File No: LTD/1908

August 2016

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

Polymer in Anquamine 670 and Anquawhite 100

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 Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment.

This Public Report is available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

Street Address:	Level 7, 260 Elizabeth Street, SURRY HILLS NSW 2010, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX:	+ 61 2 8577 8888
Website:	www.nicnas.gov.au

Director
NICNAS

TABLE OF CONTENTS

SUMMARY

The following details will be published in the NICNAS *Chemical Gazette:*

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
LTD/1908	IMCD Australia Limited	Polymer in Anquamine 670 and Anquawhite 100	Yes	≤ 1 tonne/s per annum	Component of coatings

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
Based on the available information, the notified polymer is recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the following table.

Hazard classification	*Hazard statement*
Serious eye damage/eye irritation (Category 1)	H318 - Causes serious eye damage

Based on the available information, the notified polymer is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004), with the following risk phrase(s):
R41: Risk of serious damage to eyes

Human health risk assessment
Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental risk assessment
On the basis of the reported use pattern and limited aquatic exposure, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

REGULATORY CONTROLS

Hazard Classification and Labelling

- The notified polymer should be classified as follows:
  - Serious eye damage/eye irritation (Category 1): H318 - Causes serious eye damage

The above should be used for products/mixtures containing the notified chemical, if applicable, based on the concentration of the notified chemical present and the intended use/exposure scenario.

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer as introduced, prior to its incorporation in coatings:
  - Enclosed and automated processes
  - Local exhaust ventilation where exposure may occur

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure to the notified polymer as introduced, prior to its incorporation in coatings and in the product Anquawhite 100:
  - Avoid contact with skin and eyes
  - Avoid breathing vapours/spray
  - Apply product in a well-ventilated area

- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure during handling of the notified polymer as introduced and in the product Anquawhite 100:
  - Coveralls
  - Face masks
  - Gloves
  - Safety glasses

  Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Spray applications should be carried out in accordance with the Safe Work Australia Code of Practice for *Spray Painting and Powder Coating* (SWA, 2015) or relevant State or Territory Code of Practice.

- A copy of the (M)SDS should be easily accessible to employees.

- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)* as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling are not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Storage

- The handling and storage of the notified polymer should be in accordance with the Safe Work Australia Code of Practice for *Managing Risks of Hazardous Chemicals in the Workplace* (SWA, 2012) or relevant State or Territory Code of Practice.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification
This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(1) of the Act; if
- the importation volume exceeds one tonne per annum notified chemical;

or

(2) Under Section 64(2) of the Act; if
- the function or use of the polymer has changed from component of coatings or is likely to change significantly;
- the amount of polymer being introduced has increased, or is likely to increase, significantly;
- the polymer has begun to be manufactured in Australia;
- additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

(Material) Safety Data Sheet
The (M)SDS of the products containing the notified chemical provided by the notifier were reviewed by NICNAS. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

This notification has been conducted under the cooperative arrangement with Canada. The health and environmental hazard assessment components of the Canadian report were provided to NICNAS and, where appropriate, used in this assessment report. The other elements of the risk assessment and recommendations on safe use of the notified chemical were carried out by NICNAS and the Department of the Environment.

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
IMCD Australia Limited (ABN: 44 000 005 578)
Level 1
372 Wellington Road
MULGRAVE VIC 3170

NOTIFICATION CATEGORY
Limited-small volume (Approved Foreign Scheme): Synthetic polymer with Mn < 1,000 Da (1 tonne or less per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, molecular weight, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives/adjuvants, use details and import volume.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows: all physico-chemical endpoints.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None.

NOTIFICATION IN OTHER COUNTRIES
USA (TSCA)
Canada (DSL)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Anquamine 670 (contains the notified polymer at < 70% in aqueous solution)
Anquawhite 100 (contains the notified polymer at < 5% in aqueous solution)

MOLECULAR WEIGHT
> 500 Da

ANALYTICAL DATA
Reference IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY
> 80%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Cloudy, white liquid

