File No: NA/370

Date: May 1996

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Luhydran LR8947

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Luhydran LR8947

1. APPLICANT

BASF Australia Ltd of 500 Princes Highway NOBLE PARK VICTORIA 3174, has submitted a limited notification statement with their application for an assessment certificate for Polymer in Luhydran LR8947.

2. IDENTITY OF THE CHEMICAL

The notified chemical contains no hazardous impurities or residual monomers at levels necessary to classify it as a hazardous substance (1). Therefore, information on the chemical name, CAS number, molecular formula, purity of the chemical, details of import volume and customer location has been exempted from publication in the Full Public Report and the Summary Report.

Other name:	Luhydran LR 8947X
Trade name:	Luhydran LR 8947
Structural formula:	the new polymer is a random polymer of the given monomers polymerised into discrete particles and stabilised as a dispersion in water
Maximum percentage of low molecular weight species	
(molecular weight < 1000):	<5%
(molecular weight < 500):	<1%
Method of detection and determination:	the polymer is identified using Infrared (IR) spectroscopy; Gel Permeation Chromatography (GPC) analysis is used to determine molecular weight and weight distribution

3. PHYSICAL AND CHEMICAL PROPERTIES

As the notified polymer is imported for use as an aqueous dispersion, some physical and chemical properties have been determined solely for the dispersion Luhydran LR8947 and not for the polymer. This is indicated below.

Appearance at 20°C and 101.3 kPa:	milky-white liquid (formulation)
Odour:	faint
Melting Point	0°C (formulation, as for water)
Boiling Point:	100°C (formulation, as for water)
Density:	1.05 g/cm^3 at 20°C (formulation)
Vapour Pressure:	2.3 kPa at 20°C (formulation, as for water)
Water Solubility:	polymer dispersion is infinitely dilutable
Fat Solubility:	not supplied
Partition Co-efficient (n-octanol/water):	not determined
Hydrolysis as a function of pH:	not determined
Adsorption/Desorption:	not determined
Dissociation Constant:	not determined
Flash Point:	not determined
Flammability Limits:	not determined
Combustion Products:	CO, CO_2, and N oxides
Pyrolysis Products:	not determined
Decomposition Temperature:	not determined
Decomposition Products:	not determined
Autoignition Temperature:	not determined
Explosive Properties:	not determined
Reactivity/Stability:	considered stable
Particle size distribution:	not applicable (liquid)

- **Comments on physico-chemical properties**

Most of the physical and chemical properties are for the aqueous dispersion containing the notified polymer. The polymer is only imported in this form and is never isolated. Therefore data on particle size, flash point and autoignition temperature could not be determined. The notifier states that the polymer is likely to be insoluble in water by comparison with similar synthetic polymers and for this reason has stated that a dissociation constant is not applicable. Based on the expected low water solubility and its expected high log P_{ow}, it is likely to adsorb to or be associated with soil/sediment and organic matter, and be immobile in soils. It contains no functionalities that would be expected to hydrolyse under environmental conditions. The polymer does not contain ionisable groups and will not dissociate. The aqueous dispersion, the form in which the polymer is manufactured, has no dilution limits.

4. PURITY OF THE CHEMICAL

Degree of purity: >99.8

Toxic or hazardous impurities: refer to residual monomers

Non-hazardous impurities (> 1% by weight): none

Maximum content of residual monomers: <0.1%

The levels of residual monomers in the notified polymer are well below the thresholds specified in the *List of Designated Hazardous Substances* (1) and on this basis the polymer would not be classified as hazardous according to the criteria of Worksafe Australia (2). The exposure standard for a residual monomer that conforms to *Exposure Standards for Atmospheric Contaminants* (3) is specified on the material safety data sheet (MSDS).

Additives/Adjuvants: All additives are below the threshold that would require that the formulation to be classified as hazardous (1).

5. INDUSTRIAL USE, VOLUME AND FORMULATION

The notified polymer is not isolated or manufactured in Australia. It is imported as a dispersion used to formulate industrial paints. The imported dispersion contains approximately 43.2% of the new chemical. The dispersion is imported in 120 litre open head polyethylene drums. The notified polymer is used as a component in a wood surface coating material. The notifier has indicated in their submission that products similar in composition and structure are in use overseas. Estimated import volumes of the dispersion (Luhydran LR 8947) are in the range of 75 - 150 tonnes

per year. This represents approximately 32.4 - 64.8 tonnes per year for the notified polymer for the first five years.

