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

FULL PUBLIC REPORT

Polymer in Urotuf F97-MPW-33

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**Director
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TABLE OF CONTENTS

1.	APPLICANT AND NOTIFICATION DETAILS	3
2.	IDENTITY OF CHEMICAL	3
3.	COMPOSITION	3
4.	INTRODUCTION AND USE INFORMATION.....	4
5.	PROCESS AND RELEASE INFORMATION	4
5.1.	Operation Description.....	4
6.	EXPOSURE INFORMATION	4
6.1.	Summary of Occupational Exposure	4
6.2.	Summary of Public Exposure	5
6.3.	Summary of Environmental Exposure.....	5
6.3.1.	Environmental Release	5
6.3.2.	Environmental Fate.....	5
7.	PHYSICAL AND CHEMICAL PROPERTIES	6
8.	HUMAN HEALTH IMPLICATIONS.....	6
8.1.	Toxicology.....	6
8.2.	Human Health Hazard Assessment.....	6
9.	ENVIRONMENTAL HAZARDS	6
9.1.	Ecotoxicology.....	6
9.2.	Environmental Hazard Assessment	7
10.	RISK ASSESSMENT	7
10.1.	Environment	7
10.2.	Occupational Health and Safety	7
10.3.	Public Health	8
11.	CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS.....	8
11.1.	Environmental Risk Assessment	8
11.2.	Human Health Risk Assessment.....	8
11.2.1.	Occupational health and safety	8
11.2.2.	Public health.....	8
12.	MATERIAL SAFETY DATA SHEET	8
12.1.	Material Safety Data Sheet	8
13.	RECOMMENDATIONS	8
13.1.	Secondary Notification	9

Polymer in Urotuf F97-MPW-33

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

DIC International (Australia) Pty. Ltd.
 30-32 Kilkenny Crt, Dandenong South, VIC. 3175
 ABN 17 003 441 067

NOTIFICATION CATEGORY

Self Assessment: Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name

Other Names

Molecular Formula

Structural Formula

CAS Number

Polymer Constituents

Details of Use

Volume

Molecular weight

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

CEC Permit # 598, 18th November 2004

NOTIFICATION IN OTHER COUNTRIES

USA (1995), PMN P-95-1047

Environment Canada (May 1999), NSN 6777

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in Urotuf F97-MPW-33

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >1000

3. COMPOSITION

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. INTRODUCTION AND USE INFORMATION

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

The notified polymer will not be manufactured in Australia. The notified polymer is contained within the water borne product Urotuf F97-MPW-33, and will be imported in 200kg steel drums.

The formulation of the imported product will be:

<u>Ingredients</u>	<u>CAS No.</u>	<u>Content</u>
Polyurethane resin	None allocated	30-60%
Triethylamine	121-44-8	<2%
Water	7732-18-5	>50%
N-methyl-2-pyrrolidone	872-50-4	5-10%

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>	4-10	4-10	4-20	10-40	20-50

USE

Water borne paint for wood and concrete coating.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer will be imported as a water borne resin at a concentration of 30-60% in a blend of water, 1-methyl-2-pyrrolidinone (NMP) and N,N-diethylethanamine. Imported material will arrive in 200kg steel drums.

It will be transported from the wharf to the notifiers warehouse by road, where it will be stored until such time it is delivered to the paint manufacturer. At the paint manufacturer, the product is formulated into pigmented or clear, water borne paint, for either top coat or primer application. These paints will contain 10-30% of the notified polymer.

During formulation, the notified polymer will be manually weighed and then transferred to a high-speed disperser mixing tank. Once blended with other ingredients and converted into the finished paint product, it will be decanted into 4, 20 and 200 litre steel and/or plastic paint cans for sale to customers.

The packaged containers will then shipped to a variety of manufacturing companies and trade outlets.

The paint products containing the notified polymer will be applied by standard brush, roller and spray painting methods to timber and concrete.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

Transport and warehousing workers may come into dermal and ocular contact with the notified polymer through accidental leaks and spillages of the drums and containers.

During formulation, workers will manually weigh and transfer the polymer dispersion to enclosed mixing vessels. Local exhaust ventilation is situated near the mixing vessels. Workers will wear impermeable gloves and clothing, eye protection. Exposure from the notified polymer to these workers can occur by either dermal or ocular routes, however significant exposure will be limited due to the

workplace practices, engineering controls and personal protective equipment used.

When spray applied, spray painters will come into contact with the notified polymer through dermal, inhalation and ocular routes. The risk of exposure, however, will be minimal as application is done in a ventilated spray booth with workers using protective equipment as described above.

