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

FULL PUBLIC REPORT

NT-26

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Canon Australia Pty. Ltd. (ABN 66005002951)
 1 Thomas Holt Drive
 NORTH RYDENS W 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 Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Monomer Residuals.

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

US EPA (Low Volume Exemption), 2003.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

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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
No Substantial Degradability	Yes
Not Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

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>	<1	<1	<1	<1	<1

USE

The notified polymer will be used as an ingredient at 0.1 to 5% of toner for electrophotocopying machines or electrophotographic printers.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The toner containing 0.1 to 5% notified polymer will be imported, distributed and supplied to consumers contained in a sealed cartridge or bottle 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 Environmental Exposure

The toner bottle/cartridge is installed inside of the machine or printer and designed to prevent access or leakage to toner. Therefore, no environmental release is expected in the case that the toner bottle/cartridge is replaced.

The paper printed with the toner is deinked during the paper recycling process where waste paper is repulped using a variety of alkaline, dispersing and wetting agents, water emulsifiable organic solvents and bleaches. These agents enhance fibre separation, toner detachment from the fibres, pulp brightness and the whiteness of paper. These aqueous wastes are expected to go to sewer. Due to its very low solubility very little of the notified polymer is expected to partition to the supernatant water which is released to the sewer. Sludge generated during the washing process is dried and incinerated or sent to landfill for disposal.

The size of the bottle/cartridge and the residual amount remaining in the bottle/cartridge varies with the types of copying machines or printers. A 0.2-4 L cartridge/bottle would have <12.5% residual toner left inside on disposal. Therefore, the amount of notified polymer remaining corresponds to <125 kg of total imports. Spent bottles/cartridges collected by the recovery system are recycled or reused along with all residual toner in the recycling process. Spent bottles/cartridges that are not recycled are likely to be sent to landfill.

Considering the low water solubility, the polymer is unlikely to hydrolyse in the environmental pH range of 4-9 (despite the presence of hydrolysable groups) and should associate with the organic or soil/sediment phases.

6.2. Summary of Occupational Exposure

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 by skin contamination, however, inhalation exposure could also occur, particularly if spillage occurs. The notified polymer consists of a small proportion of respirable particles (8.47% less than 10µm). However, exposure is expected to be controlled through the design of the toner cartridge or bottles and the printing and photocopier machines. Printer and photocopier maintenance personnel often wear cotton disposable gloves. 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.

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

Contact with paper printed with toners containing the notified polymer is unlikely to result in dermal exposure, as it will be bound in the structure of the paper.

6.3. Summary of Public Exposure

Members of the public may be exposed to the notified chemical through handling of the printed paper. Assuming 1 g of toner produces 3000 A4 pages of text, each page contains 0.3 mg of toner. Once printed onto paper the notified polymer is bound and unavailable for release. Exposure is possible from residues in the printer although the cartridges and bottles are designed to minimise these residues.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	White solid.
Melting Range Temperature	107 to 146°C.
Density	1097.5 kg/m ³ at 21.5°C.
Water Solubility	1.76 x 10 ⁻⁴ g/L at pH 4.4.
Dissociation constant	While in theory the polymer should be dissociated throughout the environmental range, in practice the extent of dissociation will be low due to the low water solubility.
Particle Size	% < 100 µm: 16.4 % < 10 µm: 8.47
Flammability	Not highly flammable
Self Ignition Temperature	None below melting temperature
Explosive Properties	Predicted negative from structure. Fine powder can form explosive dust-air mixtures.
Reactivity	Polymer is not designed to degrade by oxidation, hydrolysis, attack by solvents, heat, light, or microbial action. Polymer considered to be stable under the conditions in which it is used.
Degradation Products	Oxides of carbon, nitrogen and sulfur.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

A study report for the following toxicological end-point was submitted (Canon, 2003):

<i>Endpoint</i>	<i>Result</i>	<i>Classified?</i>	<i>Effects Observed?</i>
Genotoxicity - bacterial reverse mutation	non mutagenic	no	yes

Two experiments were conducted. In both experiments the number of revertant colonies did not increase by twice or more over that in the negative control. However in the second test, the number of revertant colonies of the strain TA 1535 in the presence of metabolic activation, increased to approximately double the negative control at the dosage levels of 1250, 2500 and 5000 µg/plate. Therefore a third experiment was performed for strain TA 1535 at dosage levels up to 10000 µg/plate. The number of revertant colonies did not increase by twice or more over that in the negative control at these higher dose levels. Overall, the results indicated that the notified polymer was not mutagenic.