6. OCCUPATIONAL EXPOSURE

Occupational exposure can occur at any one of three stages. The first stage is during the unloading and transport of the containerised drums of the dispersion containing the notified polymer, and warehousing and distribution of the drums to the paint formulator. Exposure will only occur if the dispersion is accidentally released through breakage or rupture of the 120 litre open head polyethylene drums. There is no repackaging prior to delivery to the paint manufacturer where reformulation takes place.

The second stage is during paint reformulation and drumming. This involves possible exposure of approximateley 10 employees for periods of between 2 and 4 hours/day for approximately 10 days/year. The processes involved in reformulating the polymer dispersion into paint include mixing with cosolvents (eg butylglycol), matting agents, defoamers and other additives as necessary. The mixing is undertaken using high speed dispersers and ball mills. Local exhaust ventilation is employed where natural ventilation is inadequate. The concentration of the polymer in the final paint product is approximately <50%.

Paint application is by spray equipment only. The solvent free paint will be applied to MDF fibreboard door panels on an industrial coating line. Occupational exposure during this phase will occur during application and during maintenance and cleaning of the spray equipment. As the paint is applied as a spray, inhalation of paint mist and dermal exposure is possible during application.

7. PUBLIC EXPOSURE

There is negligible potential for public exposure to Polymer in Luhydran LR 8947. The polymer emulsion will be transported by road to a single warehouse and then delivered to a single customer. In the event of a transport accident, the spill is to be contained and soaked up with absorbent material and disposed of by landfill. Alternatively, the spilled material may be allowed to dry prior to consignment to landfill, or be washed from sealed surfaces into the stormwater system. If the aqueous medium evaporates, the notified polymer becomes viscous and would bind to soil, thereby limiting its environmental mobility.

At the customer facility, Luhydran LR 8947 will be mixed with co-solvents, matting agents and defoamers to produce a wood surface coating paint. The final concentration of the notified polymer in the formulation will be <50%. This paint formulation containing Polymer in Luhydran LR 8947 will not be available to the public. The paint will be supplied to industrial users for application by spray equipment to MDF-fibreboard door panels.

Significant public exposure to Polymer in Luhydran LR 8947 is therefore not anticipated to arise from transport, industrial operations or waste disposal.

The public is expected to make contact with painted door panels. However, Luhydran LR 8947 becomes immobile once applied to the wooden substrate, and should exhibit negligible potential for absorption.

8. ENVIRONMENTAL EXPOSURE

. Release

Releases containing the notified polymer will be limited. Mixing and transferring operations are conducted as closed systems. Spills during formulation will be contained and diverted to the plant's waste water treatment plant. Releases through waste washings from the mixing vessels are collected and retained for use in subsequent product manufacture, thereby avoiding discharge to the waste water treatment plant. Contaminated product only will be discharged for effluent treatment.

Application of the coating will be done by automatic spray equipment in an industrial coating line. Spray booths are fitted with local exhaust ventilation. Transfer efficiencies during the spraying are estimated to range from 40% to 70%, however the runoff is recycled and used for further spraying.

Cleaning of the spray equipment will result in releases of the notified polymer to the waste water treatment system. An estimated 2% of the notified polymer will be released per annum.

Residue in containers is expected to result in up to 5% of the polymer sent to landfill.

Releases to the environment of the cured polymer from its end-use as a component of a wood surface coating agent is expected to be minimal as the polymer is considered to be immobile once applied to the wood.

. Fate

The fate of the polymer is either to be bound to articles, disposed of by landfill or sent to the sewer.

The majority of the notified polymer will be part of the coating that is applied to the wooden articles, where it is considered to be immobile. The articles coated would eventually be burnt, disposed of to landfill or reused. Burning of coated articles will result in combustion products such as carbon and nitrogen oxides.

The notified chemicals low water solubility and expected high log P_{OW} indicates it is unlikely to leach. Therefore, disposal of the notified polymer to landfill is unlikely to result in contamination of surface and ground waters.

Disposal of the notified polymer to the sewer is expected to result in partitioning of the polymer to sludge. The solids are disposed of by landfill or incineration. Incineration of the substance in excess air will result in water and oxides of carbon and nitrogen.

9. EVALUATION OF TOXICOLOGICAL DATA

For a synthetic polymer with number-average molecular weight (NAMW) > 1000, toxicology data is not required under the Act. None was provided by the notifier.

The notified polymer has a NAMW of >1000 and is therefore not expected to traverse biological membranes and constitute a toxicological hazard. The notified polymer contains low levels of a number of residual monomers (in total <0.1%, 550 ppm) and low levels of low molecular weight species (<5% with NAMW <1000), they are unlikely to present a toxicological hazard.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

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

The notified polymer is not expected to show ecotoxicity effects as it should not cross membranes and belongs to a class of polymers recognised as being of low concern (4).