When applied by brush or roller, painters may be exposed through dermal or ocular routes. However, significant exposure will be limited due to the workplace practices and the wearing of impervious gloves and safety glasses/goggles.

After application and once dried, the paint containing the notified polymer is cured into an inert matrix and the polymer is hence unavailable to exposure

6.2. Summary of Public Exposure

The notified polymer will not be sold directly to the public. However, the public will come into contact with wood and concrete that has been painted with the notified polymer. Once the notified polymer is dried and cured, it will form an inert polymer matrix. The potential for exposure of the public to the notified polymer is therefore minimal.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

Release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the drums or steel packaged containers.

During formulation and packaging, spills are expected to be minimal. When spills occur, they will be contained by bunding, collected with absorbent material and sent to a licensed off site waste disposal centre. Empty drums from import will be sent to drum reconditioners.

The majority of waste wash water from paint manufacturing equipment will be reused in subsequent batches of paint. The remainder will be processed in on site effluent treatment plants where polymer residues will be precipitated and sludge/solids disposed of to landfill.

Total waste from the above sources is expected to be less than 2 % of the import volume.

Some release of the polymer will also occur during spray application of the paint to timber surfaces. Transfer efficiency of paint during spray painting is approximately 82.5%, hence 17.5% of paint containing the new polymer could be released as overspray. However, spray painting will occur in spray booths where the overspray paint will be captured in filter baffles for later disposal as cured, solid and inert residues. These residues will be disposed of to landfill.

It is expected that approximately 20% of the paint used will be applied on site by contractors to timber and concrete surfaces. The majority of this will be applied by brush and roller. Of this quantity, it is expected that less than 1% of the notified chemical will be lost to wash water when cleaning brush, roller and spray application equipment. This wash water will either be disposed of to soil or sewer.

The remainder of the notified polymer will be bound in the paint matrix and not be available for direct release to the environment. Disposal of painted timber products may be to landfill or incineration.

6.3.2. Environmental Fate

Once dried and cured, the notified polymer is expected to be hydrolytically stable and to not be readily biodegradable. Due to the hydrophobic nature of the cured polymer, it is expected that the notified polymer in landfill will associate with sediments and organic phases of soil and sediments, and slowly degrade to simple carbon and nitrogen compounds through biotic and abiotic processes. During incineration of painted timber products, the polymer will be destroyed.

Any polymer that reaches the sewer will cure via oxidation within 24 hours forming a higher molecular weight, hydrophobic polymer that will precipitate from water and associate with organic phases of soil and sediments at sewage treatment plants.

7. PHYSICAL AND CHEMICAL PROPERTIES

In normal use and handling, the polymer is not isolated from formulation adjuvants.

Appearance at 20°C and 101.3 kPa	Hazy, pale yellow liquid. (as polymer dispersion)
Melting Point/Glass Transition Temp	Not determined
Density	1.006 – 1.03 kg/m ³ as the supplied polymer dispersion.
Water Solubility	Dispersible, but not truly soluble, given the lack of hydrophilic groups.
Dissociation Constant	Notified polymer has an anionic group expected to have typical acidity.
Reactivity	The notified polymer will cross-link further during application via oxidation of the oil modifiers.
Degradation Products	None under normal conditions of use.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data were submitted.

8.2. Human Health Hazard Assessment

No toxicological information has been provided for the polymer within Urotuf F97-MPW-33, however, the notified polymer has a high molecular weight and is unlikely to penetrate biological membranes. Its chemical structure suggests that the polymer has relatively low toxicity, and is not defined as a hazardous substance according to 'NOHSC *Approved criteria for classifying Hazardous Substances* (NOHSC, 1996). Assessment by Environment Canada has defined the polymer as having no suspicion of toxicity. The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

However, the Urotuf F97-MPW-33 product is classified as hazardous to health according to the criteria of *NOHSC Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008 (1999)], as a result of the additives 1-methyl-2-pyrrolidinone (NMP) and N,N-diethylethanamine.

The Urotuf F97-MPW-33 product is classified and labelled with the following risk and safety phrases:

R-Phrases

R 36/37/38 Irritating to eyes, respiratory system and skin

S-Phrases

S24/25 Avoid contact with skin & eyes

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S36/37/39 Wear suitable protective clothing, gloves and eye / face protection

S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label)

Any hazardous effects for the commercial product are likely to be the result of additions to the formula, specifically 1-methyl-2-pyrrolidinone (NMP) and N,N-diethylethanamine.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

A toxicological study of the Urotuf F97-MPW-33 product on Rainbow Trout showed a LC50 > 100mg / L / 96 hours, with no mortality.