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Freezing point is expected to be < 0 °C
Boiling Point*	108 °C at 101.3 kPa	(M)SDS
Density*	1,050 kg/m^3 at 21 °C	(M)SDS
Vapour Pressure*	2.4 kPa at 21 °C	(M)SDS
Water Solubility	Dispersible	(M)SDS
Hydrolysis as a Function of pH	Not determined	Contains hydrolysable functionalities; however, not expected to rapidly hydrolyse under environmental conditions (pH 4-9)
Partition Coefficient (n-octanol/water)	Not determined	Expected to partition to phase boundaries based on surfactant properties
Adsorption/Desorption	Not determined	Expected to adsorb to soil and sediment based on surfactant properties
Dissociation Constant	pKa = 10.3 ± 0.4 (strongest base)	Calculated using ACD/I-Lab v 2.0
Flash Point*	> 100 °C	(M)SDS
Flammability*	Not determined.	Introduced in aqueous solution.
Autoignition Temperature*	Not determined.	Introduced in aqueous solution.
Explosive Properties	Not determined.	Not expected to be explosive based on structure.
Oxidising Properties	Not determined.	Not expected to be oxidising based on structure.

* For the imported product Anquamine 670 containing the notified polymer at < 70% in aqueous solution.

DISCUSSION OF PROPERTIES

Reactivity
The notified polymer is expected to be stable under normal conditions of use.

Physical hazard classification
Based on the submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported into Australia in aqueous solution at < 70% concentration or in formulated products at < 5% concentration.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1

PORT OF ENTRY
Melbourne and Sydney

TRANSPORTATION AND PACKAGING
The notified polymer at < 70% concentration in aqueous solution will be imported in 205 L steel drums or 1,000 L IBCs. Formulated products containing the notified polymer at < 5% concentration will be packaged in 2, 4, 10, 20 and 205 L metal cans for industrial use only.

USE
The notified polymer will be used in industrial coating applications as a curing agent for use in a two part epoxy resin mixture at < 5% concentration.

OPERATION DESCRIPTION

Reformulation

At the reformulation site, the product containing the notified polymer (at < 70% concentration) will typically be pumped (using sealed automated and metered processes) into a closed mixing vessel, to which other ingredients will be added. The reformulated product, Part B (containing the notified polymer at < 5% concentration) will then be pumped into containers, also using sealed, automated and metered processes. Quality control personnel may sample the final reformulated product containing the notified polymer.

End use

The notified polymer is part of a two part epoxy resin mixture (containing the notified polymer at < 5% concentration) and will be used in industrial settings to coat metal products such as bulk tanks and rail cars. At the application site, the formulated product containing the notified polymer (at < 5% concentration) will be manually added into an open mixing container with the second part of the epoxy resin mixture and stirred manually or with electrical equipment to produce the final coating containing the notified polymer at < 5% concentration. The coatings will be predominantly applied by spray, but rollers and brushes may also be used.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport and storage	10 - 20	12
Formulation and packaging	4 - 8	6
End users	20 - 100	200

EXPOSURE DETAILS

Transport and storage workers may come into contact with the notified polymer at < 70% concentration only in the event of accidental rupture of containers.

Reformulation sites

At reformulation sites, dermal or ocular exposure to the notified polymer at < 70% concentration may occur during transfer processes, when taking samples during cleaning and maintenance of equipment and on occasions where manual mixing/dispensing is required. Exposure will be mitigated by the use of engineering controls and personal protective equipment (PPE), including safety glasses, laminate gloves, and coveralls.

End use

At end-use sites, dermal, ocular and inhalation exposure to coatings (containing the notified polymer at < 5% concentration) may occur during transfer, application and cleaning processes. The potential for exposure should be minimised through the use of engineering controls such as spray booths and PPE (goggles, laminate gloves, coveralls and respiratory protection) by workers. Once cured, the notified polymer is not expected to be bioavailable and further dermal contact should not lead to exposure.

6.1.2. Public Exposure

Products containing the notified polymer are for industrial use only and will not be available to the general public. The public may come into contact with coated articles containing the notified polymer. However, once the notified polymer is cured, it will be bound within the resin matrix and will not be bioavailable.

6.2. Human Health Effects Assessment

The results from toxicological investigations on the imported product containing the notified polymer at < 70% in aqueous solution were previously assessed by Canada and are described in the table below. No additional studies were submitted.

Endpoint	*Result and Assessment Conclusion*
Rat, acute oral toxicity*	LD50 > 2000 mg/kg bw; low toxicity
Rabbit, acute dermal toxicity*	LD50 > 2000 mg/kg bw; low toxicity
Rabbit, eye irritation*	corrosive
Guinea pig, skin sensitisation –non-adjuvant test.*	no evidence of sensitisation at 70%

* For the imported product Anquamine 670 containing the notified polymer at < 70% in aqueous solution.

