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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer SPF-2

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FULL PUBLIC REPORT**Polymer SPF-2****1. APPLICANT**

FUJI XEROX Australia PTY Ltd. of 546 Gardeners Road MASCOT NSW 2020 has submitted a limited notification statement in support of their application for an assessment certificate for POLYMER SPF-2.

2. IDENTITY OF THE CHEMICAL

The chemical name, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition have been exempted from publication in the Full Public Report and the Summary Report.

3. PHYSICAL AND CHEMICAL PROPERTIES

Unless stated otherwise, physico-chemical properties cited are for the end-product containing the polymer and not for the isolated notified polymer.

Appearance at 20°C and 101.3 kPa:

The notified polymer SPF-2 is a brown solid with no discernible odour. The appearance of the final products (Marketing Name) are given as follows:

AColour 620/635/935/4040 DocuColor Magenta
Developer: Dense red powder

AColour 620/635/935/4040 DocuColor Yellow
Developer: Dense yellow powder

AColour 620/635/935/4040 DocuColor Black
Developer: Dense black powder

Boiling Point/Melting Point:

Not determined.

Specific Gravity:

~ 5 (see comments below).

Vapour Pressure:

Not determined.

Water Solubility:

The final product is insoluble in water. The notified polymer has a water solubility less than 0.003 g/L at 20 °C (see comments below).

Particle Size:	Mean 50 μm .
Partition Co-efficient (n-octanol/water):	Not determined as the final product is insoluble in water (see comments below).
Hydrolysis as a Function of pH:	The notified polymer contains acidic carboxyl and amine groups which may undergo hydrolysis under certain temperature and pH conditions. Tests conducted reported up to 1.24 % change in weight due to changes in pH.
Adsorption/Desorption:	The final product is insoluble in water and an adsorption/desorption coefficient cannot be determined.
Dissociation Constant:	The pKa's are <i>ca.</i> 4.2 and 10.59-10.67 for the carboxyl groups and amine groups respectively.
Flash Point:	Not applicable.
Flammability Limits:	Not flammable.
Autoignition Temperature:	Not determined.
Explosive Properties:	The final product is not flammable under normal conditions of use but the generation of airborne developer dust may be potentially explosive in a confined space.
Reactivity/Stability:	The final product is stable.

Comments on Physico-Chemical Properties

The notifier has stated that the specific gravity is *ca.* 5. No test report was presented to substantiate this claim which is surprisingly high.

The notifier has stated that water solubility was performed by the flask method (OECD TG 105) but only produced a very synoptic test report. The small amount of free acid and amine groups should not lead to significant water solubility.

The notified polymer contains ester and epoxide groups which may undergo hydrolysis under extreme conditions but is not expected to occur within the environmental pH range.

The partition coefficient and adsorption/desorption were not determined due to the low water solubility of the notified chemical. However, the high hydrocarbon content of the notified polymer suggests that it would have an affinity for oil, soil and sediments.

4. PURITY OF THE CHEMICAL

Degree of Purity: > 99 %

Hazardous Impurities within the Notified polymer:

Chemical name: Toluene
CAS No.: 108-88-3
Weight percentage: 0.3
Toxic properties: R11; R20; not present above cut-off

Chemical name: Xylene
CAS No.: Mixture of 4 isomers; CAS No. 95-47-6
Weight percentage: 0.165
Toxic properties: R10;R20/21;R38

Chemical name: Ethylbenzene
CAS No.: 100-41-4
Weight percentage: 0.07
Toxic properties: R11; R20; not present above cut-off

Hazardous Impurities within the Final Product

Chemical name: Carbon Black
CAS No.: 1333-86-4 (within Black Developer)
Weight percentage: < 2.5
Toxic properties: NOHSC exposure standard; 3 mg/m³ TWA

Additives/Adjuvants: None stated.

Non-hazardous Impurities within the Final Product:

Chemical name: 2,3-dimethyl 2,3-diisobutyl succinonitrile
CAS No.: Not provided.
Weight percentage: 0.94

5. USE, VOLUME AND FORMULATION

The notified polymer is an ingredient used to coat the surface of ferrite particles which act as carriers in the colour developers of photocopiers. No manufacturing or reformulation will occur in Australia. The imported products contain up to 0.26 % notified polymer. Approximately 70 kg/year of notified polymer will be imported.

6. OCCUPATIONAL EXPOSURE

The notified POLYMER SPF-2 will be imported as part of the finished product, AColour Developers. The notified substance will be imported in 650 g aluminium-laminated packets, which will be packed in cartons (15 packets per carton). The cartons will be transported from the dockside to the Fuji Xerox warehouse, where they will be stored prior to being distributed to service outlets around Australia. It is anticipated that waterside workers, transport drivers and warehouse workers (5-10 workers, 2-3 hours/day, 10-15 days/year) would only be exposed to the material in the event of an accident.

Replacement of the developer involves removal of the old developer from the photocopier and loading of the new developer. This process is carried out by Customer Service Engineers only (50 workers, 5-20 minutes/day, 40-160 days/year). The procedure will not be carried out by the public and involves emptying the old developer from a reservoir into a tray or recovery bag, then refilling the reservoir directly from the container of the new developer. The old developer is repackaged at the time of replacement and disposed of to landfill.

The replacement procedure for the developer may involve exposure of the developer to the air. The mean particle size is *ca.* 50 μm and is therefore within the inspirable range. As only the mean particulate size was given, some particles may also be within the expirable range. Skin contamination may occur when cleaning the photocopier. Inhalational exposure may occur if dust clouds are generated during maintenance.

As the notified polymer will not become dissociated from the carrier particles during developer replacement, exposure to the notified polymer during this procedure will be negligible. The Customer Service Engineers wear cotton gloves during the developer replacement procedure.

