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January 2008

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

FULL PUBLIC REPORT

Polymer in UCAR Solution Vinyl Resin

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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FULL PUBLIC REPORT**Polymer in UCAR Solution Vinyl Resin****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Dow Chemical (Australia) Ltd (ABN 72 000 264 979)
541-583 Kororoit Creek Road ALTONA VIC 3018

NOTIFICATION CATEGORY

Polymer of Low Concern

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, Polymer Constituents, Residual Monomers/Impurities, 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)

No

NOTIFICATION IN OTHER COUNTRIES

US EPA/TSCA (2006)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

UCAR Solution Vinyl Resin VROH; UCAR Solution Vinyl Resin VAGF; UCAR Solution Vinyl Resin VAGC

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) > 10000 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 powder, mild odour
Melting Point/Glass Transition Temp	Decomposes at > 100°C
Density	1390 kg/m ³ at 25°C
Water Solubility	Estimated < 0.1 g/L, consistent with its hydrophobic structure.
Dissociation Constant	The notified polymer does not contain any acidic or basic groups.
Particle Size	VROH/VAGC: 180-350 µm; VAGF: 90-180 µm
Reactivity	Stable under normal environmental conditions. The notified polymer contains hydrolysable functionalities but hydrolysis should not occur in environmental pH of 4-9 due to low water solubility.
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

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

Coatings for metal, wood, paper, concrete, masonry, films, foils, fabrics, and leather, including industrial maintenance and marine finishes, general metal finishes, and as a binder in magnetic tape.

The customers dissolve the notified polymer in powder form in solvents such as acetone, methyl isobutyl ketone or cyclohexanone using a high shear mixer equipped with tight fitting covers. Additives such as pigments, plasticisers and stabilisers can be added if required. The formulations (typically 30%) may be readily applied by commonly used application methods such as brushing, spraying, dipping and roller coating. After the solvent has evaporated the so-applied notified polymer form a durable, flexible coating.

Mode of Introduction and Disposal

Imported as 97% powder in 22.68 kg paper bags.

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 toxicological endpoints observed in testing conducted on the notified polymer (a summary was provided).

Endpoint	Result	Effects Observed?
1. Rat, acute oral	LD50 > 8000 mg/kg bw	yes Analogous to OECD TG 401
2. Rabbit, acute dermal	LD50 > 8000 mg/kg bw	yes Analogous to OECD TG 402

In an acute oral toxicity study on rats, all animals were noted to have white material in the faeces on day 1 which was considered to be related to the high volume of the dose.

In an acute dermal toxicity study, clinical observations consisted of very slight erythema in six of the rabbits and desquamation was observed in three of the rabbits. All cutaneous findings were completely resolved by day 11. Reddening of the application site was noted in one animal at necropsy.

Water insoluble high molecular weight (>10000 Da) polymers used in respirable size range (< 10 µm) have the potential to cause lung overloading. No information is available on the inhalation toxicity of the polymer.

Occupational Health and Safety Risk Assessment

As the polymer meets the low concern criteria and exposure is expected to be controlled by use of engineering controls and/or personal protective equipment, the risk to workers is not considered significant. If respirable or inhalable aerosol particles are generated by spray application, a higher level of controls would be required to avoid inhalation exposure, including respiratory protection. The risk of effects from inhalation exposure cannot be excluded.

The level of atmospheric nuisance dust should be maintained as low as possible. The Australian recommended

exposure standard for nuisance dust is 10 mg/m³ [NOHSC 3008:(1995)].

Public Health Risk Assessment

Public exposure to the notified polymer may occur through use of coating products containing it at approximately 30%. Typically a consumer would buy the product in 0.5 – 4 L containers and apply it to the substrate by brush or roller. Spray application will not occur. Inadvertent dermal and/or ocular exposure to the product could occur during this process. After drying of the coatings, the notified polymer will be cross-linked within the coating matrix and will not be bioavailable. The health risk to the public is considered low because of the low hazard of the polymer and expected low exposure.

