File No: PLC/269

February 2002

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

HP-88-8215

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act* 1989 (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Ageing.

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, National Occupational Health and Safety Commission, Plaza level, Alan Woods Building, 25 Constitution Avenue, Canberra ACT 2600 between 9am to 5pm Monday to Friday.

Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

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Director
Chemicals Notification and Assessment

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1. APPLICANT

PPG Industries Australia Pty Ltd of Mc Naughton Road Clayton VIC 3168 (ACN 055 500 939) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC), HP-88-8215.

2. IDENTITY OF THE CHEMICAL

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

Marketing names: HP-88-8215

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

Additives/adjuvants:

Chemical name	Synonym	CAS no.	% weight
Solvent naphtha, petroleum, light aromatic	Aromatic Solvent	64742-95-6	10-29
n-butyl alcohol	Butyl hydroxide	71-36-3	1-9
2-Pentanone, 4-hydroxy-4-methyl-	Diacetone alcohol	123-42-2	1-9

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is a condensed, branched polyester resin containing only carboxylic and hydroxyl functional groups.

The notified polymer is manufactured in a solvent solution and cannot be isolated. No test reports were provided for the determination of physical and chemical properties.

The following physico-chemical properties are for the imported polymer solution containing >60% notified polymer, unless otherwise stated.

Property	Result	Comments
Appearance	Clear pale yellow liquid	
Boiling point	Not determined	
Density	1.05 g/cm^3	
Water solubility	Not determined	The notifier claims that the polymer is insoluble in water and is not designed to be dispersed in water. Polyesters are known to be insoluble in water.
Particle size	Not applicable	The polymer is never isolated from the solvent system.
Flammability	The product containing the notified polymer is a flammable liquid.	Burning may emit toxic fumes.
Autoignition temperature	Not applicable	The polymer is never isolated from the solvent system.
Explosive properties	The polymer itself is not expected to be explosive.	
Stability/reactivity	Not determined	The polymer itself is not expected to be reactive or decompose.
Hydrolysis as function of pH	Not determined	Saponification of esters may take place under extreme conditions such as elevated temperatures, and in the presence of acid or base catalysts. However, in the absence of a catalyst, and under ambient temperatures and in pH conditions found in the environment, no hydrolysis of the notified polymer is anticipated. The polymer is not

		expected to undergo hydrolysis, thermal degradation, photodegradation or depolymerisation under normal environmental conditions.
Partition coefficient	Not determined	The polymer is expected to partition into the octanol phase due to its low water solubility,
Adsorption/desorption	Not determined	The polymer is not expected to be mobile in soils due to its low water solubility.
Dissociation constant	Not determined	The polymer is not ionic and is therefore not expected to dissociate.

6. USE, VOLUME AND FORMULATION

Use:
The notified polymer will be used as a binder in coil coating primers.

Manufacture/Import volume:
Greater than 50 tonnes/year of the notified polymer will be imported and/or manufactured for the next five years.

Formulation details:
The polymer will not be manufactured in Australia; however, there is a possibility that it will be manufactured in Australia in future. Initially, it will be imported in 200 L polylined steel drums containing >60% notified polymer. The polymer solution will subsequently be formulated into coatings containing <30% notified polymer. The formulated coatings will be packed and stored in 20L or 200L steel drums for professional applications only.

7. OCCUPATIONAL EXPOSURE

The coating manufacture is conducted in batch sizes between 900 and 18000 L, and the number of batches per year varies between 100 and 200, depending on customer requirements. The polymer is blended with other ingredients using a high-speed mixer. After quality control, the batch is filtered and transferred to a filling machine to fill paint can and steel drums. The formulation process is fully automated and the filling process is partially automated.

Professional painters will apply the formulated coating by the coil coating process, which is fully enclosed and automated process. After application, the coated material is baked in an oven and subsequently cooled to dry the coating.

