File No: PLC/207

December 2000

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Morfree C411

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 Aged Care.

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Director
Chemicals Notification and Assessment

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1. APPLICANT

Rohm and Haas Australia Pty Ltd of 969 Burke Road CAMBERWELL VIC 3124 (ACN 004 513 188) and Coates Brothers Australia Pty Ltd of 323 Chisholm Road AUBURN NSW 2144 (ACN 000 079 550) have submitted a joint notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) "Polymer in Morfree C411".

2. IDENTITY OF THE CHEMICAL

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

Marketing name: Polymer in Morfree C411 (80 % of notified polymer)

3. POLYMER COMPOSITION AND PURITY

Purity (%): >99%

Hazardous impurities (other than residual monomers and reactants): None.

Non-hazardous impurities at 1% by weight or more: None.

Additives/adjuvants:

Exempt information

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported as an 80% solution in organic solvents. The properties reported below are those of the polymer solution unless stated otherwise.

Property	Result	Comments
Appearance	Amber coloured liquid.	
Specific gravity	1.1	
Water solubility	Not determined.	The water solubility is expected to be low.
Particle size	Not applicable.	Imported product is a liquid.
Flammability	Not determined.	Not expected to be flammable.
Autoignition temperature	Not determined.	
Flash point:	Not applicable.	
Explosive properties	None.	
Stability/reactivity	The polymer is expected to be stable under normal conditions of use.	

5.1 Comments on physical and chemical properties

No attempt was made to determine the water solubility of the notified polymer. However, the notifier has provided information for a structurally similar polymer obtained using OECD TG 105. The analogous polymer has a number average molecular weight of < 10,000 g/mol and a water solubility of 71 mg/L. The notified polymer is expected to have a water solubility less than 71 mg/L due to its: (a) similar number average molecular weight; (b) similar proportion of low molecular weight species; and (c) level of hydroxyl groups present. Therefore, the water solubility of the notified polymer is expected to be low. The polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH. However, hydrolysis is unlikely in the environmental pH range of between 4 and 9.The notified polymer contains only reactive functional groups of low concern. It is expected to remain stable under ambient conditions.

6. USE, VOLUME AND FORMULATION

The notified polymer will be used as one component of a two-pack laminating adhesive used in snack food packaging and other general packaging.

The notified polymer will not be manufactured in Australia. It will be imported as a component of Morfree C411 (80%, w/w), in 200L steel drums. The estimated quantity of the notified polymer in Morfree C411 to be imported is approximately 10 tonnes in the first year increasing to 30 tonnes per annum after 5 years.

The imported Morfree C411 will be blended with other ingredients to form an adhesive. The blended adhesive (37% w/w notified polymer) will be applied by a gravure coating process,

whereby two polymer and/or aluminium films are laminated together and the adhesive is sandwiched by the films.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Laminating machine operators		
Blending adhesive & operating laminating machine (8-20 workers 6-8 hours/day, 50 days/year).		
Dermal and ocular.	Morfree C411 (80% notified polymer) is decanted from drums by gravity feed into 50-100 L stainless steel vessels. A second component of the adhesive system is added to the mixing vessel and mechanically stirred for 15 minutes.	Blending vessels are in a bunded area with local exhaust ventilation.
	Application of adhesive mixture (37% notified polymer) onto laminating machine rollers (adhesive in tray) – mechanical processes.	Laminating machine is open and fitted with exhaust ventilation.
	Unused adhesive in the laminating machine tray or reservoir is manually transferred to a waste adhesive and solvent drum.	Operators wear safety glasses, impervious gloves, coveralls and safety boots.
	Residue on the laminating machinery is wiped off manually using rags and ethyl acetate.	
Packaging		
Packaging line operators (number of workers not specified)		
Dermal	Workers at the packaging factories will pack snack food into the material containing the notified polymer. They will handle the laminated material and packed snack food where the notified polymer is unavailable for absorption.	Not specified.
Transport and storage		
5 waterside workers, 10-15 transport & warehouse workers		
Dermal and ocular.	Workers will handle Morfree C-411 containing 80% notified polymer and packed products where the notified polymer (37%) is unavailable for absorption.	Not specified.
	Exposure to the 80% resin solution is	

	only possible in the event of a spill.	
Disposal		
Dermal and ocular.	Drums containing residues are re-used on-site for waste cleaning solvent and adhesive. A licensed hazardous waste contractor disposes of the drums of waste solvent.	Not specified.

