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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

ZONYL 8110

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989,* and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Commonwealth Environment Protection Agency and the assessment of public health is conducted by the Department of Health, Housing, Local Government and Community Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on 5 March 1996.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

ZONYL 8110

1. APPLICANT

Du Pont (Australia) Limited of 254 Canterbury Rd, Bayswater, Victoria 3153 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Zonyl 8110.

2. IDENTITY OF THE POLYMER

Other names: Zonyl 8110, MPD-8110, Fluorinated substituted urethane

Chemical Abstracts Service (CAS) Registry No.: Not available

Number-average molecular weight: 3000

Weight-average molecular weight: 4800

Maximum percentage of low molecular weight species (polymers and oligomers)
. **(molecular weight < 1000):** 3%
. **(molecular weight < 500):** 0.5%

Means of identification (list of spectral data available):

IR spectroscopy

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: soft, tacky, light yellow mass

Density: 1070 kg/m^3

Melting Point: -50-40°C (approximate softening range, endothermic reactions)

Explosive Properties: not explosive

Reactivity: toxic, severely irritating decomposition products may be formed if the notified substance is heated above 200°C

Comments on physico-chemical properties

A test report on water solubility provided by the notifier used a method based on surface tension changes and involves using 3 assumptions which are considered to be at best questionable according to the report supplied. The water solubility is expected to be significantly less than 5% , based on the high molecular weight, the long chain aliphatic portion of the substance and lack of ionisable groups.

The test for measurement of dissociation constant was not performed. The notified polymer does not contain ionisable groups.

The partition coefficient is expected to be relatively high due to the expected low solubility in water.

Hydrolysis of the notified polymer is not expected under environmental conditions due to the expected low solubility in water.

While hydrolysis, partition coefficient and adsorption/desorption information is not required for PLCs, the comments above have been included due to doubts as whether the polymer meets the water solubility criteria and the relatively high release to the aquatic compartment.

4. PURITY OF THE CHEMICAL

Purity: 97%

No hazardous residual monomer is present at a level greater than 1%.

5. INDUSTRIAL USE

The notified polymer is to be used as a textile soil release and oil water repellant finish for fabric.

6. OCCUPATIONAL EXPOSURE

The notified polymer as a component of an emulsion at 18-22% will be imported in 200L polyethylene drums at a rate of 5-10 tonnes per year for the first five years.

The imported emulsion will be pumped to a stainless steel mixing tank containing other finishing products using a small automatic dosing pump. Application of the notified polymer to fabric is carried out automatically in an application bath following which the fabric dried in a vented heating chamber. There is not expected to be any exposure of workers during application.

7. PUBLIC EXPOSURE

The notified polymer will be covalently bound to the fabric it is used to treat. Although the public will come into contact with the treated fabric, the polymer will be in a form which will limit its accessibility to the user. As a result public exposure is expected to be negligible.

8. ENVIRONMENTAL EXPOSURE

. Release

Once the polymer is covalently bound to the fabric there should not be any releases from the fabric when articles made using the treated fabric are used.

When Zonyl 8110 is used by textile mills in the treatment of fabrics, releases to the environment should be limited to left over pad liquor. The drums containing the polymer are expected to be rinsed with water, with the rinsate added to the mixing vessel, before they leave the mill for disposal (expected to be by a drum recycler). Loss of the polymer as drum residues has been calculated by the notifier as between 50 to 100 g per drum. The notifier estimates that a maximum of 50 L of pad liquor will be left after each run, containing up to 2.5 kg of Zonyl 8110 (513 g of the polymer).

. Fate

Most of the notified chemical is expected to be covalently bound to fabrics, with the final environmental fate being incineration or landfill. The polymer in the left over pad liquor is disposed of via the sewer. At one site there is on-site treatment facilities involving the use of flocculants and several other sites have settlement tanks for treating their effluent before release to the sewer. With the expected low solubility in water and the resulting high adsorption coefficient, the notified chemical is expected to be adsorbed to the sludge when the effluent from the textile mills is treated in the on-site facilities and the sewage treatment works. The sludge from the on-site treatment and the sewage treatment works is either incinerated or landfilled.