The following table summarises the exposure scenarios during coating manufacture, end use and, transport and storage.

Exposure route	Exposure details	Controls indicated by notifier
Coating Manufacture		
Paint make-up (3 workers, 8 hours/day,30 days/year)		
dermal	Possible skin contamination during addition of polymer solution to high-speed mixer. Subsequent operations enclosed. Possible skin contamination if cleaning or maintenance of machinery is required.	• Fully automated process • General and local exhaust ventilation employed. • Personal Protective Equipment (PPE): overalls, safety glasses and chemical resistant gloves
QC testing (3 workers, 8 hours/day, 30 days/year)		
dermal	Possible skin contamination when preparing small scale formulations or testing small samples prior to drum filling.	• QC testing is performed in a fume hood • PPE: safety glasses, disposable gloves and a laboratory coat for personal protection.
Filling containers (3 workers, 8 hours/day, 30 days/year)		
dermal	Dermal exposure to spills when connecting and disconnecting filling lines and cleaning of equipment.	• Process largely enclosed and automated • General ventilation employed • PPE – overalls, safety glasses and chemical resistant gloves
End Use		
Paint application (30 workers, 4 hours/day, 220 days/year)		
dermal	Exposure may occur when handling open containers of paint, activation and thinning of paint and addition to coil coating machinery. Cleaning and maintenance of application and mixing equipment.	• Coil coating process is a well ventilated and automated process with fume extraction in place. • Paint vapour is vented via a stack to the atmosphere. • PPE – anti-static flame retardant coveralls, anti-static footwear, impervious gloves and eye protection with face shields.

Transport and storage		
dermal	Possible skin contamination if accidental spillage occurs and clean-up is required.	Standard sturdy containers and use of correct equipment and machinery for internal and external transport.

8. PUBLIC EXPOSURE

The public may be exposed to the polymer in its imported form or as a component of paint in the event of serious transport accidents or accidents at processing sites. The notified polymer will be used in industrial coating processes and will not be sold to the public. The coil coating covers the polymer containing paint with a baked-on topcoat of non-polymer containing paint. This topcoat will prevent any transfer of the polymer to the skin in the unlikely event that the public will handle the coils. There are no intended domestic uses of the paint. Therefore, the potential for public exposure to the notified polymer is assessed as negligible.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

The polymer solution is a mixture of the notified polymer and aromatic hydrocarbon solvents. Although the solvents are volatile, release of the polymer to the atmosphere is expected to be negligible since the polymer is non-volatile.

Some release of the notified polymer is expected to occur during manufacture of the coating. Release is likely to occur during blending, batch adjustment and filtration and filling. Should a spill occur it would be contained in the plant through bunding. The notifier estimated that up to 100 kg per annum of the polymer is likely to be released through accidental spills, equipment cleaning and rinsing of import drums.

During the coil coating process no accidental release of the notified polymer is expected as the process is fully enclosed. Transfer efficiency of the coil coating process is estimated to be at least 90%. Spills, and cleaning of the application and mixing equipment is estimated to generate approximately 28 tonnes of waste notified polymer per annum. Residue from empty coating containers is estimated to be 560 kg of the polymer.

The notifier states that all waste generated by the formulation and application processes will be disposed of by PPG. PPG have developed a process whereby solvent is reclaimed by distillation from the waste resin and paint, and the residue containing the notified polymer converted to an inert solid which is disposed of to landfill or incinerated with the release of water vapour and oxides of carbon.

It is assumed that the majority of the notified polymer shares the fate of the coated articles at the end of their useful lives. This is expected to be landfilling or recycling, in which case the polymer would be destroyed by the high temperatures in the blast furnaces.

9.2. Fate

The majority of the wasted polymer will be disposed of to landfill in solid form after reclamation of the solvents. In landfill, the polymer is expected to be immobile due to its insolubility and is not expected to migrate into the aquatic compartment.