8. PUBLIC EXPOSURE

The notified polymer is not available for sale to the general public and will be used as an ingredient in laminating adhesive products for use in snack food and other packaging applications. The potential for public exposure to the notified polymer during transport, reformulation or disposal is assessed as negligible. Although members of the general public will handle packaging manufactured using the notified polymer and consume food from packaging, the notifier has stated that the notified polymer is unavailable since it is sandwiched between two impervious layers. Exposure during end use is unlikely.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Any spilt material will be contained in the blending/operational bunding. It is estimated that between 20 and 40 kg of Morfree C411 (ie 16–32 kg of notified polymer) will be lost per customer site via spills. Initially there will be two customer sites but this may increase to five, so the maximum total amount of notified polymer lost due to spills at customer sites would be 160 kg. It is likely that the spilt Morfree C411 and the associated clean-up materials will be disposed of to landfill. The notifier has estimated that the empty import drums will contain approximately 1 kg of residual Morfree C411. Importation of 30 tonnes of Morfree equates to a loss of 120 kg of the notified polymer annually. The notifier has estimated that 1% of the blended adhesive will be wasted, which equates to 240 kg of notified polymer. The empty importation drums are used to collect waste cleaning solvent and the unused/waste-blended adhesive, and are collected by licensed waste contractors for disposal. The waste solvent and any liquid adhesive and Morfree C411 will be incinerated. The empty drums and any solid Morfree C411 or adhesive will then be disposed of to landfill. The notifier has estimated that approximately 1 kg of the blended adhesive will remain on the blending and laminating equipment. This equipment will be cleaned daily with rags and solvents, which will be collected and disposed of by licensed waste contractors. The notifier has estimated that the adhesive will be blended and used for 50 days per year. Therefore, at maximum import levels, 18.5 kg of the notified polymer will be lost in this manner.

9.2. Fate

Notified polymer spilt or wasted during the formulation process, will be disposed to landfill by licensed hazardous waste contractors in the 200L steel importation drums. If any leakage were to occur from the importation drums the notified polymer is likely to associate with the soil and would not be expected to leach into the aquatic environment.

The majority of the notified polymer, which is contained in snack food and other packaging, will ultimately make its way into domestic landfill as household garbage. The packaging material will not degrade readily but will ultimately degrade due to chemical and biological actions. Degradation products are likely to associate with the soil and would not leach.

The polymer is not expected to cross biological membranes, due to its molecular weight and predicted low water solubility, and should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were provided. The notified polymer is imported in two organic solvents, neither of which is classified as a hazardous substance according to the NOHSC Approved Criteria for classifying Hazardous Substances (NOHSC, 1999).

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL HAZARD ASSSESSMENT

Minimal release to the aquatic environment is expected during the use of the notified polymer in the formulation of the laminated adhesive. Small quantities of the notified polymer, derived from either spills or residue waste, will ultimately be released to landfill. In landfill, the polymer is unlikely to be mobile in the soil environment and would be expected to slowly degrade to carbon dioxide gas through abiotic and biotic processes. The environmental hazard of the notified polymer in landfill is expected be low. If incinerated, the polymer would be rapidly destroyed and converted to water vapour and oxides of carbon.

Minimal release to the aquatic environment is expected through the disposal of snack food and other packaging to domestic landfill. As the packaging gradually degrades the resulting end polymer is likely to associate with the soil, where it is unlikely to leach out.

The Material Safety Data Sheet (MSDS) has outlined the correct procedure to be followed if the material is accidentally released into soils or waterways. The notified polymer molecular weight and expected low water solubility should prevent bioaccumulation.

The overall environmental hazard is therefore expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

The notified polymer in Morfree C411 is considered stable under normal conditions of use. No toxicological information has been provided for the notified polymer, however, due the high molecular weight and lack of reactive functional groups, it is unlikely to be a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999). Since the notified polymer has high NAMW, absorption across biological membranes would be restricted.

The notifier has determined that the product, Morfree C411, is not a hazardous substance.

13.2. Occupational health and safety

The notified polymer is used as a part of a laminating adhesive system for packaging. Laminating machine operators may be exposed to the polymer during manual addition of the polymer to the mixing vessels and transfer of the mixing adhesive on to the laminating machine rollers. Potential exposure to the notified polymer is by skin contact, with inhalation exposure unlikely due to the high molecular weight and anticipated low volatility of the polymer. Exposure to the operators may also occur during the manual transfer of unused adhesive and wiping residues off the laminator rolls.

Although there is potential for exposure, the risk of adverse health effects due to the notified polymer is low due to its expected low toxicity.

As the operators may be exposed to hazardous chemicals during the mixing and laminating processes, they are to wear personal protective equipment consisting of goggles, coveralls, impermeable gloves and occupational footwear during use.

The notified polymer becomes unavailable for absorption once it is incorporated in the laminated material. The health risk for workers in the food and other packaging industry, and in the distribution and retailing snack food and other products is considered to be negligible.

Transport and storage
There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the polymer solution other than in the event of an accidental spill.

13.3. Public health

The notified polymer is not available for sale to the general public and will be used in laminate adhesive products for use in food and other packaging applications. Although members of the public may consume food from laminated packages manufactured using the notified polymer, the risk to public health from the notified polymer is likely to be low because the notified polymer is sandwiched between two impermeable layers and is unlikely to be bioavailable.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

MSDS for Morfree C411, containing the notified polymer, was provided by the notifier. It 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 Morfree C411 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

To minimise occupational exposure to the Polymer in Morfree C411, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer;
- Spillage of the adhesive should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of goggles may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a) or other internationally acceptable standards.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

(i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified chemical) becomes aware of any of these circumstances, they must notify the Director within 28 days; or

(ii) the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

17. REFERENCES

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.

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

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

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

Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

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

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

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.