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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

RC 64400

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

RC 64400

1. APPLICANT

DuPont (Australia) Limited of 49-59 Newton Road WETHERILL PARK NSW 2164 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, RC 64400.

2. IDENTITY OF THE CHEMICAL

RC 64400 is considered not to be hazardous based on the nature of the polymer and the data provided. Therefore, the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition, physicochemical properties and details of exact import volume and customers have been exempted from publication in the Full Public Report.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	viscous, clear liquid (polymer solution containing 50% polymer, 50% toluene/mineral spirit)
Melting Point:	not determined
Density	1.001 $kg.L^{-1}$ 0.9107 $kg.L^{-1}$ (50% polymer solution)
Flammability Limits:	LEL 1.0%, UEL 7% for polymer solution
Flash Point:	between $^{-}$7ºC and $^{-}$23ºC for paint containing notified polymer
Water Solubility:	not determined, see comments below
Polymer Stability:	see comments below
Charge density:	functional group equivalent weight of 2 880 daltons

Comments on Physico-Chemical Properties

Water solubility has not been determined. However, the notifier claims that the polymer will have low water solubility by analogy with similar alkyds and polyesters polymers, which have low water solubility. Additionally, the application of the polymer as a protective topcoat automotive finish requires low water solubility. Environment Australia agrees that the polymer contains no polar functionalities, which would confer solubility in water, and this together with the high hydrocarbon content indicates very low water solubility.

The polymer is stable under normal conditions of use. It will not hydrolyse, undergo thermal or photo degradation or depolymerisation.

4. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia. Import volumes for the notified polymer are expected to be less than 50 tonnes per annum. The paint will be imported in 3.78 L cans for direct sale to distributor outlets.

It will be imported into Australia as a component (less than 50%) of a solvent based resin vehicle for automotive paint for the economy end of the refinish market, and used in professional spray paint shops to refinish cars and other vehicles. There are approximately 4 000 professional spray shops in Australia. The product containing the notified polymer will be used in spray booths with exhaust extraction.

5. OCCUPATIONAL EXPOSURE

The paint product containing the notified polymer is imported in sealed, 3.78L containers. It is first transported to the notifier's warehouse for storage and then dispatched to licensed distributors for storage and subsequent sale. Exposure of transport and storage workers is unlikely except in the event of an accident.

The paint product is available for sale to professional applicators only. At the spray paint workshop prior to application, an operator will measure the required quantity of paint containing the notified polymer into a measuring flask, adding one of two types of catalyst. Curing of the notified polymer in this paint system can be catalysed either by atmospheric oxygen initiated free radical polymerization or isocyanate (hexamethylene diisocyanate polymer) crosslinking. The choice of the curing technique is a cost driven decision of the end user. A tinter may also be added. The mixture is mixed within the same flask and then poured into the spray gun pot ready for application to the automobile surface. There is potential for eye, skin and inhalation exposure during all these activities.

Depending on the surface area to be sprayed, the quantity of final mixed paint product can range between 0.25 to 4 L, and commonly, 0.5 to 1 L is prepared. The notifier recommends spraying within a spray booth (an isolated area 'booth', equipped with a dedicated exhaust ventilation system designed to contain hazardous vapours and aerosols) and the wearing of

personal protective equipment which is expected to minimise the potential for eye, skin and inhalation exposure.

Potential for skin and to a lesser extent inhalation exposure to the notified polymer, solvents (and isocyanates) exists during cleaning of spray guns and pots.

Waste paint is disposed of into a waste paint drum, which is then sent for solvent recycling.

6. PUBLIC EXPOSURE

The notified polymer will not be sold to the public, but will be applied by industrial customers only. There is little potential for public exposure to the notified polymer during import, storage, transport, preparation or coating, or use of the end products. Minor public exposure to the notified chemical may result from accidental spillage during transport. If spillage occurs as a result of a transport accident, it is expected that the material would be disposed of in accordance with local and State regulations.

After import, the paint containing the notified polymer will be transported to can units in warehouses, then transported to paint shops. The notified polymer is a component of an automotive paint system. Curing of the paint system is achieved either by atmospheric oxygen or use of an isocyanate catalyst. Therefore, drying ovens are not required. There is little potential for public exposure to the notified polymer arising from these processes.

Release of the notified polymer to the general environment as a result of its use as part of an automotive topcoat system is likely to be minimal. The chemical will be immobilised in a cured form. In this form it is not expected that the notified polymer will leach from automotive topcoats, as it is stable and polymerised by oxidative crosslinking. Thus, although contact may be made with the cured paint film, it is unlikely that there would be any significant public exposure to the notified polymer in this form.

7. ENVIRONMENTAL EXPOSURE

Release

Waste paint containing the notified polymer may be generated in the following ways.
Unused/leftover paint after mixing with thinners, hardener, etc, and retained in spray equipment, will be disposed of to a waste drum. This material (totaling up to 10% of paint) is typically sent to a waste disposal company for solvent recovery. The resultant solidified residue is then taken to State Waste Management Centres for consignment to landfill.

