conducted due to the low water solubility of the notified polymer. It is not expected to undergo hydrolysis in the environmental pH range of 4-9.

Partition Coefficient (n-octanol/water) Not determined

Remarks Test was not conducted due to the low water solubility of the notified polymer. It is expected to associate with the octanol phase.

Adsorption/Desorption Not determined

Remarks Test was not conducted due to the low water solubility of the notified polymer. It is not expected to be mobile in the soil. However, it is polyanionic in nature and may adsorb to soils and sediments.

Dissociation Constant Not determined

Remarks Water solubility of the notified polymer cannot be measured analytically, and hence determination of dissociation constant is not technically feasible. The notified polymer is an anionic salt of a strong acid and is expected to remain dissociated at all environmental pH.

Particle Size approx. 0.6 mm (beads)

Remarks Test report not provided.

Flash Point Not applicable

Remarks The notified polymer is a solid at room temperature. Its aqueous slurry form is not flammable, but a dry polymer may support combustion.

Flammability Limits Not flammable (aqueous slurry)

Remarks Test not conducted.

Autoignition Temperature >500^{o}C (estimate)

Remarks Method of estimation not specified.

Explosive Properties Not considered explosive

Remarks The notified polymer is not expected to be explosive on structural ground, however it may be a dust explosion hazard in dry form.

Reactivity Stable under normal environmental conditions

Remarks The notified polymer reacts with strong oxidisers. It is also a polyanionic and thus expected to react or associate with cationic species in water.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted.

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

No ecotoxicity data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

All of the notified polymer resin will eventually be released to the environment. However, most of the notified polymer at the end of its useful life will be contained within drums and disposed of to landfill. It is expected to be immobile and will slowly degrade through abiotic and biotic processes to water vapour, sodium ions, and oxides of carbon and phosphorus, with none reaching the aquatic compartment.

9.1.2. Environment – effects assessment

No ecotoxicological data were provided so a predicted no effects concentration (PNEC) cannot be determined. The low water solubility of the notified polymer and its potential to become associated with the sediments can expect to reduce the possibility of the amounts remaining in solution to cause acute toxicity in the aquatic environment. In addition, the high molecular weight indicates a low potential for bioaccumulation.

9.1.3. Environment – risk characterisation

The release of the notified polymer to the environment is expected to be low. Abiotic or slow biotic processes are expected to be largely responsible for the eventual degradation of the notified polymer. It is not likely to present a risk to the environment when it is stored, transported and used in the proposed manner.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

During transport and storage, workers are unlikely to be exposed to the notified polymer. In the event of an accident, spills will be removed in accord with the MSDS and government regulations.

Dermal and ocular exposure will potentially occur during loading/unloading exchange resin columns, connecting pump hoses, cleaning equipment or collecting spillages. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and work practices, and personal protective equipment worn by workers.

9.2.2. Public health – exposure assessment

The notified polymer is intended only for use in industry and will not be available to the public. Exposure of the public to the notified polymer as a result of accidental spill or environmental release is considered negligible.

9.2.3. Human health - effects assessment

The high molecular weight of the notified polymer should preclude absorption across biological membranes, and systemic toxicity is not expected. As no toxicological data have been submitted the notified polymer cannot be classified under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2002).

The MSDS indicates that exposure to the notified polymer may cause slight irritation to the eyes. However, the ground resin of the notified polymer should be treated as a severe mechanical irritant to the eyes and respiratory tract if inhaled. Repeated or prolonged skin contact with the polymer may result in mild irritation.

9.2.4. Occupational health and safety – risk characterisation

The OHS risk presented by the notified polymer is expected to be low, given the expected low hazard of the polymer, the engineering controls, the good work practices and safety measures including use of appropriate personal protective equipment by workers.

9.2.5. Public health – risk characterisation

On the basis of negligible exposure and low systemic toxicity expected for the notified polymer, it is considered that the notified polymer will not pose a significant risk to public health when

used in the proposed manner.

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

10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

10.2. Environmental risk assessment

The notified polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used in the proposed manner.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product containing ≤65% notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the product containing ≤65% notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to dust and mist of the ground resin of the notified polymer:
  - Adequate local exhaust ventilation for the resin column operators.

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced in Amberlite IR 747:
  - Safety glasses;
  - Industrial standard protective clothing and gloves;
  - Dust masks or appropriate respirators if high levels of dust are present.

  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

- The following control measures should be implemented by the user to minimise environmental exposure to the notified polymer:
  - Column loading/unloading should be undertaken in a contained area only.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills/release of the notified polymer should be handled by containment and collected manually or by vacuum.

12.1. 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 Section 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.

13. BIBLIOGRAPHY

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