There was no biodegradation data provided which is considered acceptable for polymers of NAMW > 1000 or of low concern.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymer with MW >1000, according to the *Industrial Chemicals (Notification and Assessment) Act 1989.* The polymer would not be expected to cross biological membranes, due to its expected low solubility and high molecular weight and therefore is not expected to bioaccumulate.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

Most of the imported polymer will be covalently bound to the treated fabrics and in this form there is little environmental exposure and therefore no hazard. The final fate of most fabrics is landfill or incineration. Incineration of the polymer bound to the fabric is expect to generate oxides of carbon and nitrogen together with water and a small amount of hydrogen fluoride. In landfill, the polymer covalently bound to fabric is not expected to leach. The environmental hazard when the treated fabric is disposed by landfill or incineration is expected to be negligible.

Release to the environment is expected to be limited to the waste from the pad liquors, stated by the notified to be a maximum of 50 L of liquor per run, containing 510 g of the polymer. This is expected to be disposed of via the sewer at most sites. The notifier estimates usage of Zonyl 8110 to be 2 tonnes per site per annum over 50 working days, 8 runs per day. Therefore 4.1 kg of the polymer is expected to be released for each day of use, approximately once a week. Assuming no removal in the various treatments, the predicted environmental concentration for a metropolitan based mill

Amount in sewage effluent	4.1 kg per day (when used)
Volume of effluent (typical city)	250 ML per day
Concentration of polymer in effluent	0.016 ppm
PEC in ocean (1:10 dilution)	0.0016 ppm

For a rural based site, with the effluent treated in small sewage treatment plant and discharging to river

Volume of effluent	5 ML
Concentration in effluent	0.82 ppm
PEC in river (1:2 dilution)	0.41 ppm

As the polymer is expected to have low solubility in water and strong absorption, some of the polymer is expected to be removed in the on-site treatment and the sewage treatment works and thus the PEC is expected to be significantly less than that above. Non-ionic polymers with NAMW > 1000 are of low concern (1), and therefore the environmental hazard is expected to be low.

Accidental spills during transport or during formulation are expected to be cleaned up according to the MSDS. The instructions in the MSDS are adequate to limit environmental exposure.

The overall environmental hazard is rated as low.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Zonyl 8110 has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the *Industrial Chemicals (Notification and Assessment) Act, 1989.* The polymer meets most of the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act except for water solubility. However, this should not contribute to mammalian toxicity and the notified polymer can be considered of low hazard to human health.

Exposure to the notified polymer is likely to be limited to the pumping operation into the mix tank prior to application and is likely to result from small spills and drips from the spear inserted into the drum. However, the level of exposure may be considered to be minimal.

The risk of adverse occupational and public health effects arising from transport, storage, use and disposal of the notified polymer is expected to be low.

12. RECOMMENDATIONS

To minimise occupational exposure to Zonyl 8110 the following guidelines and precautions should be observed:

. if engineering controls and work practices are insufficient to reduce exposure to a safe level, then personal protective devices which conform to and are used in accordance with Australian Standards (AS) for eye protection (AS 1336, AS/NZS 1337) (2,3) and impermeable gloves (AS 2161) (4) should be worn. Industrial clothing (AS 2919) (5) and footwear (AS 2210) (6) also should be worn;

. good work practices should be implemented to avoid spillages and splashing;

. use only with adequate ventilation;

. good housekeeping and maintenance should be practised. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal in accordance with Local or State government regulations;

. good personal hygiene should be observed; and

. a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

13. MATERIAL SAFETY DATA SHEET

The attached Material Safety Data Sheet for the prospective imported product containing Zonyl 8110 was provided in accordance with Worksafe Australia's *National Code of Practice for the Preparation of Material Safety Data Sheets* (7).

This MSDS was provided by Du Pont (Australia) Limited as part of their notification statement. The accuracy of this information remains the responsibility of Du Pont (Australia) Limited.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Zonyl 8110 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. Nabholz J V, Miller P and Zeeman M, "Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act TSCA Section Five", in *Environmental Toxicology and Risk Assessment*, W. G. Landis, J. S. Hughes and M. A. Lewis (Eds), pp 40-55.

2. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia.

3. Standards Australia, Standards New Zealand 1992, *Australian/ New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

4. Standards Australia 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves*), Standards Association of Australia Publ., Sydney, Australia.

5. Standards Australia, 1987, *Australian Standard 2919 - 1987 Industrial Clothing,* Standards Association of Australia Publ., Sydney, Australia.

6. Standards Australia, Standards New Zealand 1994, *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

7. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, AGPS, Canberra, Australia.