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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Collacral LR 8990

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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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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FULL PUBLIC REPORT**Polymer in Collacral LR 8990****1. APPLICANT**

BASF Australia Ltd (ABN 62 008 437 867) of 500 Princes Highway NOBLE PARK VIC 3174 has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in Collacral LR 8990.

2. IDENTITY OF THE CHEMICAL

The chemical name, 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 names: Collacral LR 8990 is a solution containing the notified polymer at approximately 40%.

Molecular weight (MW):

Number-average MW	Weight-average MW	% MW < 1000	% MW < 500	Method
8600	20100	2.1	0.4	GPC

Structural identification method: Infrared spectroscopy.

3. POLYMER COMPOSITION AND PURITY

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

Purity (%): approximately 98%

Hazardous impurities (other than residual monomers and reactants): none

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

Additives/adjuvants: none

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is not isolated. The physico-chemical properties listed below are for the 40% aqueous solution.

Property	Result
Appearance	colourless solution
Melting point	not determined
Density	1010 kg/m ³
Water solubility	soluble
Viscosity	500 – 1500 mPa.s
Particle size	not applicable
Flammability	not determined; imported in aqueous solution
Autoignition temperature	not determined
Explosive properties	not determined
Stability/reactivity	not determined
Hydrolysis as function of pH	not determined
Partition coefficient	not determined
Adsorption/desorption	not determined
Dissociation constant	not determined

5.1 Comments on physical and chemical properties

The notified polymer contains urethane linkages that could be expected to undergo hydrolysis under extreme pH conditions. However, in the environmental pH range of 4 to 9, significant hydrolysis is unlikely to occur.

The partition coefficient has not been determined for the notified polymer. However, its high water solubility, and its likely hydrophilic nature are indicative of partitioning into the aqueous phase.

No adsorption/desorption tests were conducted for the notified polymer. It is expected to be mobile in soil due to its high water solubility.

No dissociation constant tests were conducted for the notified polymer. It contains no functional groups that may be expected gain or lose a proton in the environmental pH range of 4 to 9.

6. USE, VOLUME AND FORMULATION

Use: The notified polymer will be used as a thickener in water based architectural paint formulations. The paints will be available for trade and public sale.

Manufacture/Import volume: The notified polymer will be imported at a volume of approximately 10 - 100 tonnes per annum.

Formulation details: The notified polymer is to be imported as a 40% (approx.) component of an aqueous solution in 120 kg or 200 kg metal drums and added to paint at a final concentration of approximately 2% (5% Collacral LR 8990).

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Manufacture of paint</i>		
<i>Addition of polymer solution to mixing vessel, drumming off paint (25 labourers, 43 laboratory technicians working 0.5 hours/day, 230 days per year)</i>		
dermal/ ocular	Polymer solution is removed from drum by inserting a tap, running the solution into a bucket and manually pouring the solution into the mixing vessel or via drum spear and piping. Batch size is 3 to 20 tonnes to contain 5% polymer solution (2% polymer). Drumming off of paint for architectural purposes is typically via automated lines into tins or drums of 0.5 – 200 L capacity. Laboratory testing involves small paint preparations of approximately 5 L.	Reaction vessel enclosed, safety glasses/goggles/face shields, overalls and gloves worn. Local exhaust ventilation is employed where general ventilation is considered to be inadequate.
<i>End use</i>		
<i>Paint application by roller, brush or spray</i>		
inhalation dermal/ ocular	Widespread exposure to paint during application. Some inhalation exposure possible during spraying.	Typically overalls only.

Transport and storage

Transport and storage of polymer solution and finished paint (1 – 2 transport drivers, up to

32 store persons)

dermal/ ocular	Handling sealed drums; no exposure expected except in case of accident.	Typically overalls and gloves.
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8. PUBLIC EXPOSURE

Public exposure to surface coatings containing the notified polymer is expected to be widespread but intermittent, ie limited to periods of home decoration. The likely route of exposure would be dermal, with the possibility of oral, ocular, and inhalation exposure. Due to the wide range of applications in the public domain, exposure via dermal contact with dried surface coating films containing the notified polymer is expected to be high.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

The notifier estimates that 1% or up to 1000 kg per annum of the notified polymer will be disposed of to the sewer during formulation and 1% or up to 1000 kg of the notified polymer will be released during the disposal of import and reformulation containers. Brushes, rollers and spray equipment used to apply the paint containing the notified polymer will be washed in water and may be disposed into the sewer. Assuming up to 2.5% of imports will be lost this way, up to an additional 2500 kg per annum of the notified polymer may be disposed of into the sewer.

9.2. Fate

The majority of the notified polymer will be bound with other paint components in a high molecular weight and stable paint film. Therefore, once incorporated into the paint formulation, the notified polymer is expected to be immobile and pose little risk to the environment.