Overspray is caught in filters of the spray booth and may constitute from 20 to 50% of total paint sprayed. Solid residues are trapped in the filter, which when due for replacement (typically every three months) is disposed of to landfill, or incinerated.

In approximately 30% of spray shops, a "wet floor" arrangement is used in place of or in combination with dry filters. In this instance, a water trap is used to catch overspray.

Periodically (typically every three months), water from the trap is collected by a waste disposal company for treatment. This treatment usually involves flocculation or centrifugation of the suspended material that is then taken to State Waste Management Centres and either consigned of to landfill or incinerated.

The crosslinked polymer will be effectively inert and be disposed of with the vehicles. Releases of the cured polymer during vehicle repairs, etc. will be diffuse and limited to small quantities of the cured polymer.

Fate

The low water solubility of the notified polymer indicates leaching from landfill sites is not expected. Any incineration of the notified polymer is expected to produce water and oxides of carbon.

The majority of the notified polymer is not expected to be released to the environment until it has been cured into a solid polymer matrix. The resultant matrix structure should limit the hydrolysis or biodegradation of the polymer.

Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer even before curing (Connell, 1989).

8. EVALUATION OF TOXICOLOGICAL DATA

No toxicology data were provided. This acceptable for polymers of number-average molecular weight (NAMW) >1000 according to the Act.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided. This acceptable for polymers of number-average molecular weight (NAMW) > 1000 according to the Act.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

Disposal of the notified polymer to landfill (up to 60% of imported product as either an inert solid or cured paint largely from paint overspray) is unlikely to present a hazard to the environment, as it will be in a solid matrix and is not expected to biodegrade or leach.

The main environmental hazard would arise through spillage in transport accidents that may release small quantities (less than 50% of a 3.78 L tin) of the uncured polymer to drains and waterways. However, the polymer would quickly become immobile on association with soil/sediment layer.

The low environmental exposure of the polymer resulting from the proposed use, together with its expected low environmental toxicity, indicate the overall environmental hazard

should be low.

11. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer will be imported in 3.78 L sealed cans at a concentration of up to 50% by weight of the paint product.

The notified polymer is not water soluble and since it has a molecular weight greater than 1 000, it is unlikely to readily cross biological membranes. The percentage of low molecular weight species below 1 000 is low. Since none of the monomers are classified as hazardous, and the notified polymer does not contain any reactive functional groups, little toxicity from this source is likely. On the information provided, the notified polymer is not considered hazardous and is unlikely to pose a health risk to workers. The main health risk associated with the handling and use of the paint system is related to the solvent content of the product of at least 30% and the addition of the isocyanate catalyst if selected.

Considering the solvents, both xylene and toluene are present in the imported product containing the notified polymer and also appear in the National Occupational Health and Safety Commission (NOHSC) *List of Designated Hazardous Substances* (National Occupational Health and Safety Commission, 1994a). However, both solvents are present in the product at concentrations below their respective concentration cut-off levels. The product contains VM&P naphtha (10 to 30 %) and medium mineral spirits (15 to 40 %). According to the European Commission Dangerous Substances Directive (European Commission, 1996), these would require the product being labeled with risk phrase R65 – Harmful: may cause lung damage if swallowed. In addition, VM&P naphtha is classifiable as carcinogen category 2 (R45 - may cause cancer) if the VM&P naphtha contains greater than 0.1% benzene. It is expected that NOHSC will adopt these European hazard classifications in the near future. Health hazard information for each solvent in the product containing the notified polymer is summarised in the notifier's MSDS.

Isocyanates are irritating to the skin and may cause dermatitis. They are particularly irritating to mucous membranes and may cause isocyanate asthma.

In accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Federal Office of Road Safety, 1998), the product overall is classified as a Dangerous Good (Class 3) because of the solvent content. Therefore, appropriate precautions should be taken during transport, storage and handling. These are outlined in the notifier's MSDS.

The occupational health risk for waterside, transport and storage workers is negligible, as exposure is not expected to occur under normal circumstances.

Spray painters may experience skin, eye and inhalation exposure to the notified polymer, solvents and isocyanate (if the isocyanate catalyst is selected) during the following activities: opening of cans, dispensing of paint product into measuring flasks, and subsequent mixing with catalyst. The product is viscous and unlikely to form aerosols or mists during dispensing and mixing. Therefore, during opening of the cans and dispensing, eye and skin contact is expected to be minimal. The isocyanate types used in this paint system are

formulated as prepolymers. Prepolymers minimise the content of free isocyanate and are of a lower volatility, thus reducing vapour hazard. The notifier recommends the use of local ventilation and personal protective equipment such as protective clothing, goggles, gloves and vapour/particulate respirator, which will serve to minimise exposure by all routes to vapours and any aerosols.