Toxicokinetics, metabolism and distribution.
No information on the toxicokinetics of the notified polymer was provided. For dermal absorption, molecular weights below 100 Da are favourable for absorption and molecular weights above 500 Da do not favour absorption (ECHA, 2104). Log P values > 1 suggest that a substance is likely to be sufficiently lipophilic to cross the stratum corneum. However water solubility values < 1 mg/L suggest that a substance may not be sufficiently water soluble to partition from the stratum corneum into the epidermis, limiting the rate of penetration (ECHA, 2014). Therefore absorption of the notified polymer across biological membranes is expected to be limited based on the high molecular weight of the notified polymer (> 500 Da) and its water solubility (calculated to be < 1 mg/L). However, the notified polymer contains a proportion of low molecular weight species (< 500 Da) that may be absorbed. The effects seen in toxicity studies on the imported product containing the notified polymer (at < 70% concentration) indicate that some absorption through the gastrointestinal tract is occurring.

Acute toxicity.
The notified polymer (at < 70% concentration) was found to be of low toxicity in rabbits *via* the dermal route and in rats following acute oral exposure.

When exposed to the notified polymer (at < 70% concentration) by oral gavage 1/10 rats (1/5 males, 0/5 females) dosed at 2000 mg/kg bw died within 2 hours of exposure. On necropsy, this animal exhibited abnormalities of the liver and gastrointestinal tract, and wetness of the nose/mouth and anogenital areas. In the surviving animals, adverse effects after dosing included lethargy (2/4 males, 1/5 females), diarrhoea (1/4 males, 1/5 females), soiling and wetness of the anogenital area (1/4 males, 1/5 females) and localized alopecia (2/5 females). There were no significant changes in body weight in the surviving animals and no significant findings on necropsy.

When exposed to the notified polymer (at < 70% concentration) by dermal application, very slight (1/5 males, 1/5 females) to well-defined (1/5 males, 0/5 females) erythema was observed 24 hours following exposure with complete recovery indicated at 7 days following exposure. No observations regarding skin irritation were made between the 24 hour and 7 day observations. One female exhibited diarrhoea (days 3, 4, 6 and 7) and reduced faecal output (days 8-10) as well as a loss in body weight during the first week (recovery to starting weight was observed in the second week of the study), but did not exhibit any signs of dermal irritation. All other animals (9/10) gained the expected amount of body weight. No adverse systemic effects were observed in any of the animals at necropsy.

Irritation and sensitisation.
The notified polymer (at < 70% concentration) showed no evidence of sensitisation in a Guinea Pig sensitisation test (Buehler method).

In an eye irritation study on rabbits, the notified polymer (at < 70% concentration) was found to be corrosive in rabbits. In the initial study, all three (male) rabbits exhibited moderate to severe corneal opacity, conjunctival redness and chemosis as well as moderate iritis from 1 hour after exposure and persisting for the duration of the 14 day observation period. Recovery from these eye irritation effects was not indicated in any of the animals. All animals exhibited a red discharge from treated eyes post-dose. Diarrhoea was observed in one animal on days 2 and 3 of the observation period, and another animal exhibited rales (respiratory irritation) on day 2 of the observation period persisting to the end of the observation period. No other adverse effects were recorded.

An additional seven animals were exposed to the notified polymer (at < 70% concentration) through the conjunctival sac (as for an eye irritation study). No adverse clinical or systemic effects were noted in these animals. Eye irritation effects were not recorded as part of the methodology (as per the initial eye irritation study), other than recording that a red discharge was observed in treated eyes post-dose.

Health hazard classification
Based on the available information, the notified polymer is recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the following table.

Hazard classification	*Hazard statement*
Serious eye damage/eye irritation (Category 1)	H318 - Causes serious eye damage

Based on the available information, the notified polymer is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004), with the following risk phrase(s):
R41: Risk of serious damage to eyes

The notified polymer contains residual monomers that are classified as hazardous according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. However, these are not present in the notified polymer as introduced above the cut off concentrations for classification.

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety
Dermal, ocular and inhalation exposure to the notified polymer at a < 70% concentration may occur during reformulation and application of coatings containing the notified polymer onto industrial items. Once the coatings containing the notified polymer have cured, the notified polymer will be incorporated into a polymer matrix and will not be bioavailable. Toxicological studies on the notified polymer (at < 70% concentration) indicate that the polymer causes serious eye damage and may be irritating to the respiratory system if inhaled. Dermal, ocular and inhalation exposure is expected to be limited through the use of sufficient control measures, including the use of automated processes, safe work practices and the wearing of personal protective equipment (PPE) such as gloves, face masks, coveralls and safety glasses/goggles.

