File No PLC/601

April 2006

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Setalux 37-6766

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Nuplex Industries (AUST.) Pty. Ltd., ABN: 25 000 045 572
46-61 Stephen Road,
BOTANY N.S.W. 2019

NOTIFICATION CATEGORY
Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:

- Chemical Name
- Molecular Formula
- Structural Formula
- Means of Identification
- Molecular Weight (NAMW and WAMW)
- Weight Percentage of polymer species with MW <1000 and MW <500
- Reactive Functional Groups
- Charge Density
- Polymer Constituents
- Residual Monomers/Impurities
- Site of Manufacture/Reformulation (NO LONGER AN OPTION ON THE NEW CHECKLIST)

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)
Polymer in Setalux 37-6766

OTHER NAME(S)
Polymer in Setalux Pave 500

MOLECULAR WEIGHT (MW)
Number Average Molecular Weight (Mn) >10000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

The notified polymer contains no moderate or high concern functional groups.

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
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 be manufactured in Australia as an aqueous dispersion (up to 50% notified polymer) which will be sold for formulation into coating products.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	1-5	100-500	100-500	100-500	100-500

USE
Polymer component of surface coatings used primarily by the joinery industry.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

Manufacturing
At the manufacturing site, the raw materials are charged to the reactor (5000 L registered pressure vessel fitted with a condensor), stirred and the prescribed thermal cycle followed under controlled conditions to manufacture the notified polymer. All vapours from monomers and water are contained due to the presence of a condensor and returned through piping to the sealed reactor. After polymerisation is complete, the resulting dispersion containing up to 50% of the notified polymer is pneumatically pumped through a sealed filter into intermediate bulk storage (20–30 tonne tanks) or directly into Intermediate-Bulk Containers (IBCs, 1000 L) or 200 L drums for transport.

Reformulation
At customers' sites, the dispersion is pumped from its packaging container (1000 or 200 L containers) into mixing tanks where it is blended with other raw materials to produce water-based surface coatings. The finished coatings will contain up to 40% of the notified polymer. Although the processes are likely to be carried out on a large scale and be semi-automated, at some sites the polymer may be manually poured. Similarly the filling of surface coatings into a range of container sizes (500 mL, 1 L, 4 L and 20 L) is likely to be semi-automated at most but not all reformulation sites.

End Use
The surface coatings made using the dispersion will be applied to mainly timber substrates by industrial painting operations, trade painters or the home handyman. Although the notifier did not specify the methods of application, it is likely that the coatings would be applied through spraying, rollers and paint brushes.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

Manufacturing

Dermal and ocular exposure could occur during the manufacturing process at four stages:

(1) During testing of the dispersion to check for complete polymerisation. This is achieved through purpose built sampling valves;
(2) Cleaning of the reactor, filters and product tanks after manufacture and packing off. This is done by hosing down the equipment with water;
(3) In the case of accidental spillage during filtering and packing off; or
(4) During quality control checks by laboratory technicians

However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers. PPE includes, safety glasses, gloves, safety footwear and protective clothing (overalls for manufacture workers and laboratory coats for laboratory technicians)

Transport and Storage

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

Reformulation

Dermal and ocular exposure can occur during the reformulation process. Appropriate engineering controls and PPE should prevent significant exposure to the notified polymer.

End use application of paint

The potential exposure of workers to coatings containing the notified polymer may vary, depending on the scale of painting operations and mode of application, eg spray, roller or brush. It is expected that appropriate engineering controls would reduce or prevent inhalation exposure. Dermal or ocular exposure would be minimised by use of PPE.

6.2. Summary of Public Exposure

Paint containing the notified polymer at up to 40% may be used by home handymen. Dermal and ocular exposure can occur during the painting process but good work practices and use of appropriate clothes (including gloves and safety glasses) should minimise the exposure.

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

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

During manufacture of the notified polymer, there will be only small volume of vapours emitted. The condenser attached to the reaction vessel will contain the vapours and the condensate is returned to the reactor. After the polymerisation is complete, the monomers are reduced to very low levels (<0.05%). The polymer dispersion is pumped through enclosed filters and then back to bulk storage tanks or directly to packing station. The polymerisation, filtration and packing operations are efficient with losses of dispersion mainly due to washing of the equipment. This is done by hosing with a few hundred litres of water after each 5 tonnes batch. An allowance of 1-5% for losses due to hang-up on the vessels, etc is made, but these losses are reduced significantly when several batches are run in succession.