It is considered unlikely that waterside workers and transport drivers will be exposed to the notified polymer. A Material Safety Data Sheet will be available to users of the product.

7. PUBLIC EXPOSURE

The imported products containing up to 0.26 % notified polymer will not be sold to the public but only to office type environments. The products will only be handled by trained Customer Service Engineers. The public is unlikely to come into contact with the notified polymer since the polymer is bound to paper and dry. Exposure to unbound polymer on paper is considered to be minimal.

8. ENVIRONMENTAL EXPOSURE

Release

The developer is distributed in packets (not fully sealed units) which are opened prior to insertion into copier machines and therefore some environmental release is expected prior to and during use.

The notifier has indicated that up to 1% of the total import volume of the notified polymer may be released as a result of spills and leaks. A further 2% is expected to be released as spillage during developer replacement. The notifier has indicated that between 30 and 50% of the notified polymer will be released in exhausted developer. The notifier did not indicate percentages of residue remaining in empty developer packages but it is estimated this will be *ca.* 2%. Assuming a maximum import volume of 70 kg, up to 38.5 kg of the notified polymer released via these avenues will be discarded to landfill.

Significant release of the notified polymer is also expected to occur at landfill sites where waste paper is discarded. In addition, polymer removed from the paper during recycling is likely to be incorporated with the waste sludge which will then be discarded to landfill or incinerated.

Although there is a risk of release of this polymer during transport, it is considered that the risk to be low as the polymer is contained in individual, sealed packets. Collection of spilt material will be disposed of to either landfill or incineration.

Fate

During recycling, waste paper is pulped and de-inked using a variety of dispersing and wetting agents, organic solvents and bleaches. After pulping, the contaminants and ink are separated from the fibres by pumping the stock through various heat washing, screening, cleaning, flotation and dispersion stages. During these processes there is the potential for hydrolysis of the polymer to occur. Polymer removed from the paper will most likely be incorporated with the sludge remaining from recycling. Sludge is likely to be discarded to landfill or incinerated. Combustion of the notified polymer is likely to yield water and oxides of carbon, nitrogen and hydrogen.

Once in landfill, leaching of the developer/polymer mix is unlikely to occur due to the low solubility of the substance. The polymer is expected to degrade slowly via biotic and abiotic processes.

Any polymer accidentally entering waterways would be expected to settle out onto sediments. The polymer is not expected to cross biological membranes, due to the low solubility and high molecular weight. Therefore the notified substance is not expected to bioaccumulate.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data was submitted for the notified polymer. The levels of hazardous impurities and unreacted monomers in the polymer are low. The NAMW is greater than 1000, indicating that it is unlikely to cross biological membranes.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The major release of the notified polymer is not expected to occur until disposal to landfill in the recovery bag or when paper containing the notified polymer is recycled. The notified polymer would remain either bound to waste paper, or to sludge that results from recycling processes and may be sent to landfill or incinerated.

Accidental spills of the notified polymer, either during replacement of developer or during transport, are expected to be minimal. Spilt material and notified polymer remaining in spent packets will be disposed of to landfill. Movement of the notified polymer by leaching from landfill sites is not expected.

The low environmental exposure of the notified polymer as a result of normal use indicates that the overall environmental hazard should be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Hazard Assessment

No toxicological data was submitted for the notified polymer. The levels of hazardous impurities and unreacted monomers in the polymer are low. The NAMW is greater than 1000, indicating that it is unlikely to cross biological membranes. A small number of reactive functional groups are present. Based on this information, the notified polymer is unlikely to be a hazardous substance under NOHSC Approved Criteria for Hazardous Classifications (NOHSC 1999).

The particles to which the polymer is bound have a mean particulate size of 50 μm . The MSDS supplied by the notifier indicates that products containing the notified polymer are unlikely to cause significant effects if swallowed and are not skin or eye irritants.

Occupational Health and Safety

Transport and storage of the developer containers is unlikely to result in worker exposure except in the event of accidental spillage. Customer Service Engineers will perform additions of developer and replacement of a used developer container and are expected to be exposed infrequently to the notified polymer as the developer container is re-filled, *i.e.* sealed and loaded directly into a printing machine. In addition, exposure to the developer containing the notified polymer may occur during machine cleaning and maintenance and whilst clearing paper feed problems, with risk of inhalational and dermal exposure likely in the event of contact with the developer.

Given its likely low toxicity and very low concentration in the developer, the notified polymer will not pose a significant health risk in the occupational environment.

Workers handling printed paper are not at risk of adverse health effects as the polymer is fixed to the paper and not available for exposure or dermal uptake. The notified polymer is combined within a polymer matrix and is not expected to degrade or decompose under normal use conditions. There is not expected to be any natural loss of monomers, reactants, additives, or impurities from the polymer matrix when applied in a dry bound form to paper.

Disposable gloves should be worn to prevent skin irritation and workers should avoid any generation of dust when handling the developer. Spilt residues should be swept up manually or using a dust explosion-proof vacuum cleaner and placed within a waste container.

Public Health

There is negligible potential for public exposure to the notified polymer arising from its use as a component in photocopying developers. Based on the toxicity profile and use pattern, the notified polymer will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to POLYMER SPF-2, the following guidelines and precautions should be observed:

- Avoid generation of dust clouds;
- Cotton gloves should be worn to prevent dermal exposure;
- Spillage of the notified polymer should be avoided. Spillage should be swept up manually or by vacuum cleaner and placed within a waste container;
- Good personal hygiene should be practiced to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the notified polymer was provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC (1994)].

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified polymer may be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

National Occupational Health and Safety Commission (1999). List of Designated Hazardous Substances [NOHSC:10005(1999a)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999b). Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1999)]. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1994) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.