Although it is difficult to predict the course of degradation of the notified polymer in the environment in the absence of specific physico-chemical data, it is anticipated that the polymer will slowly degrade via abiotic processes. Degradation products are expected to be carbon dioxide and water.

Recycling of coated articles will presumably result in the polymer being incinerated to water vapour and oxides of carbon.

It is expected that approximately 660 kg per year of the notified polymer will eventually be disposed of to landfill as a residue from PPG solvent reclamation process. The majority of the polymer is likely to ultimately be disposed of to landfill as the coating on treated articles. In both cases, it will be in a solid inert form, as such its mobility and solubility is expected to be minimal; therefore, it is unlikely to leach out.

Due to its high molecular weight and low water solubility, the polymer is unlikely to bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

There is no toxicology data available on the notified polymer. The polymer is not isolated from the solution.

The health hazards of the constituents and hazardous impurities, additives and adjuvants are tabulated below.

Chemical	Health hazards	Regulatory controls
Constituents Residual monomers and reactants	Unknown; all present at low concentrations	
Hazardous impurities	None stated	
Additives/adjuvants The notified polymer is contained in a 10-30% hazardous aromatic hydrocarbon solvent system	May cause eye and skin irritation, may result in nausea, vomiting and central nervous system depression if swallowed and may cause irritation to the mucous membranes and respiratory tract if inhaled, may cause lung damage if swallowed.	Hazardous Substance R65; Xn $\geq$ 10 % – (NOHSC, 1999a). Scheduled Poison S5 (AHMAC, 1999).
n-butanol	Irritating to respiratory system and skin. Risk of serious damage to eyes (Richard, 1996).	NOHSC Exposure Standard with skin notation (Sk); peak exposure; 50 ppm (NOHSC, 1995).
Diacetone alcohol	Irritating to respiratory system and skin. Risk of serious damage to eyes (Richard, 1996).	NOHSC Exposure Standard of 50 ppm time weighted average (NOHSC, 1995).

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSSESSMENT

An estimated 100 kg per annum of the notified polymer is expected to be released from accidental spills, equipment cleaning and rinsing of import drums during formulation of the coating.

The coil coating process in expected to be at least 90 % efficient as it is fully enclosed, therefore all overspray from application is trapped within the equipment. Cleaning of the equipment is expected to generate up to 28 tonnes of waste notified polymer and residue from empty coating containers 560 kg.

All waste notified polymer, including from the coil coating sites, will be converted to an inert solid during distillation process at PPG to reclaim the solvent. The solid residue will be

disposed of to landfill or incinerated with the release of water vapour and oxides of carbon. In landfill the polymer is expected to be immobile due to its insolubility in water, and is not expected to migrate to the aquatic compartment. It is anticipated that the polymer will degrade slowly through abiotic processes. The majority of the notified polymer will share the fate of the coated articles at the end of their useful lives. This is expected to be landfilling or recycling.

The environmental risk posed by the polymer when subject to normal use and application is considered to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological data has been provided on the notified polymer. Considering the high molecular weight, the notified polymer is unlikely to cross biological membranes. The polymer meets the PLC criteria and is unlikely to be a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b).

The polymer is not isolated from solution. The MSDS for the imported polymer solution containing >60 % notified polymer, states that it may cause eye and skin irritation, may result in nausea, vomiting and central nervous system depression if swallowed and may cause irritation to the mucous membranes and respiratory tract if inhaled.

Due to the solvents present (10-30 % aromatic hydrocarbon solvent system), the product is classed as a hazardous substance and warrants the following risk and safety phrases: Xn (harmful), R65 (may cause lung damage if swallowed), S16 (Keep away from sources of ignition), S23 (do not breath vapour), S24/25 (avoid contact with skin and eyes) and S62 (if swallowed, do not induce vomiting, seek medical advice immediately and show the container or label). It is a dangerous good, Class 3, flammable liquid (ADG Code, 2001) and is a schedule 5 poison (AHMAC, 1999). There are NOHSC exposure standards for *n*-butanol and diacetone alcohol. *n*-Butanol is also assigned with a skin notation (NOHSC, 1995).