The vessel washings are collected and travel through trade waste lines in the plant to the liquid trade waste treatment plant. The treatment plant carries out biological oxidation and polymer flocculation. The waste water passes through a settling pond discharge point. Flocculated polymer goes to landfill. Flocculated polymer and polymer film from drying of the dispersion are expected to be inert in the environment.

The dispersion will be sold to coatings manufacturers who will blend the dispersion with other frequently used coatings raw materials to produce water-based coatings used to paint mainly timber products. The surface coatings manufacturers and industrial painting operations typically have their own waste capture and treatment processes and waste polymer will be effectively captured, treated and

disposed of in the same manner as their current trade wastes. It is assumed that 5% will be captured and be landfilled. It is likely that the coatings would mainly be applied through rollers and paint brushes. Since the paint is water-based, it is assumed that 5% of the brush and roller use mainly by handyman will be released to the sewer through washing of painting equipment.

It is expected that after use the empty containers will only contain hang up on the sides and rim of the can and the surface coating will have solidified into a surface film. Thus there would only be 1-2% of the product in the container corresponding to 0.8% of the notified polymer. Empty containers would be disposed of to landfill in domestic recycling programs.

Hence the maximum total amount of the notified polymer released during use would correspond to about 5% discharged to sewer and 5% disposed of to landfill.

After application to timber product and once dried, the coating containing the notified polymer is cured into an inert matrix and is hence unavailable for exposure.

6.3.2. Environmental Fate

The notified polymer's high molecular weight suggests that it is unlikely to cross biological membranes and bioaccumulate. As the notified polymer is not water soluble, and if released to water, it would be expected to partition to sediments.

Although the disposal quantity of the notified polymer is relatively large, the waste will be disposed of in landfill in a dispersed manner and in solid form. Waste water containing the notified polymer from cleaning of the application/manufacture equipment are treated at the waste treatment plant.

In landfill, solid wastes containing the polymer will be immobile and not leach into the aquatic compartment, but should slowly degrade and become associated with the soil matrix. Although the notified polymer contains hydrolysable groups, hydrolysis will not occur under environmental pH range due to low water solubility.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	White liquid dispersion.
Melting Point/Glass Transition Temp	Not Known – Polymer is not isolated.
Density	Approximately 1100 kg/m^3 (unspecified temperature).
Water Solubility	The polymer is not soluble in water. The polymer is manufactured in situ in water. The polymer being represented by the solid content in the resultant aqueous dispersion.
Dissociation Constant	The polymer contains a small amount of anionic functionality expected to have typical acidity.
Particle Size	80-100 nm, is sold as a dispersion.
Reactivity	Stable under normal environmental conditions.
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

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

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 unlikely to apply to the notified polymer. The toxicity to algae is likely to be further reduced due to the presence of calcium ions, which will bind to the functional groups (Nabholz *et al*. 1993).

10. RISK ASSESSMENT

10.1. Environment

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 to landfill and from washing of brushes and rollers to sewer. If spilt on land, the notified polymer is expected to become immobilized in the soil layer. Due to its expected 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. Waste generated during paint manufacture and application are expected to be landfill (6%) and the remaining (5%) is discharged in domestic wash waters to waste water treatment systems through washing of brushes and rollers.

Following its use in Australia, it is assumed that 5% of notified chemical will eventually be released into the aquatic environment as a result of washing of brushes and rollers. A calculated worst-case scenario daily PEC in the sewer effluent is 17.0 µg/L. In calculating the PEC, the following were assumed: (1) usage of the maximum import volume of 500 tonnes is evenly distributed over a 365 day period; (2) usage is nationwide, with a population of 20 million contributing 200 L of water per person per day to the sewer, (3) there is no adsorption or degradation in the sewer prior to release. Aquatic toxicity is expected to be low providing sufficient safety margin.

The majority of the notified polymer will remain attached to timber product and typically be sent to landfill at the end of the products useful life.

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

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer will be present in non-hazardous formulations.

10.3. Public Health

The notified polymer is intended for use by trade painters and home handymen (up to 40% notified polymer). The notified polymer is present in products in significant concentrations however with appropriate personal protective equipment the overall risk to the public from exposure to the notified polymer is low.

Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be low because the notified polymer is bound within a matrix and unlikely to be bioavailable.

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 No Significant Concern to public health when used in the proposed manner.

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.

Disposal

- The notified polymer should be disposed of by landfill.

Emergency procedures

- Place inert absorbent material onto spillage. Use clean non-sparking tools to collect the material and place into a suitable labelled container. Dispose of the waste according to government regulation.

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.