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

FULL PUBLIC REPORT

CIN10093460 in Kodak Inks

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**Director
NICNAS**

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FULL PUBLIC REPORT**CIN10093460 in Kodak Inks****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Kodak Australia Pty Ltd (ABN 49 004 057 621)
181 Victoria Parade,
Collingwood VIC 3066

NOTIFICATION CATEGORY

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, Residual Monomers/Impurities, Use Details, and Manufacture/Import Volume.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Melting Point/Glass Transition Temperature, Density, Water Solubility, Dissociation Constant, Particle Size Distribution

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

Ministry of Labor, Ontario Canada 2006
CRC/SEPA, China 2005
US EPA 2006

2. IDENTITY OF CHEMICAL

OTHER NAME(S)

CIN 10093460

MARKETING NAME(S)

CIN10093460 in Kodak Inks

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >10,000 Da

REACTIVE FUNCTIONAL GROUPS

The notified polymer contains only low concern functional groups.

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</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 Hazardous Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Clear polymer solution
Melting Point/Glass Transition Temp	Not determined The notified polymer is never isolated from solution.
Density	1,000-1,100 kg/m ³ (density of polymer solution)
Water Solubility	~500 g/L solutions (~50% w/v) have been prepared, but no test has been conducted.
Dissociation Constant	pKa ~4-5 (Estimated value, based on monomeric species)
Reactivity	Although the polymer contains hydrolysable functional groups, it is expected to be stable under normal environmental conditions (pH 4-9).
Degradation Products	None under normal conditions of use

5. 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>Volume</i>	150 kg	150 kg	150 kg	150 kg	150 kg

USE AND MODE OF INTRODUCTION AND DISPOSAL

Mode of Introduction

The notified polymer will be manufactured in the USA, and imported into Australia through Port Botany, Sydney. The notified polymer will be imported as a component of inkjet printer inks (<30%), contained within inkjet printer cartridges of <75 mL volume.

Reformulation/manufacture processes

No reformulation or repackaging will occur in Australia.

Use

The notified polymer is a component of inkjet printer inks, contained in inkjet printer cartridges. The ink containing the notified polymer will mainly be used in office and domestic applications for printing onto paper and other small media.

The inkjet printer cartridges will be distributed to retail outlets by road from a warehouse. The cartridges will be purchased from these retail outlets by consumers, who are likely to store them until their use. As needed during printing operations, the consumer will remove an empty cartridge from the inkjet printer and insert a new cartridge into the printer. The empty cartridge will be disposed of with normal waste.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

OCCUPATIONAL EXPOSURE

Office and other imaging industry workers are likely to use inkjet printers and thus may experience exposure to the notified polymer. Such workers usually do not wear any personal protective equipment (PPE).

Dermal exposure to the notified polymer may occur when replacing spent cartridges. However, the design of the cartridges is such that exposure to the notified polymer during these activities should be low. In addition, dermal exposure to inkjet printer inks is possible on freshly printed media, if it is handled incautiously before it has dried.

Other workers that might be exposed to ink containing the notified polymer include printer maintenance workers and service technicians, who may be exposed to inks while carrying out repairs on inkjet printers. The exposure of these workers is likely to be similar to that of other workers, although they may be more likely to wear PPE, such as gloves.

Once the ink has dried, the notified polymer will be trapped within a matrix on the printed paper, and therefore dermal exposure to the notified chemical from contact with the dried ink is not expected.

PUBLIC EXPOSURE

The scenarios by which the public may be exposed to the notified chemical would involve home use of inkjet printers, and are similar to those for office workers. However, it is expected that the public will be using the printer less often than workers. During normal use, exposure should be low.

6.2. Toxicological Hazard Characterisation

No toxicological data were submitted. The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

6.3. Human Health Risk Assessment

OCCUPATIONAL HEALTH AND SAFETY

The OHS risk presented by the notified polymer is expected to be low, based on the minimal exposure to workers and the low intrinsic hazard of the polymer.

