

File No SAPLC/82

April 2008

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

FULL PUBLIC REPORT

XZ 91419 Anion Exchange Resin

This Self Assessment has been compiled by the applicant and adopted by NICNAS 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), administered by the Department of Health and Ageing and the Department of the Environment, Water, Heritage and the Arts has screened this assessment report. The data supporting this assessment will be subject to audit by NICNAS.

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**XZ 91419 Anion Exchange Resin****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT

Dow Chemical (Australia) Ltd (ABN: 72 000 264 9790)
 541-583 Kororoit Creek Road
 ALTONA VIC 3018

NOTIFICATION CATEGORY

Self Assessment: Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

The following details are claimed exempt from publication.

Chemical Name

CAS Number

Molecular and Structural Formulae

Molecular Weight

Polymer Constituents

Residual Monomers/Impurities

Purity

Manufacture/Import Volume

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

XZ 91419 Anion Exchange Resin

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (NAMW) >10000 Da

REACTIVE FUNCTIONAL GROUPS

Functional Group	Category	Equivalent Weight (FGEW)
Amino functional groups	High Concern	N/A*

* The notified polymer has Mn > 10000 Da and therefore FGEW is not applicable

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</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 is a cationic polymer containing high concern amino functional groups. It meets the PLC requirements because it has a Mn (NAMW) > 10000 Da, is not soluble or dispersible in water and will only be imported and used in the solid phase as an ion-exchange resin. It will not be released to sewer or the aquatic environment.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	White to tan beads
Melting Point/Glass Transition Temp	Not applicable
Density	1080 kg/m ³ Bulk Density: 673 kg/m ³
Water Solubility	The notified polymer is not soluble in water
Particle Size	Particle Size Distribution: Range: 760 – 1200 µm > 1190 µm, max. ≤ 2% < 768 µm, max. ≤ 5%
Reactivity	Stable under normal environmental conditions. Avoid contact with oxidising materials. The severity of the reaction with oxidizing materials can vary from slight degradation to an explosive reaction.
Degradation Products	None known under normal conditions of use. Formation of chlorinated hydrocarbons, aromatic compounds, hydrocarbons, hydrogen chloride and organic amines may occur in the event of fire or during thermal decomposition.

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	< 10	< 100	< 100	< 100

USE AND MODE OF INTRODUCTION AND DISPOSAL

Mode of Introduction

The notified polymer in bead form will be imported in a damp state (water content ≥ 35 to $\leq 45\%$) in 25 kg bags, and will be transported by road from the wharf to a warehouse and stored until required for dispatch to customers. The notified polymer will remain in its original packaging until it reaches the customer site.

Reformulation/manufacture processes

The notified polymer will not be manufactured or reformulated in Australia.

The notified polymer resin will be delivered in 25 kg bags to a warehouse or to the site of use and stored under cover. When required, forklifts will move resin bags on pallets to the process plant, where it will be used in either an “automated multi-column” or “resin in pulp” process for the recovery of precious metals.

Automated multi-column process

The notified polymer resin beads are poured into a holding tank, conditioned with acid and then transferred to the exchange columns via “bottom end opening” bulker bags. A clarified solution containing the precious metal is pumped through columns connected in series. In this process the precious metal is preferentially attracted to the resin surface. The columns will be subsequently treated with mineral acid to recover the metal and prepare the resin for re-use.

Resin in pulp process

The notified polymer resin beads are poured into a holding tank, conditioned with acid and then transferred via “bottom end opening” bulker bags to mixing tanks containing a thickened slurry of ground ore. The slurry has been previously treated with acid or an activated solvent and the resin will chelate the metal salts present in solution. The resin will then be separated from the slurry by filtration and transferred into large 10-100 m³ columns, where it will be treated with mineral acid to recover the metal and prepare the resin for re-use.

The notified polymer resin can be used for a large number of cycles until eventually it loses efficiency and can then be disposed of to landfill or incinerated. The resin is expected to be replaced over a five to ten year period, as it loses effectiveness.

Use

The notified polymer will be used as an ion-exchange resin in the mining industry. It will be used in a secondary treatment plant at the mining site to recover extracted metals (e.g. gold from cyanidation leach solutions).