8.2. Human Health Hazard Assessment

The notified polymer was negative in a bacterial mutagenicity test. No other toxicity data have been provided. The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. The powder may cause mechanical irritation to the eyes, and to the respiratory tract if inhaled.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

No test results were included for biodegradability or ecotoxicity studies of the notified polymer. Polyanionic polymers may be moderately toxic to algae. The hypothesised mode of action is chelation of nutrient metal ions needed for growth, and depending on the number of such functions. Since this is relatively low in this case, it may be expected that toxicity will be at the lower end of the range. In the presence of calcium or hard water the possible algal toxicity of the polymer is further reduced. (Boethling and Nabholz 1997). These polymers are of low toxicity to fish and aquatic invertebrates.

10. RISK ASSESSMENT

10.1. Environment

The notified polymer will enter environmental compartments indirectly by disposal of waste paper (for recycling, to landfill or for incineration) and by direct release from discarded bottles/cartridges at landfill sites. The substance is not expected to bioaccumulate due to its high molecular weight. In landfill abiotic or slow biotic processes are expected to be largely responsible for the degradation of the notified polymer. Considering the low water solubility, the polymer is likely to be immobilised through adsorption onto soil particles and sediments. Based on the above and the widespread and diffuse use of the notified polymer, release to the environment is expected to be low and is unlikely to pose an environmental risk.

10.2. Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low due to its expected low toxicity, low concentration in toner and low potential for exposure. Nevertheless, due to the particulate nature of the toner, skin, eye and respiratory exposure should be avoided. Individuals with the potential for prolonged exposure, i.e. service personnel, should wear cotton or disposable gloves. Photocopiers and printers should be located in well-ventilated areas. The NOHSC exposure standard for atmospheric dust is 10 mg/m³ (TWA).

10.3. Public health

The risk to public health presented by the notified polymer is expected to be low due to its expected low toxicity, low concentration in toner and low potential for exposure. Nevertheless, due to the particulate nature of the toner, skin, eye and respiratory exposure should be avoided. Photocopiers and printers should be located in well-ventilated areas

11. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS**11.1. Environmental Risk Assessment**

The notified 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 public health when used in the proposed manner.

12. MATERIAL SAFETY DATA SHEET**12.1. Material Safety Data Sheet**

The notifier has provided a 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.
- Service personnel should wear cotton or disposable gloves and ensure adequate ventilation is present when removing spent printer cartridges containing the notified polymer and during routine maintenance and repairs.
- A copy of the MSDS should be easily accessible to employees.

Disposal

- The notified polymer should be disposed of to landfill or by incineration.
- The toner or toner container or cartridge should not be put into fire as heated toner may cause severe burns. The toner container holding remaining toner or toner cartridge should not be shredded unless dust-explosion preventing measures are taken as finely dispersed particles form explosive mixtures in air. Disposal should be subject to Federal, State and Local laws.

Emergency procedures

- No toner spillage occurs in normal operations of handling. If it should occur, avoid inhalation of the dust. Sweep material onto paper and carefully transfer to a sealable waste container. Clean remainder with wet paper, wet cloth or a vacuum cleaner. If a vacuum cleaner is used, it must rate as a dust explosion-proof type. Fine powder can form explosive dust-air mixtures.

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

Boethling R S and Nabholz J V (1997) Environmental assessment of polymer under the US Toxic Substances Control Act. In: Hamilton, Sutcliffe ed. Ecological assessment of polymers, strategies for product stewardship and regulatory programs. New York, Van Nostrand Reinhold, p 187.