13.2. Occupational health and safety

Skin contamination with the notified polymer may occur during coating manufacture, QC testing, cleaning of spills, and maintenance and cleaning of equipment. The manufacturing process is enclosed, with local exhaust ventilation provided. QC testing provides the possibility of exposure to small quantities of the notified polymer when collecting samples. Workers handling the polymer solution will wear personal protective equipment consisting of safety glasses, protective gloves and overalls.

Dermal exposure to the notified polymer in the finished paint may also occur during paint drumming off, paint make-up and during coil coating process. The filling process is largely automated and the coil coating process in fully automated and enclosed. Workers will wear anti-static flame retardant coveralls, anti-static footwear, impervious gloves and eye protection with face shields to minimise skin contamination during coil coating process. These controls will also provide protection against exposure to other constituents of the

formulated coating. The low toxicological impact and the control measures in place render the health risk from the notified polymer for the workers as low.

Once the final paint mix has hardened, the notified polymer is bound within the matrix and unavailable for exposure.

Exposure of transport and storage workers is only possible in the event of accidental spillage. The health risk for transport and storage workers handling the notified polymer is expected to be negligible under normal conditions.

Conclusion
The notified polymer is of low hazard to human health and safety. The control measures in place during coating manufacture, quality control, transfer and filling operations, and end use will ensure sufficient protection against exposure to the notified polymer. No specific additional risk reduction measures are necessary.

Given the hazardous nature of the aromatic hydrocarbon and other solvents contained within the polymer solution, the use of effective airflow monitoring and ventilation systems may be necessary to maintain exposure levels below the relevant NOHSC exposure standards.

13.3. Public health

The notified polymer will only be available for industrial use and will not be sold to the public. The public may be exposed to the polymer only in the event of an accidental spill. Although toxicity data is lacking, the potential for exposure of the public to the polymer is assessed as negligible. Therefore, it is considered that the notified polymer will not pose a significant hazard to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the polymer solution provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

The label for the polymer solution provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

Regulatory controls

- Use the following risk phrases for the polymer solution:
  - ≥10%: Harmful – May cause lung damage if swallowed (R65)

- The polymer solution should be classified as follows under the ADG Code:
  - Class 3 (Flammable Liquid) and packing group II

- Suppliers should label the polymer solution as a Class [3] dangerous good with the signal word [Flammable] and the risk and safety phrases listed above.

Control Measures

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer in solution:
  - Exhaust ventilation during coating manufacture and filling process
  - Enclosed and automated coating manufacture and filling processes, and paint application
  - Use of air flow monitoring and ventilation system to ensure that atmospheric exposure is below the relevant NOHSC exposure standards

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer in solution:
  - During transfer operations and cleaning of equipment, avoid spills and splashing

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
  - Chemical resistant gloves
  - Protective clothing which protects the body, arms and legs
  - Goggles or eye protection with side shields
  - Antistatic footwear, anti-static flame retardant coveralls and respiratory protection during paint application

  Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- 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 using absorbent/inert material (sand/soil) to collect material and seal in properly labelled containers for disposal.

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.

16. REFERENCES

Australian Health Ministers Advisory Council (AHMAC) (1999) Standard for Uniform Scheduling of Drugs and Poisons, Australian Government Publishing Service, Canberra.

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

Federal Office of Road and Safety, Australian Code for the Transport of Dangerous Goods by Road and Rail (1998), Australian Dangerous Goods Code, 6th Edition, Australian Government Publishing Service, Canberra

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

National Occupational Health and Safety Commission (1999b) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

Richard SR, L (1996) SAX's Dangerous Properties of Industrial Materials, 9th Edition, Van Nostrand Reinhold, USA.