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

OCCUPATIONAL EXPOSURE

<i>Category of workers</i>	<i>Number</i>	<i>Exposure duration</i>	<i>Exposure frequency</i>
Transport & storage	4	2-3 hours/day	4 days/year
Ion exchange resin handlers	10-15	3 hours/day	20 days/year

Transport and storage

There is little potential for occupational exposure to the notified polymer during transport and storage of the imported product.

Ion Exchange Resin Column Handlers

Skin and eye exposure to the notified polymer may occur at various stages of the process. For example, exposure may occur during manual tipping of the polymer to holding tanks, column packing (loading and recharging), cleaning up of spills and during maintenance. However, as the notified polymer beads are damp, there is negligible potential for dust generation. Accidental exposure to the eye may cause mechanical injury.

Where exposure to the notified polymer may occur, during loading or emptying, personal protective equipment, such as safety glasses, impervious gloves and coveralls, is provided. During use, the resin beads containing the notified polymer are in sealed equipment operated automatically and the potential for incidental exposure to operating personnel is negligible.

Dermal and ocular exposure may potentially occur during certain processes involving the notified polymer. However, exposure to significant amounts of the notified polymer is limited because of the automated processes, and the engineering controls and personal protective equipment worn by workers.

PUBLIC EXPOSURE

The notified polymer is intended only for use in industry.

The public is unlikely to be exposed to the notified polymer during transport, storage, and use except in the event of an accidental spill.

6.2. Toxicological Hazard Characterisation

The result of an acute oral toxicity test on the notified polymer indicated an $LD_{50} > 5,000$ mg/kg bw (rat, female). No other toxicological data were submitted. The notified polymer meets the PLC criteria and can therefore be assumed to be of low hazard.

6.3. Human Health Risk Assessment

OCCUPATIONAL HEALTH AND SAFETY

Although exposure to the notified polymer could occur during addition of the polymer to the holding tanks, column packing (loading and recharging) and maintenance, the risk to workers is considered to be low due to the assumed low hazard of the notified polymer

PUBLIC HEALTH

The general public will not come into contact with the notified polymer, therefore the risk of exposure of the general public to the notified polymer is considered to be low.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

The notified polymer will not be manufactured or reformulated in Australia.

Imported end product is in the form of beads 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, i.e. < 1000 kg per annum. Any spilt material will be collected and placed in sealed containers ready for disposal to landfill.

The notified polymer is an ion exchange resin that will be used in filter columns to extract heavy metal cations (e.g. gold) in the mining industry. The filter columns are not cleaned between emptying and refilling with resin, so no waste cleaning stream is created.

Empty import bags will be disposed to landfill. It is estimated that 0.2% may remain as residues in bags (i.e. < 200 kg per annum).

The spent polymer resin from filter columns will be drummed and disposed of to landfill.

ENVIRONMENTAL FATE

Once spent, the majority (~99%; up to 99 tonnes per annum) of the imported resin beads of the notified polymer will end up in landfill on the mine sites where it is used. Here, it is expected to remain immobile within soil and eventually degrade to landfill gases including oxides of carbon and nitrogen, methane, ammonia and water vapour.

The notified polymer is not expected to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

7.2. Environmental Hazard Characterisation

No ecotoxicological data were submitted. PLCs that will only be used in the solid state, and are not soluble or dispersible in water, are of low concern to the aquatic environment.

7.3. Environmental Risk Assessment

The notified polymer resin will be used on mining sites. The ultimate fate of the resin is to be buried in landfill on the mine site, where it is expected to remain immobile within soil. The potential environmental hazard is low if the notified polymer is used in the typical manner outlined.

8. CONCLUSIONS

8.1. Level of Concern for Occupational Health and Safety

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

8.2. Level of Concern for Public Health

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

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

- 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.

11. 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 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 chemical has changed from use as an ion-exchange resin in the mining industry, or is likely to change significantly;
 - the amount of chemical being introduced has increased from 100 tonnes per annum, or is likely to increase, significantly;
 - if 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.