File No: NA/469

Date: May 1997

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Hydran ND-300A

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Hydran ND-300A

1. APPLICANT

ACI Fibreglass of 117 Frankston Road DANDENONG Victoria 3175 has submitted a limited notification statement in support of their application for an assessment certificate for Polymer in Hydran ND-300A.

2. IDENTITY OF THE CHEMICAL

Polymer in Hydran ND-300A is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report and the Summary Report.

Trade Name:	Hydran ND-300A (formulation containing ~80% of the notified polymer)
Number-Average Molecular Weight (NAMW):	> 1 000
Maximum Percentage of Low Molecular Weight Species	
Molecular Weight < 500:	< 10%
Molecular Weight < 1 000:	< 20%

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	viscous, slightly yellow liquid (formulation, Hydran ND-300A)
Boiling Point:	~120°C (formulation, Hydran ND-300A)
Specific Gravity:	~1.2 (formulation, Hydran ND-300A)
Vapour Pressure:	1.68 kPa at 25°C (formulation, Hydran ND-300A)

Water Solubility:	not available
Partition Co-efficient (n-octanol/water):	not available
Hydrolysis as a Function of pH:	not available
Adsorption/Desorption:	not available
Dissociation Constant:	not available
Flash Point:	31°C (formulation, Hydran ND-300A, closed cup method)
Flammability Limits:	Upper Explosive Limit = 2.7% Lower Explosive Limit = 11.75% this is for the solvent, propylene glycol monomethyl ether (PGME),~20% of formulation, Hydran ND-300A
Autoignition Temperature:	not available
Explosive Properties:	not available
Reactivity/Stability:	not available

Comments on Physico-Chemical Properties

The notifier claims that the notified polymer is dispersible in water. The polymer's water solubility is likely to be low, it should be noted that high molecular weight polyesters generally have limited solubility.

The notified polymer contains ester functionalities, which are subject to abiotic and biotic hydrolysis, ie ester hydrolysis and aerobic biodegradation {USEPA, 1995 #39}. However, ester hydrolysis in the expected environmental pH range would be precluded by its expected low water solubility.

The partition coefficient has not been determined and would be difficult to test. The notifier claims that the polymer will partition almost exclusively into the organic phase. The majority of the polymer is not expected to cross biological membranes because of its high molecular weight {Anliker, 1988 #2; Gobas, 1986 #6}.

The notifier claims that the notified polymer will adsorb strongly to the organic matter in soil. It is expected that the polymer will readily bind to, or be associated with, soil and sediment.

The notifier did not measure dissociation. The polymer contains a carboxylic acid moiety at one terminus. The pK_a of this group is expected to be approximately 4.9 (based on the carboxylic acid moiety).

4. PURITY OF THE CHEMICAL

Degree of Purity:	high
Toxic or Hazardous Impurities:	1%
Non-hazardous Impurities (> 1% by weight):	see residual monomers
Maximum Content of Residual Monomers:	< 10%
Additives/Adjuvants:	none, the formulation Hydran ND-300A contains ~20% propylene glycol monomethyl ether (PGME), CAS number, 107-98-2

5. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia. It will be imported into Australia as a component (80%) of the product, Hydran ND-300A, which also contains approximately 20% of the solvent PGME. It will be used as a glass fibre sizings material.

Import volumes for the notified polymer are 1.2 tonnes in year one rising to 2.4 tonnes in year two to five.

The notified polymer will be used as glass fibre sizings material on fibreglass reinforcements. It will only be used at the notifier's site in Dandenong, Victoria. It will not be made available for general public use.

6. OCCUPATIONAL EXPOSURE

Occupational exposure during transport and warehousing is unlikely and will only occur in the event of accidental spillage or leakage from the 200 L drums in which the formulation, Hydran ND-300A, is imported. Occupational exposure will be greatest at the notifier's fibreglass treatment facilities. The formulation will be manually decanted by six "size" operators into a closed mixing vessel where it is diluted from an approximately 80% polymer solution down to approximately 31%. This is undertaken with local exhaust ventilation. The following processes are undertaken with general ventilation only. After dilution the formulation is drummed off and decanted into a second closed tank where it is blended with other

chemicals to a final formulation containing approximately 4% of the notified polymer.

The final formulation is pumped into open trays where it is applied to fibreglass by a roller drum. The "forming" operators will oversee this operation including cleaning and general maintenance. There will be 50 forming operators. The treated fibreglass will contain approximately 0.5% of the notified polymer, which when dried cures into a comparatively inert form.