PUBLIC HEALTH

The risk to public health presented by the notified polymer is expected to be low due to its intrinsic low toxicity and low potential for exposure during printing operations.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

The notified polymer is imported and sold within a printer cartridge, with no reformulation in Australia. No release of the notified polymer will occur except in the unlikely event of spills, where the cartridge is ruptured.

During use, the notified polymer will be fixed to the paper substrate. At the end of the paper substrate's useful life, it will be disposed of or recycled. If the paper is recycled, it will be de-inked with some of the notified polymer being adsorbed to the sludge and the remainder released to trade waste sewers.

It is expected that up to 5% (<7.5 kg per annum) of the ink containing the notified polymer will remain within printer cartridges. Most will be disposed of as household waste; however, some is expected to be sent for cartridge recycling. The inks may be incorporated into low-grade inks for colouring items such as recycled plastic products. At the end of these products' useful lives, they will be disposed of to landfill.

ENVIRONMENTAL FATE

Paper substrates having the notified polymer fixed thereon will be disposed of to landfill, incinerated or recycled. During recycling some of the notified polymer will be released to sewer, with the remainder being adsorbed to sludge for disposal by incineration or landfill. Most of the residue in empty cartridges will be disposed of to landfill. If the ink is recycled to low-grade ink and incorporated into recycled products, then it is likely to be disposed of to landfill at the end of the recycled products' useful life.

7.2. Environmental Hazard Characterisation

No ecotoxicological data were submitted. However, 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 could apply to the notified polymer. The notified polymer's toxicity to algae is also likely to be reduced due to the presence of calcium ions, which will bind to the functional groups¹.

¹ Nabholz JV, Miller P and Zeeman M (1993). Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act (TSCA) Section Five. In: Landis WG, Hughes JS & Lewis MA ed *Environmental Toxicology and Risk Assessment*, ASTM STP 1179, American Society for Testing and Materials, Philadelphia, PA.

7.3. Environmental Risk Assessment

The notified polymer as a component of ink is expected to remain fixed to the paper for its useful life. Assuming that 5% of the chemical will remain in empty cartridges with 95% used for its intended purpose as ink, and with 50% of paper being recycled² then up to 71 kg will be disposed of during paper recycling. Paper recycling is likely to occur at facilities located throughout Australia. Assuming a worst-case scenario where none is adsorbed to sludge then a predicted environmental concentration (PEC) of 0.07 µg/L is calculated ($PEC = 71 \text{ kg} \div (20.5 \text{ million persons} \times 200 \text{ L per person per day} \times 260 \text{ working days})$).

A predicted no effect concentration (PNEC) cannot be calculated, as no ecotoxicity data are available. Although the notified polymer may show some toxicity to algae, the PEC is very low and is unlikely to adversely affect algae.

The remainder of the paper products will be landfilled or incinerated. Residual chemical in the empty cartridges will be landfilled or recycled, with any recycled product likely to also be landfilled at the end of its useful life. The notified chemical during incineration is expected to be combusted to oxides of carbon, metal salts and water vapour. In landfill, in spite of the polymer's high water solubility, its anionic sites are likely to bind to cations in soil limiting its mobility. It is expected that the polymer will eventually degrade by biotic and abiotic processes.

The notified polymer is likely to pose an acceptable risk to the environment.

² NOLAN-ITU (2001), National Packaging Covenant Council, Independent Assessment of Kerbside Recycling in Australia Revised Final Report - Volume I, NOLAN-ITU Pty Ltd.

8. CONCLUSIONS

8.1. Level of Concern for Occupational Health and Safety

The notified polymer presents no significant risk to occupational health and safety under the conditions of the occupational settings described.

8.2. Level of Concern for Public Health

The notified polymer presents no significant risk to public health when used as a component of inkjet printer inks.

8.3. Level of Concern for the Environment

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

9. MATERIAL SAFETY DATA SHEET

9.1. 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.

10. 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 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.
- 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

- Spills and/or accidental release of the notified polymer should be handled by adsorbing spill using paper towel (etc.) or adsorbent material. Residual contamination should be cleaned using water.

10.1. 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.