File No PLC/536

June 2005

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

F5-020-200

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
The IPL Group (ABN: 21006075216)
63-85 Victoria St
Alexandria NSW 2015

NOTIFICATION CATEGORY
Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical Name, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, Manufacture/Import Volume, and Site of Manufacture/Reformulation

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
Japan (year unknown)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
F5-020-200
The notified polymer will be imported as a component (<3%) of toner.

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
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
Importation as a component (<3%) of toner powder in sealed cartridges or bottles.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	<50	<50	<100	<100	<100

USE
Toner additive for use in photocopiers and other office machinery.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The toner containing <3% notified polymer will be imported, distributed and supplied to consumers in sealed cartridges or bottles packaged in cardboard cartons.

The toner is mainly used in offices for copying and printing. To refill the toner, the toner bottle is firmly fitted into the copying machine and the shutter opened. To change the cartridge, the seal tape is removed and the cartridge is placed into the copying machine or printer. The toner bottle and cartridge are designed not to release the toner until the shutter is opened or seal tape is removed. Used cartridges may be disposed of to landfill, or collected and exported for recycling.

During the copying or printing operation, the toner will be transferred onto the paper and firmly fixed by heat.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

Waterside, warehouse and transport workers are unlikely to be exposed to the notified polymer unless the packaging is breached.

Office workers and printer maintenance workers may be intermittently exposed to the notified polymer when replacing the spent cartridge or bottle, and during maintenance and cleaning of printers or photocopiers. Maintenance workers may potentially come in contact with the notified polymer more often than office workers. Exposure would be principally dermal, however, inhalation exposure could also occur, particularly if spillage occurs. Printer and photocopier maintenance personnel often wear cotton disposable gloves to reduce dermal exposure. Toner cartridges and bottles are sealed and worker exposure to the toner is minimised by the use of the replacement procedures recommended by the manufacturer.

Exposure to toner containing the notified polymer on printed paper is unlikely, as it will be bound in the structure of the paper.

6.2. Summary of Public Exposure

Dermal and inhalation exposure to the notified polymer may occur when changing the toner bottle or cartridge, however this is unlikely as the containers are designed not to release their contents unless fitted properly. Exposure to toner containing the notified polymer on printed paper is unlikely, as it will be bound in the structure of the paper.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

The toner containing the notified polymer present at <3% is imported. The toner is packed into cartridges and bottles and no reformulation will occur locally. Thus there will be no environmental exposure associated with this process.

The notified polymer as part of the formulation contained in the cartridges will be used in copy machines. The notified polymer can potentially be released to the environment during the disposal of the spent cartridges and bottles which are to be disposed of by landfill or incineration. It is estimated that 15% of the notified polymer will remain in the used cartridges and bottles.

In the end use process it would be expected that the notified polymer will be bound to the paper which will be landfilled, burnt or recycled. Although the notified polymer can be released from paper by degradation in a landfill or leaching, the high molecular weight and the hydrophobic components will show a high affinity for the organic phase of the soil and sediments.

6.3.2. Environmental Fate

Analogous silicon-containing polymers have been tested concerning adsorption on sludge and degradability. These tests indicate that >90% of the notified polymer will be removed from the aqueous stream with the sludge. Wastewater treatment plants monitoring and simulation studies have confirmed that analogous silicon-containing polymers which enter treatment plants are largely removed by adsorption to sludge and will be almost completely absent from treated effluent. Also, these polymers did not impact the freshwater treatment process.

If the sludge is composted some hydrolysis of the notified polymer may occur. The sludge is likely to be used as solid amendment or to be incinerated. High temperature incineration will result in complete degradation to inorganic silica, water and carbon dioxide.

Incineration of the waste paper will destroy the compound with the generation of water vapours and oxides of carbon and silicon.

Except for paper recycling, the polymer is not expected to enter the aquatic environment. In any case, the polymer's high molecular weight will preclude absorption across biological membranes. Hence the substance is not expected to bioaccumulate.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20ºC and 101.3 kPa	Slightly yellow waxy solid
Melting Point	51.7-83.5ºC
Density	940 kg/m^3 at 20ºC
Water Solubility	<1x10^{-4} g/L at 19.5ºC
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use. MSDS states that burning can produce oxides of carbon and silicon.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

The following toxicological end-points were submitted:

Endpoint	*Result*	*Classified?*	*Effects Observed?*
Rat, acute oral LD50 >2000 mg/kg bw	low toxicity	no	no
Genotoxicity – bacterial reverse mutation	non mutagenic	no	no

All results were indicative of low hazard.

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. This is confirmed by studies on the effect of analogous silicon-containing polymers on organisms in the environment, which demonstrate they have no adverse effects or if any only very limited toxic effects.

10. RISK ASSESSMENT

10.1. Environment

Most of the notified polymer will be bound to paper; its fate will be dictated by paper disposal trends. The 3 main routes of paper disposal are landfill, incineration and recycling. Current paper recycling rates in Australia are 70-92%. Consequently, most of the paper containing the notified polymer will be recycled.

The notified polymer is expected to be insoluble in water and is likely to adsorb to sludge. Paper recycling is carried out in paper mills, where it is likely that at least primary sedimentation occurs, with some facilities also having biological treatment facilities. Therefore, in these facilities the notified polymer is expected to largely partition into sludge under the usual waste treatment pH, and eventually be disposed of in landfill with other waste sludge. It is anticipated that prolonged residence in an active landfill will result in degradation the notified polymer contained in sludge or in papers disposed of directly through normal garbage.

Due to the nature of the aquatic release pattern, i.e. largely from paper recycling plants scattered throughout Australia, a Predicted Environmental Concentration (PEC) is considered difficult to calculate. Given the diffuse and widespread use of the toner and the low water solubility, the concentration of the notified polymer in the aquatic compartment is likely to be low. Furthermore, studies on the effect of analogous silicon-containing polymers on aquatic organisms demonstrate they have little toxic effect. Therefore, the notified polymer is unlikely to pose an environmental risk in the aquatic compartment.

It is expected that any waste generated during use (15% of import) will be disposed of by incineration or to landfill. In landfill the notified polymer contained in sludge or in papers will degrade slowly via biotic or abiotic processes. Therefore, environmental risk from the reported use pattern of the notified polymer is likely to be low.

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.
The level of atmospheric nuisance dust should be maintained as low as possible. The NOHSC exposure standard for atmospheric dust is 10 mg/m^3.

10.3. Public Health

The notified polymer will mainly be used in offices, and thus there will be low exposure to the public. Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is not hazardous, present at low concentrations 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 No Concern to occupational health and safety under the conditions of the occupational settings described.

11.2.2. Public health

There is Negligible 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 an 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

Disposal

- The notified polymer should be disposed of by landfill, incineration or recycling.

Emergency procedures

- No special precaution necessary

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.