Therefore, given the use of sufficient workplace controls, the risk to workers from use of the notified polymer is not considered to be unreasonable.

6.3.2. Public Health
The notified polymer is for industrial use only and will only be available to the general public when present on industrial items where it will be bound within a polymer matrix and as such will not be bioavailable. Therefore, the risk to the public is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE
The notified polymer will be imported into Australia as a component of an aqueous solution, for reformulation into one part (Part B) of a two-part epoxy coating system for industrial applications. Release of the notified polymer to the environment from transport and storage is unlikely, except in the case of accidental spills and leaks. In the event of spills, products containing the notified polymer are expected to be collected with adsorbents, and disposed of to landfill in accordance with local government regulations.

The reformulation process will involve blending operations that will be highly automated, and is expected to occur within a fully enclosed environment. Therefore, significant release of the notified polymer from this process to the environment is not expected. The process will be followed by automated filling of the formulated products into containers of various sizes suitable for distribution. Wastes containing the notified polymer generated during reformulation include equipment wash water, empty import containers, and spilt materials. It is

estimated by the notifier that a maximum of 2.5% of the import volume (or up to 25 kg) of the notified polymer may be released as reformulation wastes. Wastes may be collected and released to sewers in a worst case scenario, or disposed of to landfill in accordance with local government regulations.

RELEASE OF CHEMICAL FROM USE

Products containing the notified polymer will be applied by professional users only in industrial settings, for coating metal surfaces. At the application sites, the product containing the notified polymer will be mixed with Part A of the two-part epoxy coating system prior to application. During use, epoxy coatings containing the notified polymer are expected to be predominantly applied by spray techniques, as well as some brush or roller application. Spray applications are expected to occur within spray booths with ventilation systems to collect particulate overspray.

Overspray and solid wastes from application of the epoxy coatings containing the notified polymer will be collected, and disposed of to landfill. Residues containing the notified polymer in spray equipment and on brushes are expected to be rinsed into containers, and then allowed to cure before disposal as solid wastes to landfill. During use, the notified polymer may also be released to the environment as accidental spills and container residues. It is estimated by the notifier that a maximum of 2% of the import volume (or up to 20 kg) of the notified polymer may be released as container residue. These releases are expected to be collected and disposed of to landfill in accordance with local government regulations.

RELEASE OF CHEMICAL FROM DISPOSAL

The majority of the notified polymer in surface coatings is expected to share the fate of the substrate to which it has been applied. These are predominantly expected to be disposed of to landfill, or thermally decomposed during substrate reclamation.

7.1.2. Environmental Fate

No environmental fate data were submitted for the notified polymer. The majority of the notified polymer is expected to be cured within an inert coating matrix, and is expected to share the fate of the articles to which it has been applied. These will involve eventual disposal to landfill, or undergo thermal decomposition during substrate reclamation. The notified polymer is also expected to enter landfill as collected wastes and residues. Once cured, the notified polymer is not expected to be bioavailable nor biodegradable. The uncured notified polymer contains a significant proportion of low molecular weight species, which may have the potential to bioaccumulate. However, bioaccumulation is unlikely to occur, due to its surfactant properties and the limited potential for aquatic exposure of the uncured polymer. In landfill and during thermal decomposition, the notified polymer is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon and nitrogen.

7.1.3. Predicted Environmental Concentration (PEC)

The calculation for the predicted environmental concentration (PEC) is summarised in the table below. Based on the reported use in an epoxy coating system for industrial applications, a conservative release of 1% to sewers on a nationwide basis over 260 working days per year is used for the notified polymer. It is also assumes a worst case scenario where none of the notified polymer is removed during Sewage Treatment Plant (STP) processes.

