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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Carboset GA-1915

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FULL PUBLIC REPORT**Polymer in Carboset GA-1915****1. APPLICANT**

Australian Vinyls Corporation Ltd of 599 Kororoit Creek Road ALTONA VIC 3018 (ABN 1507 855 8595) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC), Polymer in Carboset GA-1915.

2. IDENTITY OF THE CHEMICAL

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

Marketing names: Polymer in Carboset GA-1915

Number-average molecular weight (NAMW): >1000

3. POLYMER COMPOSITION AND PURITY

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

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer will be imported as a polymer emulsion in water. Unless otherwise stated the physico-chemical properties tabulated below are for the polymer emulsion containing 23% notified polymer.

Property	Result	Comments
Appearance	Milky white, slightly translucent liquid	
Melting point	Not determined	The notified polymer will be imported as an emulsion in water.
Relative density	1.05	The density of the notified polymer is 1.22, which is obtained by calculation.
Water solubility	Not determined	The notified polymer is highly soluble in water due to the neutralisation of the carboxylate functionality with sodium hydroxide resulting in the formation of the corresponding sodium salt.
Vapour pressure	2.34kPa	
Particle size	Not determined	The notified polymer will be imported as an emulsion in water.
Flammability	Not determined	Not expected to be flammable as the product is a polymer emulsion in water
Autoignition temperature	Not determined	Not expected to self-ignite as the product is a polymer emulsion in water
Explosive properties	Not determined	Not explosive
Stability/reactivity	Not determined	Not reactive itself but may react with oxidising agents
Hydrolysis as function of pH	Not determined	The notified polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH. In the environmental pH range of 4 to 9, significant hydrolysis is unlikely.
Partition coefficient	Not determined	The notified polymer is likely to be highly soluble due to the present of a carboxylate salt, and is expected to partition into the aqueous phase.
Adsorption/desorption	Not determined	Polyanionic polymers are known to absorb to soils and sediments due to the metal chelating characteristics (Nabholz <i>et al.</i> 1993).

Dissociation constant	Not determined	The notified polymer does not contain any groups, which dissociate in water.
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6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be used as a component of a temporary protective coating for motor vehicles. The coating will only be applied to high damage areas on the vehicle such as front and rear guards. The coating will be removed from the vehicle before it leaves the automobile assembly plant.

Manufacture/Import volume:

The estimated quantity of the notified polymer to be imported is approximately 40 tonnes per annum over the next 5 years.

Formulation details:

The notified polymer will not be manufactured in Australia. It will be imported into Australia as a 23% solids emulsion in water contained in 200L polylined steel drums. It will be transported by road to a coating manufacturer for formulation into temporary automotive coatings. At the coating manufacturer site, the polymer emulsion will be blended with other ingredients prior to packing into 20L plastic pails or 200L polylined steel open head drums. The final coating containing 16% w/w notified polymer will be transported to a motor vehicle manufacturer.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Formulation (Coatings manufacture)</i>		
<i>Production (6 workers, 2 hours/day, 6 days/year)</i>		
Dermal and ocular	Exposure to polymer emulsion (23% notified polymer) when connecting and disconnecting transfer hoses to mixer.	impervious gloves, coveralls, safety shoes and safety glasses; mixing vessels are fitted with exhaust ventilation
	Exposure to formulated coating (16% notified polymer) during filtration and filling containers.	impervious gloves, coveralls, safety shoes and safety glasses; enclosed filling
	Exposure to liquid spills and drips when cleaning spills and equipment (up to 23% notified polymer).	impervious gloves, coveralls, safety shoes and safety glasses
<i>Quality control (2 workers, 1 hour/day, 6 days/year)</i>		
Dermal,	Exposure to small quantities of the	impervious gloves, coveralls, safety

ocular, and inhalation	notified polymer when collecting samples and performing QC testing of formulated coating (16% notified polymer).	shoes and safety glasses; enclosed spray booth fitted with filtered exhaust system
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End use (Spray application)

Thinning of paint, addition of paint to circulating system and spray paint operations (4 workers, 8 hours/day, 200 days/year)

Dermal, ocular, inhalation	Possible skin/eye contamination from spills and splashes when loading formulated coating into circulation system, application and cleaning of spray equipment; formation of aerosols and therefore inhalation exposure is likely during spray application (16% notified polymer).	impervious gloves, coveralls, and safety glasses while mixing paint and cleaning; cartridge type respirators when paint spraying; enclosed spray booth fitted with filtered exhaust system
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Once the final paint mix has hardened, the notified polymer is bound within the matrix and unavailable for exposure.