The formulation Hydran ND-300A also contains approximately 20% of the flammable solvent PGME, this has an occupational exposure standard of time-weighted average (TWA) 100 ppm (369 mg/m^3) and short term exposure limit (STEL) of 150 ppm (553 mg/m^3) {National Occupational Health and Safety Commission, 1995 #14}. The use of exhaust ventilation during manual decanting will reduce exposure to this chemical as well as the notified polymer. The main exposure pathways are likely to be dermal, although the vapour pressure of the formulation, Hydran ND-300A, indicates that inhalational exposure is possible. The vapour pressure is likely to be more representative of the PGME rather than the polymer in the formulation. Ocular exposure to the polymer may occur via splashing. Occupational exposure to the notified polymer when handling treated fibreglass will be reduced further as the polymer cures.

7. PUBLIC EXPOSURE

There is negligible potential for public exposure to Polymer in Hydran ND-300A arising from fibreglass formulating processes. The final product, containing less than 0.5% of the notified polymer, will be available for industrial use only. When cured, the polymer is not expected to leach from its substrate. Based on the use pattern described, there would only be limited opportunity for public contact with the notified polymer.

8. ENVIRONMENTAL EXPOSURE

Release

The notifier estimates that 10% of the notified polymer will be lost during application (up to 240 kg at maximum import volumes) due to spills, drips, leaks, etc. All liquid wastes resulting from the application processes are collected and sent to the on-site wastewater treatment system. The plant consists of dissolved air flotation (DAF) tanks where wastewater is treated with flocculants to separate waste chemicals as sludge. The treated effluent from the DAF tanks is then released to the sewer under discharge licence from the local water authority (South Eastern Water).

Waste also results from the coated fibreglass scraps, and are estimated to be 20% (up to 480 kg at maximum import volumes). The scraps are collected into a

disposal bin which is emptied daily by waste disposal contractors. These wastes are disposed of to landfill.

Fate

The majority of notified polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix. The coating containing the polymer will share the fate of the fibreglass articles to which it is applied.

The fibreglass scraps, which contain approximately 0.5% cured coating material (ie 0.02% notified polymer), will be disposed of to landfill. The notified polymer will be strongly bound within the matrix of the cured coating material. Therefore, no hydrolysis, movement, leaching, biodegradation or bioaccumulation of the polymer is expected.

The notifier expects that liquid waste polymer sent to the plant's waste water treatment plant will be adsorbed strongly to sludge. The sludge from this process is compressed and disposed of as 'prescribed waste' in accordance with Local and State Regulations. Any remaining polymer left in the waste water will be released to the sewer for further treatment. Solids removed from the municipal waste water treatment process are either landfill or incinerated.

Incineration of the polymer is expected to produce water and oxides of carbon. Any chips or flakes of the cured polymer coating that occur (due to chips, accidents, wear and tear, etc) will be inert, diffuse and form part of the sediments.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicology data were provided, which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided, which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The majority of notified polymer will be incorporated into a cured coating for fibreglass articles. The coating containing the polymer will share the fate of the articles to which it is coated. Only one manufacturer will be using the product containing the notified polymer. Fibreglass scraps coated with the cured polymer product will be sent to landfill (up to 480 kg of polymer per year). The environmental hazard through such use and release is considered negligible since releases are low.

Liquid polymer product wastes will be sent to the plant's on-site waste water treatment system (up to 240 kg per year). The notifier expects that the notified polymer will adsorb strongly to sludge. They calculate that, assuming 90% adsorption/separation in the waste water treatment process, approximately 24 kg per year of the notified polymer will be released to the sewer (at maximum import quantities). Assuming 60 production days and 300 000 kg/day of treated wastewater released to the sewer, the 'worst case' concentration of notified polymer released to sewer will be approximately 1.3 ppm. It is expected that the notified polymer will bind strongly to sludge based on its expected low water solubility. Any polymer released to sewer should be removed in the municipal waste water treatment process.