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Total Annual Import/Manufactured Volume	1,000	kg/year
Proportion expected to be released to sewer	1%	
Annual quantity of chemical released to sewer	10	kg/year
Days per year where release occurs	260	days/year
Daily chemical release:	0.04	kg/day
Water use	200.0	L/person/day
Population of Australia (Millions)	22.613	million
Removal within STP	0%	
Daily effluent production:	4,523	ML
Dilution Factor - River	1.0	
Dilution Factor - Ocean	10.0	
PEC - River:	0.009	µg/L
PEC - Ocean:	0.001	µg/L

STP effluent re-use for irrigation occurs throughout Australia. The agricultural irrigation application rate is assumed to be 1,000 L/m^2/year (10 ML/ha/year). The notified polymer in this volume is assumed to infiltrate and accumulate in the top 10 cm of soil (density 1,500 kg/m^3). Using these assumptions, irrigation with a concentration of 0.01 µg/L may potentially result in a soil concentration of approximately 0.06 µg/kg. Assuming accumulation of the notified polymer in soil for 5 and 10 years under repeated irrigation, the concentration of the notified polymer in the applied soil in 5 and 10 years may be approximately 0.28 µg/kg and 0.57 µg/kg, respectively.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted for the notified polymer. Ecotoxicological endpoints for the notified polymer were calculated based on ecological structure active relationship (ECOSAR v1.11; US EPA, 2012) equations. The acute and chronic endpoints are summarised in the table below.

Endpoint	*Result*	*Assessment Conclusion*
Acute Toxicity		
Fish	96 h LC50 = 0.28 mg/L	Predicted to be very toxic to fish (acute)
Daphnia	48 h EC50 = 0.10 mg/L	Predicted to be very toxic to *Daphnia* (acute)
Algae	96 h EC50 = 0.04 mg/L	Predicted to be very toxic to algae (acute)
Chronic Toxicity		
Fish	ChV = 0.02 mg/L	Predicted to be very toxic to fish (chronic)
Daphnia	ChV = 0.01 mg/L	Predicted to be very toxic to *Daphnia* (chronic)
Algae	ChV = 0.02 mg/L	Predicted to be very toxic to algae (chronic)

The notified polymer is predicted to be very toxic to aquatic invertebrates and algae, and harmful to fish on an acute basis, and is predicted to be toxic to aquatic invertebrates on a chronic basis. The ECOSAR estimation procedure used here is a standard approach, and is considered reliable to provide general indications of the likely environmental effects of a polymer. However, this method is not considered sufficient to formally classify the acute and chronic hazards of the notified polymer to aquatic life under the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) (United Nations, 2009).

7.2.1. Predicted No-Effect Concentration

The predicted no-effects concentration (PNEC) has been calculated from the most sensitive endpoint for *Daphnia*. A safety factor of 100 was used given only modelled endpoints are available.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
ChV (*Daphnia*, 21 d)	0.01	mg/L
Assessment Factor	100	
Mitigation Factor	1.00	
PNEC:	0.10	µg/L

7.3. Environmental Risk Assessment

The Risk Quotients (Q = PEC/PNEC) have been calculated based on the predicted PEC and PNEC.

Risk Assessment	PEC µg/L	PNEC µg/L	Q
Q – River	0.009	0.10	**0.085**
Q – Ocean	0.001	0.10	**0.009**

The risk quotient for discharge of treated effluents containing the notified polymer to the aquatic environment indicates that the notified polymer is unlikely to reach ecotoxicologically significant concentrations in surface waters, based on its maximum annual importation quantity. The majority of the notified polymer will be irreversibly bound within an inert coating matrix during use, and will not be bioavailable. After their useful life, the notified polymer will share the fate of the coated articles. The notified polymer is not expected to be bioaccumulative based on its surfactant properties. Therefore, on the basis of the PEC/PNEC ratio, maximum annual importation volume and assessed use pattern in industrial epoxy coatings, the notified polymer is not expected to pose an unreasonable risk to the environment.

BIBLIOGRAPHY

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

NTC (National Transport Commission) 2007 Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 7th Edition, Commonwealth of Australia

SWA (2015) Code of Practice: Spray Painting and Powder Coating, Safe Work Australia, http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/spray-painting-and-powder-coating.

SWA (2012) Code of Practice: Managing Risks of Hazardous Chemicals in the Workplace, Safe Work Australia, http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/managing-risks-of-hazardous-chemicals-in-the-workplace.

United Nations (2009) Globally Harmonised System of Classification and Labelling of Chemicals (GHS), 3rd revised edition. United Nations Economic Commission for Europe (UN/ECE), <http://www.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html >.

US EPA (2012) ECOlogical Structure Activity Relationship (ECOSAR) Class Program for Microsoft® Windows, v 1.11. United States Environmental Protection Agency. Washington DC, USA.