Transport and storage

Transport workers (2 workers, 4 days/year) and storage workers (12 workers, 10 days/year)

Dermal	No exposure is expected to the notified polymer except in case of an accident (up to 23% notified polymer).	sealed containers
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Removal of temporary coating

None	No worker exposure is expected during removal of temporary coating (16% notified polymer).	Removal process is achieved by using an automatic water spray in an enclosed booth
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Disposal

Drum cleaning/recycling or disposal (4 workers, 8 hours/day, 200 days/year)

Dermal	Possible skin contamination from spills and splashes during rinsing of drums (up to 23% notified polymer)	None specified
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8. PUBLIC EXPOSURE

The temporary protective coating containing the notified polymer is applied then removed under controlled conditions in a coating manufacturing plant. The only possible public exposure is from spills in transport of the polymer emulsion and coating.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Typically, up to 30% of the notified polymer will be lost as overspray and will be disposed of into the sewer.

Prior to delivery of motor vehicles to retailers, the temporary coating will be removed from the motor vehicles by automatic cold-water spray in a spray booth. These aqueous wastes containing the notified polymer will be discharged into a trade waste sewer.

The notifier indicates that approximately 400 kg per annum of waste containing the notified polymer will be generated during minor spills (50 kg), the cleaning of formulation equipment (300 kg) and the cleaning of used import drums. Presumably, these wastes will also be disposed of into the sewer.

Empty coatings drums will be disposed of by drum recyclers. The notifier indicates that 200 kg of the notified polymer will be released, presumably into the sewer, from this source each year.

Therefore, the total import volume of the notified polymer will be released into the sewer in each of the first years.

9.2. Fate

The notifier indicates that the total imported volume of the notified polymer will be released into the sewer. Polyanionic polymers are known to chelate metal ions (Nabholz *et al.* 1993) and may associate with soil particles through interactions with metal ions on their surface. Therefore in the sewer, the notified polymer is expected to adsorb to sediment due to its polyanionic nature and it should not bioaccumulate (Connell, 1990) even though it is water soluble.

The notifier has supplied no biodegradation information concerning the notified polymer. However, it would be likely that the chemical would biodegrade slowly over time.

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data on the notified polymer were provided. The notifier states that similar polymers are in use over the years and no adverse health effects have been reported.

Health hazards of the constituents and hazardous impurities, additives and adjuvants

Constituents

Residual monomers are present at 0.2% concentration, which is below their respective concentration cut off levels as listed in the NOHSC *List of Designated Hazardous Substances* (NOHSC 1999a).

Hazardous Impurities

None.

Additives/Adjuvants

The notified polymer does not contain additives or adjuvants *per se*. However, the notified polymer will be imported as a 23% emulsion in water.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

The intended use pattern of the notified polymer is expected to result in the entire import volume being eventually released to the aquatic environment. Release will be in a dilute manner as the notified polymer contained within the wastewater released from the spray booths will be at a low concentration. Subsequent treatment at local sewage treatment plants would further dilute the notified polymer to very low concentrations.

Based on maximum annual imports of 40 tonnes/annum, all of which is released to sewer in Melbourne (pop. 3500000) and assuming that each person contributes an average 150 L/day to overall sewage flows, the predicted concentration in sewage effluent is estimated to be 0.2 mg/L.

Amount of Carboset GA-1915 entering sewer annually	40000 kg
Population of Melbourne	3.5 million
Amount of water used per person per day	150 L
Number of days in a year	365
Estimated PEC	0.21 mg/L (0.21 ppm)

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 0.02 mg/L.

In the sewer, the notified polymer is expected to adsorbed to sediment due to its polyanionic nature and not bioaccumulate (Connell, 1990) even though it is water-soluble. While no biodegradation information concerning the notified polymer was supplied in the submission, it is likely that the polymer will biodegrade slowly over time.