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The low environmental exposure of the polymer as a result of normal use indicates that the overall environmental hazard should be negligible. The cured polymer will be bound as part of a coating on wooden doors.

The main environmental exposure arises from landfill disposal of 3.2 tonnes per annum of residue in empty containers after application. As the polymer is expected to be insoluble in water, the polymer waste consigned to landfill is unlikely to degrade or leach and will stay in the landfill. Neutral polymers with NAMW >1000 are understood to be of low environmental concern (4). The environmental hazard from the disposal of the product containing the polymer is rated as negligible.

Any release of polymer to the sewer will be diluted by several orders of magnitude. The polymer is expected to partition to sludge at the sewage treatment works. The solids are disposed of by incineration or landfill.

Instructions in the MSDS are adequate to limit the environmental exposure from spills, and therefore the environmental hazard from possible accident spills should be low.

The overall environmental hazard from the use of the polymer is rated as low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Occupational exposure to the notified polymer can occur through accidental release during transport and warehousing, during reformulation into paint and during application of the final paint product. Only the aqueous dispersion of the notified polymer is imported and when reformulated into the final paint product the concentration of the notified polymer is further reduced. Local exhaust ventilation is employed during reformulation to reduce exposure to fumes given off by the polymer dispersion. The highest level of occupational exposure to the notified polymer is likely to occur during application of the final paint product. As this will be sprayed there is a high potential for dermal, eye and inhalatory exposure unless personnel protective equipment is used to minimise this exposure.

There is negligible potential for public exposure to Polymer in Luhydran LR 8947 arising from product formulation or industrial use as paint. There may be public contact with the notified polymer on the surface of treated wooden panels, but its immobilisation on the substrate and physico-chemical properties will be sufficient to preclude absorption across the skin or other biological membranes.

On the basis of the chemical identity (structure, formula, hazardous chemical content) and physicochemical data, Polymer in Luhydran LR8947 would not be classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* (2), however there is no toxicological data available to confirm this. In addition the formulation Luhydran LR8947 would not be classified as hazardous on the basis of the content of residual monomers and other ingredients according to the *List of Designated Hazardous Substances* (1).

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Luhydran LR8947 the following guidelines and precautions should be observed:

- When reformulating or using products containing Luhydran LR8947, which contains the notified polymer, ensure that good general exhaust ventilation is installed to maintain exposure standards for residual monomers and that dermal exposure is limited through good work practices.

- In addition, safe practices, as should be followed when handling any chemical formulation, should be adhered to - these include:

    - minimising spills and splashes;

    - practising good personal hygiene; and

    - practising good housekeeping and maintenance including bunding of large spills which should be cleaned up promptly with absorbents and put into containers for disposal.

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

- It is expected that, in the industrial environment, protective clothing conforming to and used in accordance with Australian Standards (AS) 2919 (5) and protective footwear conforming to Australian/New Zealand Standard (AS/NZS) 2210 (6) should be worn as a matter of course; in addition it is advisable that when handling chemical formulations containing the notified polymer to wear chemical-type goggles (selected and fitted according to AS1336 (7) and meeting the requirements of AS/NZS 1337 (8), impermeable gloves (AS 2161) (9) should be worn to protect against unforseen circumstances.

- Ensure that good general exhaust ventilation is installed in areas where paint spray is applied, drift is minimised and that respiratory protection conforming to AS/NZS 1715 (10) and AS/NZS 1716 (11) is used.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the formulation containing Polymer in Luhydran LR8947 was provided in a format similar to the Worksafe Australia format described in the *National Code of Practice for the Preparation of MSDS* (12).

This MSDS was provided by BASF Australia Ltd as part of their notification statement. The accuracy of this information remains the responsibility of BASF Australia Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act secondary notification of Polymer in Luhydran LR8947 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 Publ., Canberra.

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

3. National Occupational Health and Safety Commission 1995, *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:3008 (1995), 1003(1995)], Australian Government Publishing Service Publ., Canberra.

4. J. V. Nabholz, P. Miller and M. Zeeman, “Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act TSCA Section Five”, in *Environmental Toxicology and Risk Assessment*, W. G. Landis, J. S. Hughes and M. A. Lewis (Eds), pp 40-55

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

6. Standards Australia, Standards New Zealand 1994, *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

7. Australian Standard 1336-1982, *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, 1982.

8. Australian Standard 1337-1984. *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.

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

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

11. Standards Australia, Standards New Zealand, 1991. *Australian/ New Zealand Standard 1716 - 1991 Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ., Wellington, New Zealand.

12. 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.