7. ENVIRONMENTAL IMPLICATIONS

ENVIRONMENTAL RELEASE

No accidental spillage is anticipated. However if a bag is ruptured product may be collected and recovered. Less than 0.5% of the original quantity is expected to remain in containers (bags). The total of residual product and accidental spillage which may enter landfill is estimated to be 0.5% of the quantity imported. Contaminated product should be bagged to prevent dust escaping and may be disposed of in an approved industrial landfill. Product is not classified as prescribed waste.

Formulation is performed under controlled conditions in an industrial environment. Release of notified polymer to the environment is confined to cleaning of equipment. It is estimated that less than 1% of total quantity used would be washed from equipment and collected by a licensed waste disposal company for treatment. Non hazardous, solid waste will be disposed of in approved industrial landfill.

Coating operations are performed using spray, brush, dipping or roller under controlled conditions in an industrial environment. Release of notified polymer to the environment is confined to cleaning of equipment. It is estimated that less than 1% of total quantity used would be washed from equipment and collected by a licensed waste disposal company for treatment. However, releases from over spraying may be up to 30%, which is expected to be trapped using standard engineering controls, treated and the solid waste disposed of to landfill. Some may be deposited on paper or on the ground, such as in the case of marine finishes on slipways. There may also be some release to the sewer from washing of brushes and rollers though the extent of water based paint use is not known. Detailed information on the method of application of coatings to fabric and leather is not available.

ENVIRONMENTAL FATE

Fabrics, metal containers and consumer articles coated with notified polymer will ultimately be disposed to landfill at the end of useful life.

7.2. Environmental Hazard Characterisation

Hazard Characterisation

No ecotoxicological data were submitted. Non ionic polymers of NAMW > 1000 are generally considered to have low aquatic toxicity. This is supported by environmental endpoints observed in testing conducted on the notified polymer.

<i>Endpoint</i>	<i>Result</i>
Fish Toxicity (Carp)	EC50 > 100 mg/L
Daphnia Toxicity	EC50 > 100 mg/L

Environmental Risk Assessment

The products containing the notified polymer are likely to be used throughout Australia. The major environmental exposure is expected to be due to the disposal of waste from the coatings manufacture and particularly from overspray during application to landfill. If spilt on land, the notified polymer is expected to become immobilised in the soil layer. Due to its low water solubility, the polymer will remain bound within the soils and sediments of the landfill and to be slowly degraded by the abiotic processes.

Based on the proposed use pattern, the release of the notified polymer to the aquatic environment is expected to be low and dispersed. There may be some release to sewer from washing of rollers and brushes as well as from applications to fabrics and leather. Adsorption to sludge, soil and sediment as well as dilution in receiving waters should reduce environmental concentrations to acceptable levels. Abiotic or slow biotic processes are expected to eventually degrade the notified polymer to oxides of chlorine and carbon.

Given the above, environmental exposure and the overall environmental risk are expected to be low.

8. CONCLUSIONS AND RECOMMENDATIONS

Human health risk assessment

Under the conditions of the occupational settings described, the risk to workers is considered to be acceptable.

When used in the proposed manner the risk to the public is considered to be acceptable.

Environmental risk assessment

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

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.
- Spray application should be carried out in accordance with the *National Guidance Material for Spray Painting*.
- In the interest of occupational health and safety, the following guidelines and precautions should be observed for use of the notified polymer as introduced in powder form
 - The level of atmospheric nuisance dust should be maintained as low as possible. The ASCC exposure standard for atmospheric dust is 10 mg/m³.
- 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 by landfill.

Storage

- The following precautions should be taken:
 - Store in a dry place
 - Store away from direct sunlight.

Emergency procedures

- Spills and/or accidental release of the notified polymer should be handled by preventing it from entering into soil, ditches, sewers, waterways and groundwater.

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 polymer has changed from use as coatings for metal, wood, paper, concrete, masonry, films, foils, fabrics, and leather, including industrial maintenance and marine finishes, general metal finishes, and as a binder in magnetic tape, or is likely to change significantly;
 - the amount of polymer being introduced has increased from 30 tonne per annum, or is likely to increase, significantly;
 - if the polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the polymer 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.