File No: NA/188

Date: August 9, 1994

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

ACRYLIC RESIN WB-170

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 Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Human Services and Health.

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.

For Enquiries please contact the Administration Coordinator at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA
Telephone: (61) (02) 565-9466 **FAX (61) (02) 565-9465**

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

ACRYLIC RESIN WB-170

1. APPLICANT

ICI Dulux Australia, McNaughton Road, Clayton VIC 3169

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided Acrylic Resin WB-170 is considered to be non-hazardous. Therefore, the identity of the chemical and its components and impurities have been exempted from publication in the Full Public Report and the Summary Report.

Name: Acrylic Resin WB-170

Method of detection and determination:

Gel Permeation Chromatography analysis used for determination of molecular weight and weight distribution Infra Red Spectroscopy is used to identify the chemical.

3. PHYSICAL AND CHEMICAL PROPERTIES

The majority of this data is for the notified polymer in 2-butoxyethanol solvent, as the polymer is manufactured in a solution of 2-butoxyethanol from which it is never isolated.

Appearance at 20°C and 101.3 kPa:	Viscous, clear, water white
Odour:	Solvent
Boiling Point:	Initially at the boiling point of 2-butoxyethanol of 171°C.
Specific Gravity/Density:	Calculated to be 1.120 for the polymer alone.
Vapour Pressure:	Polymer alone is not expected to be volatile. The polymer in solvent is expected to have the vapour pressure of 2-butoxyethanol = 0.1 kPa at 20°C.
Water Solubility:	Not measured but expected to be insoluble.
Fat Solubility:	Not provided.
Partition Co-efficient (n-octanol/water) log $P_{O/W}$:	Not provided. The polymer is not expected to cross biological membranes due to its high molecular weight.
Hydrolysis as a function of pH:	Not measured but the polymer is not expected to hydrolyse.
Adsorption/Desorption:	Not measured.
Dissociation Constant (pKa)**:**	Not measured.

Flash Point:	Expected to have the flash point of 2-butoxyethanol ie. 64°C.
Flammability Limits:	Expected to be the same as the limits of 2-butoxyethanol solvent at 1.1 -10.6%.
Combustion Products:	Oxides of carbon and nitrogen.
Pyrolysis Products:	Not provided.
Decomposition Temperature:	Not provided.
Decomposition Products:	Not provided.
Autoignition Temperature:	Expected to be the same as 2-butoxyethanol ie. 244°C.
Explosive Properties:	Expected to be the same as for 2-butoxyethanol which has no explosive properties.
Reactivity/Stability:	The polymer in 2-butoxyethanol is stable but should be kept from strong oxidising agents.

Comments on Physico-Chemical Properties

There are no, or very limited, data available on the physical and chemical properties of the polymer itself, due to the polymer not being isolated from the in situ manufactured polymer dispersion. The above data are most cases is for the polymer solution in 2-butoxyethanol.

By analogy with similar polymers, this polymer is not volatile under conditions of use. The polymer solution is expected to boil initially at the boiling point of 2-butoxyethanol, eg 171^{O}C. The vapour pressure would be that of 2-butoxyethanol, ie 0.1 kPa at 20^{O}C.

With regard to solubility and hydrolysis the notifier maintains that "By analogy with similar polymers, the polymer is insoluble in water and is not subject to hydrolysis. However, neither can be measured as the chemical is never isolated from its solvent". Low water solubility is a function of acrylic paint resins and would preclude hydrolysis of the ester and nitrile functionalities at environmental pH.

No data on partition coefficient (n-octanol/water) were provided as this polymer is not anticipated to cross biological membranes because of its high molecular weight.

No data were supplied on Adsorption/desorption. However, as the solvent evaporates from the polymer solution it will become more viscous and sticky and will readily bind to the soil, thereby becoming immobilised.

These explanations are acceptable for this formulation and class of polymer. The polymer contains a small proportion of free carboxylic acid groups, expected to have typical acidity.

4. PURITY OF THE CHEMICAL

Degree of purity: 99.98%

5. INDUSTRIAL USE

The notified polymer is a component of TWX-400 Waterborne Basecoat which is used to coat the external primed steel surface of car bodies. Acrylic Resin WB-170 functions as a film-forming component which after heat-curing reacts to form an integral part of the paint.

Acrylic Resin WB-170 will be imported into Australia at the rate of approximately 1-10 tonnes during the first year and 10-100 tonnes per year during years 2-5. The basecoat will then be produced in Australia.

6. OCCUPATIONAL EXPOSURE

The polymer solution will be transported and stored in 20 L and 200 L drums, and treated as a dangerous good due to the presence of 2-butoxyethanol. Three people are anticipated to be involved in laboratory manufacturing and testing of the polymer for up to 8 hours per day and 20 days per year. Nine workers will be involved in paint manufacture in processes such as paint makeup, quality control testing and transfer processes for up to 8 hours per day for 30 days per year. The paint components are mixed, adjusted, filtered and added to drums. Exhaust ventilation will be utilised during the mixing and transferring. The paint will then be sprayed onto primed steel car bodies using an automatic spray machine inside spray booths with a fume extraction system. In addition to the work being performed at Dulux, a single Dulux customer will receive TWX-400 Waterborne Basecoat and apply it to car bodies in their own premises. A total of thirteen workers may be involved in hand spraying touch-up and one in equipment clean-up for up to 200 hours per year.

7. PUBLIC EXPOSURE

The potential for public exposure to Acrylic Resin WB-170 during paint formulation and application is very low. Operations at the notifiers and customers sites are conducted in bunded areas within which spills would be contained. Overspray is trapped by a water scrubbing system from which paint is separated for disposal by landfill or incineration. Drums containing paint residues will be incinerated, washed and recycled. The physical characteristics of Acrylic Resin WB-170 should confer low water solubility and vapour pressure on the polymer, thereby restricting its environmental mobility in the event of a transport accident.