9.2. Environmental Hazard Assessment

The notified polymer has a number average molecular weight greater than 1000 and is not expected to cross biological membranes thus minimising potential for bioaccumulation.

The notified polymer also meets the PLC criteria and can therefore be considered to be of low hazard. The notified polymer is likely to be anionic under normal environmental conditions. 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 is when the acid is on alternating carbons of the polymer backbone. This is very unlikely to apply to the notified polymer. However, the toxicity to algae is likely to be further reduced due to the presence of calcium ions, which will bind to the functional groups.

The results of a toxicological study on Rainbow Trout indicate low toxicity to aquatic organisms.

10. RISK ASSESSMENT

10.1. Environment

Waste polymer will cure via oxidative processes to form a higher molecular weight, hydrophobic and inert polymer that is insoluble in water.

The majority of the polymer is expected to be disposed to landfill or incinerated. If disposed to landfill, the polymer is unlikely to be mobile in the soil environment and would be expected to slowly degrade through abiotic and biotic processes. The environmental risk posed by the notified polymer in landfill is expected to be low.

Little release to the aquatic environment is expected during paint manufacture and application. Any polymer that may reach the aquatic environment through application equipment cleaning will cure via oxidation within 24 hours, forming a higher molecular weight, hydrophobic polymer that will precipitate from water and associate with organic phases of soil and sediments. Additionally, the results of a toxicological study on Rainbow Trout indicate low toxicity to aquatic organisms.

A worst case PEC has been estimated as follows, assuming 5% of the 20% import volume used by brush and roller enters the sewer from washing of application equipment, with no removal or degradation:

Amount entering sewer annually: $[50\text{t/y} \times 0.2 \times 0.05] = 0.5 \text{ t/y}$

Population of Australia: 20.1 million

Amount of water used per person per day: 200.0 L/d

Amount of water used per day: $[20,100,000 \times 200 \text{ L/d}] = 4.02 \text{ GL/d}$

Number of days used per year: 365 d/y

PEC: $[(0.5 \text{ t/y} \div 365 \text{ d/y}) \div 4.02 \text{ GL/d}] = 0.341 \text{ } \mu\text{g/L}$

Based on the Rainbow Trout $\text{LC}_{50} = >100 \text{ mg/L}$, and assuming a safety factor of 1000, the PNEC is $>100 \text{ } \mu\text{g/L}$. Therefore the PEC/PNEC ratio is $0.341 \text{ } \mu\text{g/L} \div >100 \text{ } \mu\text{g/L} = < 3.41 \times 10^{-3}$. As this is considerably less than 1, there should be low risk to the aquatic organisms.

The remainder of the polymer will be contained in paint applied to timber and concrete surfaces. Upon drying and curing the polymer will form part of an inert, durable coating and pose no risk to the environment.

Given the above, the overall environmental risk is expected to be low.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low, based on low hazard and low exposure, as well as the engineering controls and personal protective equipment used by workers.

10.3. Public Health

The notified polymer will not be sold to the public. Once the polymer is applied and cured it will be contained in an inert matrix, and hence will not be bioavailable. Risk to the public is considered low.

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

11.2.2. Public health

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

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS in accordance with the schedule item B 12 of the *ICNA Act*. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. RECOMMENDATIONS

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.
- Personal protective equipment required during formulation of the Urotuf F97-MPW-33 product are:
 - Eye protection (safety glasses or goggles)
 - Impermeable gloves
 - Industrial clothing and footwear
 - Respirator with organic vapour cartridge when occupational exposure standards are exceeded.
- 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.
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced and in

formulated paint products:

- Use of spray paints containing the notified polymer should be in accordance with the NOHSC National Guidance Material for Spray painting (NOHSC, 1999).

Environment

- The following control measures should be implemented by the notifier to minimise environmental exposure during formulation of the notified polymer:
 - Bunding
- The following control measures should be implemented by end users (spray painters) to minimise environmental exposure during use of the notified polymer:
 - Exhaust ventilation with filter

Disposal

- The notified polymer should be disposed of to landfill or incinerated.
- Empty containers should be sent to local recycling or waste disposal facilities.

Emergency procedures

- Spills/release of the notified polymer should be handled by absorbing with sand and put into suitable container for disposal. Contaminated containers can be re-used after cleaning.
- The notified polymer should not be allowed to enter drains or waterways.

Storage

- If products and mixtures containing the notified polymer are classified dangerous goods, dangerous goods storage requirements may apply.

Transport and Packaging

- If products and mixtures containing the notified polymer are classified dangerous goods, dangerous goods transport and packaging requirements may apply.

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.
 - [list of circumstances]

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.