Without ecotoxicological data it is difficult to determine the environmental hazard posed by the notified polymer. Polycarboxylic polymers may exhibit toxicity to aquatic organisms,

particularly algae, due to their metal chelating ability, a characteristic which is enhanced when carboxylic acid groups are positioned such that they are separated by one carbon atom on the polymer backbone. Increasing the separation of carboxylic groups on the backbone decreases the polymer's chelating ability and hence its toxicity, as is the case here (Nabholz *et al.* 1993). Therefore, the notified polymer is expected to be of low toxicity to aquatic organisms.

Therefore, the environmental exposure and overall, environmental hazard from the notified polymer is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information was provided for the notified polymer. However, the notified 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 notified polymer is not a dangerous good for road or rail transport.

The Material Safety Data Sheet (MSDS) for Carboset GA-1915 indicates that health effects such as irritation to the mouth and throat following ingestion, eye irritation and irritation from repeated or prolonged contact with skin may occur. Vapour or mist may cause headache, nausea, dizziness, flu-like symptoms and irritation to mucous membranes and respiratory tract. These effects are related to the possible presence of residual monomers rather than effects due to the notified polymer.

13.2. Occupational health and safety

Skin contamination with the notified polymer may occur during formulation, QC testing, packaging, cleaning of spills, loading formulated coating into paint circulating system, and cleaning of equipment. QC testing provides the possibility of exposure to small quantities of the notified polymer when collecting samples. The formulation process is largely enclosed, with exhaust ventilation provided, and workers who will handle the polymer will wear personal protective equipment consisting of safety glasses, protective gloves, overalls and safety boots. These controls will also provide protection against exposure to other constituents of the formulated coating. These controls combined with a low likely toxicological impact renders the health risk from the notified polymer for these formulation workers low.

During spray application of the formulated coating, inhalation exposure to the notified polymer may occur, in addition to dermal and ocular exposure during application and cleaning of equipment. Exposure from the notified polymer (16%) during end-use is considered minimal as long as in situ engineering controls (spray booth) and full personal protective equipment are utilised. Should exposure occur, the risk of health effects from the notified polymer is low due to its expected low toxicity. Once the final paint mix has hardened, the notified polymer is bound within the matrix and unavailable for exposure.

The temporary coating is removed in an automatic cold-water spray booth. Worker exposure is not anticipated during this process.

There is no occupational exposure expected for transport and storage workers except in case of an accident.

Conclusion

The notified polymer is not hazardous to human health and safety, and measures are in place to control occupational exposure. Therefore, the notified polymer is of low concern to occupational health and safety and no specific risk reduction measures are necessary.

13.3. Public health

Neither Carboset GA-1915 emulsion nor the finished coating products containing the notified polymer will be sold to the public. The coatings will only be applied to, and then removed from, motor vehicles in manufacturing plants. Public exposure through contact with the treated vehicles is unlikely. Based on this information, it is considered that the notified polymer will not pose a significant risk to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the notified polymer and products containing the polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). They are 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 notified polymer and products containing the polymer provided by the notifier were 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 (for formulator and end-user)

No special precautions are required for the notified polymer, however in the interests of good occupational health and safety, employers should implement the following engineering controls to minimise occupational exposure to the notified polymer:

- exhaust ventilation during coating formulation and packaging processes
- enclosed mixing tanks during formulation to prevent exposure to aerosols
- enclosed spray painting booth during paint application to prevent exposure to paint aerosols

Due to the possible presence of hazardous residual monomers, employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:

- during transfer to mixing tank and circulation system, prevent splashing and generation of aerosols

Employees should wear the following personal protective equipment to minimise occupational exposure to the notified polymer:

- chemical resistant gloves
- protective clothing which protects the body, arms, legs and feet
- eye protection when splashes and aerosols are generated
- cartridge type respirator when spray painting

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* (NOHSC, 1999b), workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Secondary notification

If the notifier or any other importer or manufacturer of the notified polymer becomes aware of any of the following circumstances:

- the notified polymer is manufactured in Australia
- the notified polymer is introduced in a chemical form that does not meet the PLC criteria

or any circumstances listed in subsection 64(2) of the Act, they must notify the Director in writing within 28 days. The Director will then decide whether secondary notification is required.

16. REFERENCES

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

Nabholz JV, Miller P & Zeeman M (1993) Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act (TSCA) Section Five. In: Landis WG, Hughes JS & Lewis MA eds, Environmental Toxicology and Risk Assessment. ASTM STP 1179. American Society for Testing and Materials, Philadelphia, p 49.

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