File No PLC/503

25 October 2004

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in 5562 Carbinol Fluid

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Director
Chemicals Notification and Assessment

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5562 Carbinol Fluid

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Dow Corning Australia Pty Ltd, ABN 36 008 444 166
3 Innovation Road
Macquarie University Research Park, North Ryde, NSW 2113

NOTIFICATION CATEGORY
Synthetic 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 formula
- structural formula
- molecualr weight
- Polymer constituents
- maximum introduction volume of notified chemical (100%) over next 5 years

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
Korea Ministry of Environment, 10 April 2001

2. IDENTITY OF CHEMICAL

OTHER NAME(S)
Dow Corning® 5562 Carbinol Fluid

MARKETING NAME(S)
5562 Carbinol Fluid

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met (yes/no/not applicable)*
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported as Dow Corning® 5562 Carbinol Fluid (containing >99% of the polymer) into Australia over the next 5 years.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	3-10	3-10	10-30	10-30	10-30

USE
The notified polymer will be used as a component in a wide range of cosmetic products.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

Transportation

The notified polymer will be imported as 5562 Carbinol Fluid in 200-kg drums or 15-kg pails. Drums and pails will be transported by trucks from wharves to the relevant warehouses, where they will be unloaded using forklifts.

Reformulation

The product containing >99% notified polymer will be reformulated in Australia by manufacturers of cosmetics, skin care and hair care products. At a reformulation plant, it will be poured into either an open or closed paddle mixer. Following the mixing process, the formulated product (containing 5-15% of the polymer) will be fed through an enclosed system from the mixer to an automatic packaging machine, where the product will then be fed into 50-500 mL bottles.

The workroom involved is provided with good mechanical dilution ventilation, while the mixer is fitted with locally exhausted side hoods. The work-floor is bunded to control any surface runoff that may occur. Operators wear overalls and protective gloves to prevent skin contact, and wear chemical goggles to prevent eye contact.

End-use

The final products will be transported to retail outlets for consumer use.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

6.1.1. Environmental Release

Empty pails or drums containing very small amount of residual polymer (<1%) will be disposed of to landfill. The reformulation equipment will be cleaned by washing with water and an industrial detergent. The liquid waste will be treated as site industrial waste and dealt with by licensed disposal contractor. A small amount of the notified polymer (approximately 0.5%) is expected to be released into the sewer from the cleaning of process equipment. Up to 98% of the imported notified polymer will be released to sewer due to use and subsequent personal washing.

6.1.2. Environmental Fate

Residual polymer disposed of to landfill in empty containers is expected to be

adsorbed to soil particles and will eventually be degraded through biological and abiotic processes. When released into the sewer, the polymer will eventually adsorb onto sediments/sludge due to its low water solubility. Although not readily biodegradable, any notified polymer adsorbed onto sewage sludge or sediment is likely to be gradually degraded to natural components. In dry soils, silicone polymers are expected to be rapidly hydrolysed due to abiotic processes (Dow Corning, 1998).

The low water solubility of the notified polymer may indicate a potential for bioaccumulation. However, the high molecular weight will limit bioaccumulation.

6.2. Summary of Occupational Exposure

During transport and storage, workers are unlikely to be exposed to the notified polymer except when the drums or pails are accidentally broken. Dermal and ocular exposure can occur during the reformulation/packaging processes. Skin contamination of maintenance workers can also occur when cleaning equipment and during routine maintenance. However, exposure to significant amounts of the notified polymer will be limited because of the engineering controls, and personal protective equipment worn by workers.

Except in the case of an accident, workers handling the finished product during distribution and retail would not be exposed to the notified polymer because of the closed containers. Even in the event of spills, the small packaging size and the low concentration of the notified polymer in the finished products would limit exposure. Intermittent, wide-dispersive use with direct handling is expected to occur among cosmeticians and beauticians. According to EASE (1997) modelling of this work environment, exposure in the range of 0.5-2 mg/cm^2 of products containing 5-15% of the notified polymer could result.

6.3. Summary of Public Exposure

Widespread public exposure to cosmetic products containing 5-15% of the notified polymer is expected since the products are for sale to the general public. Members of the public will make dermal contact and possibly accidental ocular contact with products containing the notified polymer. There is also a slight chance of ingestion of the notified polymer. However, exposure will be low because the notified polymer is present at low concentrations.

The potential for exposure of the public to the notified polymer during normal industrial storage, handling and transportation is negligible, except in the case of an accident. The packaging will protect the contents from being released during normal handling.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Colourless to pale yellow, liquid
Melting Point/Glass Transition Temp	Not determined
Density	980 kg/m^3 at 25°C
Water Solubility	<0.001 g/L at 20°C. The notified polymer is chemically stable and will not be hydrolysed in water. It has very low water solubility in line with known properties of siloxanes.
Reactivity	It is a stable polymer under normal environmental conditions.
Degradation Products	In the event of fire, carbon oxides and silicon dioxide may be formed.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data were submitted.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. Nonionic polymers which have NAMW > 1000 are also known to be of low concern.

10. RISK ASSESSMENT

10.1. Environment

For a worst case scenario where all of the possible maximum import volume (i.e. 30 tonnes) of the notified polymer may be released to the sewer, a predicted environmental concentration (PEC) can be estimated on the assumption that there will be no removal in the sewer or effluent treatment plant as follows:

Maximum amount entering sewer annually	30 tonne (30×10^{12} µg)
Population of Australia	20 million
Amount of water used per person per day	200 L
Number of days in a year	365
PEC_{sewer}	$\frac{30 \times 10^{12}}{20 \times 10^{6} \times 200 \times 365}$ = 20.5 µg/L
$PEC_{freshwater}$ (dilution factor of 1)	20.5 µg/L
PEC_{marine} (dilution factor of 10)	2.05 µg/L

However, due to the polymer's low water solubility it is likely that it will become absorbed onto suspended organic matter, sludge or sediments. Therefore, the PECs in freshwater and marine compartments will actually be much less.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be present in formulations containing hazardous ingredients. If these formulations 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.

10.3. Public Health

The end products containing 5-15% of the notified polymer will be used by the general public applying the products themselves and also by those having products applied during professional cosmetic applications. The notified polymer has a MW > 1000, and thus will be unable to cross biological membranes. Despite the potential widespread use, the risk to public health is considered low due to the non-hazardous nature of the notified polymer.

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

11.1. Environmental Risk Assessment

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

11.2. Human Health Risk Assessment

11.2.1. Occupational health and safety

There is No Concern to occupational health and safety under the conditions of the occupational settings described.

11.2.2. Public health

There is Low Concern to public health when used as a component of cosmetic products.

12. MATERIAL SAFETY DATA SHEET

12.1. 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.

13. 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 reformulating plant to minimise environmental exposure during reformulation of the notified polymer:

  – Regular maintenance of bunding, drains, intercept pits and effluent treatment plants.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills/release of the notified polymer should be handled by adsorption with material such as sand and put into suitable container for disposal. Contaminated containers can be re-used after cleaning.

13.1. 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.

No additional secondary notification conditions are stipulated.

14. BIBLIOGRAPHY

Dow Corning (1998) Degradation of Silicone Polymers in Nature. Health Environment & Regulatory Affairs Dow Corning Corporation (Environmental Information Update No. 01-1113-01).