When aerosols are generated during spray-painting, significant eye, skin and inhalation exposure to the notified polymer, solvents and unreacted free isocyanates is expected. The notifier recommends the paint system be applied within a spray booth. The wearing of recommended protective clothing, gloves, goggles and appropriate respiratory protection (see Section 12) should minimise the potential for eye, skin and inhalation exposure and consequently any health effects, to the above substances.

The use of the control measures described above will also serve to minimise the possibility for skin and inhalation exposure to the notified polymer, solvents (and free isocyanate) during cleaning of spray guns and pots.

The NOHSC exposure standards (National Occupational Health and Safety Commission, 1995) should be observed during all phases where worker exposure to the paint system may occur. Regular air monitoring should be conducted to ensure that exposure standards are not exceeded. The exposure standards are: isocyanates, 0.02 mg/m^3 (TWA), 0.07 mg/m^3 (STEL), sensitiser notation; butyl acetate 150 ppm (TWA), 200 ppm (STEL); xylene, 80 ppm (TWA), 150 ppm (STEL); toluene 100 ppm (TWA), 150 ppm (STEL); and aluminium, metal dust, 10 mg/m^3 (TWA).

Regulation 14(1)(a) of the *National Model Regulations for the Control of Workplace Hazardous Substances* (National Occupational Health and Safety Commission, 1994b) provides for health surveillance for isocyanates. Health surveillance should be conducted for any worker who has been identified in the workplace assessment process as having a significant risk of exposure to isocyanates.

There is negligible potential for public exposure to the polymer arising from importation, formulation and industrial application in automotive topcoats. Similarly, the potential for public exposure to the chemical during transport, or disposal of waste after a spill is very minor. The polymer will finally be immobilised as part of an inert, hardened paint film of very low aqueous solubility. Although the public could contact the paint film on motor vehicles, it will only contain the crosslinked polymer in a matrix with pigments and other polymers, and there seems no likely route of exposure and absorption.

12. RECOMMENDATIONS

To minimise occupational exposure to the paint system containing the notified polymer the following guidelines and precautions should be observed:

- Respirators should be selected and fitted in accordance with Australia/New Zealand Standard 1715 -1994: *Use and Maintenance and Respiratory Protective Devices* (Standards Australia/Standards New Zealand, 1994a) and Australian/New Zealand Standard 1716 -1991 *Respiratory Protective Devices* (Standards Australia/Standards New Zealand, 1994b);

- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992);

- Industrial clothing should conform to the specifications detailed in AS 2919 (Standards Australia, 1987) and AS 3765.1 (Standards Australia, 1990);

- Impermeable gloves or mittens should conform to AS 2161 (Standards Australia, 1978);

- All occupational footwear should conform to AS/NZS 2210 (Standards Australia/Standards New Zealand, 1994c);

- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;

- Good personal hygiene should be practised to minimise the potential for ingestion;

- Spray painting booths should conform to AS/NZS 4114 (Standards Australia/Standards New Zealand, 1994d); and

- A copy of the MSDS should be easily accessible to employees.

The NOHSC exposure standards (National Occupational Health and Safety Commission, 1995) should be observed during all phases where worker exposure to the paint system may occur. Regular air monitoring should be conducted to ensure that exposure standards are not exceeded. The exposure standards are: isocyanates, 0.02 mg/m^3 (TWA), 0.07 mg/m^3 (STEL), sensitiser notation; butyl acetate 150 ppm (TWA), 200 ppm (STEL); xylene, 80 ppm (TWA), 150 ppm (STEL); toluene 100 ppm (TWA), 150 ppm (STEL); and aluminium, metal dust, 10 mg/m^3 (TWA).

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13. MATERIAL SAFETY DATA SHEET

The MSDS for the product containing the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994c).

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.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified polymer 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

Connell DW (1989) General characteristics of organic compounds which exhibit bioaccumulation, In: D. W. Connell ed. Bioaccumulation of Xenobiotic Compounds, Boca Raton, CRC Press.

European Commission (1996) EC Council Directive 96/54/EC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, Official Journal of the European Communities, L248, 30 September 1996.

Federal Office of Road Safety (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail, Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1994a) List of Designated Hazardous Substances [NOHSC:10005(1994)], Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1994b) National Model Regulations for the Control of Workplace Hazardous Substances [NOHSC:1005(1994)] Canberra, Australian Government Publishing Service.

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

National Occupational Health and Safety Commission (1995) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)] Canberra, Australian Government Publishing Service.

Standards Australia (1978) Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding electrical and medical gloves), Sydney, Standards Association of Australia.

Standards Australia (1987) Australian Standard 2919-1987, Industrial Clothing, Sydney, Standards Association of Australia.

Standards Australia (1990) Australian Standard 3765.1-1990, Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals, Sydney, Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment, Sydney, Standards Association of Australia.

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

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Standards Australia/Standards New Zealand (1994d) Australian/New Zealand Standard 2210-1994, Spray Painting Booths, Sydney/Wellington, Standards Association of Australia/Standards Association of New Zealand.