The notified polymer in waste from spills and equipment cleaning will be collected by licensed waste disposal contractors and will either be disposed of in landfill or incinerated. Small spills will be washed into the notifier's on-site effluent treatment plant where wastes are treated with flocculants to remove solids prior to discharge to sewer. Solid wastes from this process will be disposed in landfill.

Brushes, rollers and spray equipment used to apply the paint will be washed in water and as such the notified polymer may be disposed into the sewer or poured onto the ground. In landfill and when disposed of onto the ground, the polymer is expected to eventually become part of the soil matrix. Incineration of wastes containing the notified polymer will produce water vapour and oxides of carbon and nitrogen. When released into the sewer, the notified polymer's high water solubility suggests that it will be predominantly remain in the aquatic compartment, where it will become diluted and dispersed, eventually associating with sediments.

The notified polymer is not expected to cross biological membranes due to its high molecular weight is therefore not expected to bioaccumulate (Connell 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

The majority of the notified polymer will be bound with other paint components in a high molecular weight and stable paint film. Therefore, once incorporated into the paint formulation, the notified polymer is expected to be immobile and pose little risk to the environment.

The notified polymer in waste from spills and equipment cleaning will be collected by licensed waste disposal contractors and will either be disposed of in landfill or incinerated. Small spills will be washed into the notifier's on-site effluent treatment plant where wastes are treated with flocculants to remove solids prior to discharge to sewer. Therefore, release of the notified polymer is expected to be low. Solid wastes from this process will be disposed in landfill.

Equipment used to apply the paint will be washed in water and the notified polymer may be disposed of into the sewer or poured onto the ground. In landfill and when disposed of onto the ground, the dried paint containing the notified polymer is expected to become associated with the soil matrix. Incineration of wastes containing the notifier polymer will produce water vapour and oxides of carbon and nitrogen. When released into the sewer, the notified polymer's high water solubility suggests that it will be predominantly distributed in water, where it will become diluted and dispersed and eventually associating with sediments.

In a worst case based on maximum annual releases of 4.5 tonnes per annum, all of which is released to sewer and assuming that none is removed during sewage treatment processes, assuming a national population of 19,000,000 and that each person contributes an average 150 L/day to overall sewage flows, the predicted concentration in sewage effluent on a nationwide basis is estimated as 4.3 microgram/L.

Amount entering sewer annually	4500 kg
Population of Australia	19 million
Amount of water used per person per day	150 L
Number of days in a year	365
Estimated PEC	4.3 microgram/L (4.3 ppb)

When released to receiving waters the concentration is generally understood to be reduced by a further factor of at least 10, and so the Predicted Environmental Concentration (PEC) is

around 0.43 microgram/L. Due to the water solubility of the notified polymer most would be expected to remain in the water column but some will be treated with flocculants and removed prior to release to receiving waters, further reducing this concentration.

The notified polymer is not expected to cross biological membranes due to its high molecular weight is therefore not expected to bioaccumulate (Connell 1990).

The notified polymer is not likely to present a hazard to the environment when it is stored, transported and used in the proposed manner.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

The notified polymer fulfils the criteria for a synthetic polymer of low concern and can be considered not to be a health hazard.

The technical bulletin for the 40% aqueous solution of the polymer states that prolonged exposure may cause irritation of the skin and mucous membranes.

13.2. Occupational health and safety

Transport and storage of the containers of notified polymer should result in minimal worker exposure and consequent health effects except in the event of accidental container rupture.

During the paint manufacture processes, the main exposure route for the notified polymer will be dermal. The paints will be viscous, and ready formation of aerosols is not expected. There is a risk of slight irritation (dermal, ocular) should spillage occur as indicated on the MSDS for the imported polymer solution.

Occupational exposure during the sale and professional use of architectural paints is likely to be widespread and often under poorly controlled conditions. Dermal contact during handling and application of the paints is likely. The occupational health and safety risk associated with dermal contact with the notified polymer in the form of uncured paints will be low, due to the low toxicological hazard of the polymer and the low concentration (< 2 %) in the finished paints.

Conclusion

The notified polymer is of low concern to human health and safety and no specific risk reduction measures are necessary.

13.3. Public health

While dermal and possibly eye contact with the notified polymer may occur during application of the paints containing the polymer by the public, the notified polymer is not expected to pose a significant hazard to public health when used in the proposed manner based on its expected low toxicity.

In dried paint films, the notified polymer will be encapsulated in an inert, very high molecular weight matrix, which will render it biologically unavailable, and consequently public exposure to the notified polymer from dried paint films is considered to be low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of Collacral LR 8990 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 Collacral LR 8990 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

Control Measures

No specific precautions are required to control exposure to the notified polymer. However, in the interests of good occupational health and safety, the following guidelines and precautions should be observed:

Occupational Health and Safety

- Spillage of the notified polymer should be avoided. Spillage 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 chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with State and Territory hazardous substances regulations must be in operation.

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

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(1999)]. Australian Government Publishing Service, Canberra.