Although there will be widespread public contact with Acrylic Resin WB-170 on finished car bodies, by this stage the notified polymer will be incorporated into an inert, cured paint film from which absorption would be unlikely.

8. ENVIRONMENTAL EXPOSURE

. Release

The paint formulation process is conducted in a bunded area under exhaust ventilation with the vapours conducted to the plant incinerator. Spillages and rinsate from cleanup procedures are treated by a process aimed at reclaiming and reusing solvent. The accumulated sludge is then dried and consigned to landfill. Estimates of the quantity of paint containing the polymer to be disposed of to landfill from formulation and filling processes are 250 kg per annum.

The formulated paint stored in 20 and 200 L drums is transported to the customer by road.

At the customer site the paint products are sprayed by a combination of electrostatic and air atomised spray. Transfer efficiencies range from 35% to 75% depending on the application method. The resultant overspray is trapped by a high efficiency water scrubbing system. The paint material that is removed by scrubbers is separated using flotation techniques. This separated sludge is then removed

to land fill as approved by the Victorian EPA. Maximum amount of the paint sludge containing the notified substance for annual disposal to landfill is about 15 tonnes.

Empty drums containing paint residues are sent to a recycler who cleans the drums by incineration of the residues in the drums. They are then washed and reused. This process is approved by state authorities and will result in disposal of approximately 200 kg of paint in this way.

. Fate

As the notified substance is a polymer with low water solubility degradation in or leaching from landfill sites is not expected. Incineration of the notified substance is expected to produce water and oxides of carbon and nitrogen.

Most of the notified polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix on the surface of the treated car body. The resultant matrix structure covered by the top colour coat should limit the hydrolysis and biodegradation of the polymer. Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data has been provided which is acceptable under the *Act* for a polymer with Number Average Molecular Weight > 1000.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the *Act*.

Due to its high NAMW the polymer is not expected to cross biological membranes.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is incorporated into the paint and applied to the metal car bodies.

The polymer is also unlikely to present a hazard to aquatic organisms due to the end-use application and the polymer's high molecular weight.

The main environmental exposure arises from landfill disposal of approximately 15 tonne per annum of recovered waste paint containing the resin. However, since it is stable and immobile in soil, environmental hazard is expected to be low.

The paint containing the polymer resin is applied to the body parts of motor vehicles that is covered by the topcoat and protected from the environment. On disposal of the motor body, by resmelting the steel for recycling, the polymer would undergo high temperature incineration.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Acrylic Resin WB-170 polymer is a viscous substance with a low vapour pressure. It is therefore unlikely to be either easily spilled or inhaled. The notified chemical is a high molecular weight polymer with a number average molecular weight of > 1000. Acrylic Resin WB-170 is therefore unlikely to cross biological membranes and is expected to present a low health hazard.

2-Butoxyethanol, the solvent in which Acrylic Resin WB-170 resides, is a hazardous substance with an exposure standard. 2-Butoxyethanol has been declared as a priority existing chemical and will be assessed under NICNAS. Work practices are therefore designed to avoid exposure to this chemical and routine air monitoring is carried out to ensure exposure to this solvent remains acceptable. It is considered that these practices would be adequate to minimise exposure to the notified polymer. Exhaust ventilation procedures are used during manufacture of the coating TWX-400 Waterborne Basecoat, both during mixing and transfer processes. During application of the Basecoat to primed steel car bodies, automatic spray equipment is used inside spray booths utilising exhaust extraction. Thus exposure via inhalation is controlled by engineering techniques. Spills may occur at several stages of coating manufacture and application, but exposure will be limited by protective clothing and gloves.

Acrylic Resin WB-170 appears to present a low risk to those who work with the substance as a result of its low hazard and engineering controls.

There is potential for widespread public contact Acrylic Resin WB-170 on finished car bodies. However by this stage the notified polymer will be incorporated into an inert, cured paint film from which absorption would be unlikely. It is considered that Acrylic Resin WB-170 will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to Acrylic Resin WB-170 the following guidelines and precautions should be observed:

. If engineering controls and work practices are insufficient to significantly reduce exposure to a safe level, then personal protective devices which conform to and are used in accordance with Australian Standards (AS) for chemical-type goggles (AS 1336; AS 1337) (1,2), impermeable gloves (AS 2161) (3) and protective clothing (AS 3765.1 AS 3765.2) (4,5) should be worn.

. Good work practices should be implemented to avoid splashing or spillages.

. Good personal hygiene should be adopted.

. A copy of the MSDS for Acrylic Resin WB-170 and products containing it, such as TWX-400 Waterborne Basecoat, should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for Acrylic Resin WB-170 was provided in Worksafe Australia format (6). (Attachment 1). This MSDS was provided by ICI Dulux Australia as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of ICI Dulux Australia.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of Acrylic Resin WB-170 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

1. Australian Standard 1336-1982, *Eye protection in the Industrial Environment*, Standard Association of Australia Publ. Sydney, 1982.

2. Australian Standard 1337-1984, *Eye protectors for Industrial Applications*, Standard Association of Australia Publ. Sydney, 1984.

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

4. Australian Standard 3765.1-1990, *Clothing for Protection against Hazardous Chemicals*, Standard Association of Australia Publ., Sydney 1990.

5. Australian Standard 3765.2-1990, *Clothing for Protection against Hazardous Chemicals Part 2 Limited Protection Against Specific Chemicals*, Standard Association of Australia Publ., Sydney 1990.

6. National Occupational Health and Safety Commission, *Guidance Note for Completion of a Material Safety Data Sheet* 2nd Edition, Australian Government Publishing Service., Canberra, 1990.