Waste polymer sent to the municipal waste water treatment plant will be handled as part of the normal solid waste recovery, and disposed of to landfill or through incineration. In landfill, the polymer is not expected to be mobile or degrade due to its expected low water solubility. Incineration products are not expected to present a significant hazard to the environment.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

No toxicology data on the notified polymer have been submitted. The NAMW of the polymer is greater than 1 000, which is sufficiently high to prevent its absorption across biological membranes. The notified polymer contains less than 20% of species with a NAMW below 1 000 and less than 10% with a NAMW of less than 500. The high level of low molecular weight species indicates some potential for this substance to cross biological membranes. The maximum weight percentage of residual monomers is 5%, comprising 1% of a designated hazardous substance {National Occupational Health and Safety Commission, 1994 #10}, however the concentration is below the threshold for hazardous classification for this impurity. The polymer will be imported as approximately 80% of the formulation. The other 20%, PGME, is a flammable solvent. The formulation on this basis is classified a Class 3 Dangerous Good {Federal Office of Road Safety, 1992 #5}; PGME has an occupational exposure standard of TWA 100 ppm (369 mg/m^3) {National Occupational Health and Safety Commission, 1995 #14}. PGME is a skin and eye irritant with the potential for percutaneous absorption and hence systemic effects {Toxline Silver Platter, 1996 #27}.

Occupational exposure to the notified polymer will be unlikely during transport and warehousing unless there is accidental spillage or leaking from imported 200 L containers. There is the potential for occupational exposure during reformulation and "forming", the process of application to fibreglass. The greatest risk will occur when handling the concentrated form Hydran ND-300A, which contains approximately 80% of the notified polymer. The most likely exposure pathways will be dermal although ocular exposure is possible. Actual exposure risk will be reduced through the various stages of reformulation and application due to dilution of the polymer. Exposure to the more volatile component of the formulation, PGME, will be minimised by local exhaust and general ventilation. Potential occupational

exposure risks through handling the formulation, Hydran ND-300A will be mainly due to the PGME component.

There is negligible potential for public exposure to the imported formulation Hydran ND-300A during transportation and fibreglass manufacturing operations. Given that products containing the notified polymer are intended for industrial use only, there is low potential for public exposure arising from finished goods. If contact were made with the products containing the notified polymer, significant exposure is not anticipated due to the low final concentration, physical state and relatively high molecular weight of the notified polymer.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Hydran ND-300A the following guidelines and precautions should be observed:

- Industrial clothing should conform to the specifications detailed in Australian Standard (AS) 2919 {Standards Australia, 1987 #18};
- All occupational footwear should conform to Australian Standard/New Zealand Standard (AS/NZS) 2210 {Standards Australia/Standards New Zealand, 1994 #24};
- Spillage of products containing 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;
- A copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

In addition, when handling Hydran ND-300A, the following additional precautions should be observed; these take into account the presence of PGME.

- Safety goggles should be selected and fitted in accordance with AS 1336 {Standards Australia, 1994 #21} to comply with AS/NZS 1337 {Standards Australia/Standards New Zealand, 1992 #23};
- Impermeable gloves or mittens should conform to AS 2161 {Standards Australia, 1978 #17};
- The occupational atmospheric exposure standard for PGME of TWA 100 ppm and STEL of 150 ppm should be observed at all times;

- Where engineering controls are inadequate in maintaining this exposure standard then the appropriate respiratory device should be selected and used in accordance to AS/NZS 1715 {Standards Australia/Standards New Zealand, 1994 #25} and should conform to AS/NZS 1716 {Standards Australia/Standards New Zealand, 1994 #26}.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the formulation 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, 1994 #13}.

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.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical 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. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances [NOHSC:10005(1994)]*, Australian Government Publishing Service, Canberra.

2. USEPA 1995, New Chemicals Program (NCP):Chemical Categories, , gophrer://gopher.epa.gov/00/Offices/PestPreventToxic/Toxic/chemcat/chemcat1.

3. Anliker, R., Moser, P. & Poppinger, D. 1988, 'Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors', *Chemosphere*, vol. 17, no. 8, pp. 1631-1644.

4. Gobas, F. A. P. C., Opperhuizen, A. & Hutzinger, O. 1986, 'Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation', *Environmental Toxicology and Chemistry*, vol. 5, pp. 637-646.

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

6. Federal Office of Road Safety 1992, *Australian Code for the Transport of Dangerous Goods by Road and Rail*, 5th edition, Australian Government Publishing Service, Canberra.

7. Toxline Silver Platter 1996, *Toxline SilverPlatter CD-ROM database: January 1994-June 1996*, Silver Platter International, N.V.

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

9. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

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

11. 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, Sydney/Wellington.

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

13. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1715-1994, Selection, Use and Maintenance of Respiratory Protective Devices*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

14. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

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