

File No: LTD/1022

June 2002

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in Detac D2420

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT

Polymer in Detac D2420

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

BetzDearborn Australia Pty Ltd (ABN 84 001 221 941), 69-77 Williamson Rd Ingleburn NSW 2565.

NOTIFICATION CATEGORY

Limited-small volume: Polymer with NAMW < 1000 (1 tonne or less per year)

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Part B: Chemical Name, Other Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Spectral Data, Purity, Impurities (Hazardous/Non-hazardous), Additives/Adjuvants, Customer Identity and Use.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Part B: Melting point, Boiling point, Density, Vapour Pressure, Water Solubility, Hydrolysis as Function of pH, Partition Coefficient, Adsorption/Desorption, Dissociation Constant, Particle Size, Flash Point, Flammability Limits, Autoignition Temperature, Explosive Properties, Reactivity.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

USA (1991)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Detac D2420 (<30% notified polymer)

3. COMPOSITION

DEGREE OF PURITY

>90%

Non-Confidential

4. INTRODUCTION AND USE INFORMATION

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

Import

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

Year	1	2	3	4	5
Tonnes	0.1	≤0.9	≤0.9	≤0.9	≤0.9

USE

Non-Confidential

For use in wastewater treatment of paint spray booths.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY
Sydney

IDENTITY OF MANUFACTURER/RECIPIENTS **Non-Confidential**
BetzDearborn Australia Pty Ltd, 69-77 Williamson Rd Ingleburn NSW 2565.

TRANSPORTATION AND PACKAGING
Transport by road in 200 L steel drums.

5.2. Operation Description

The notified polymer will be imported as a component of the product Detac D2420. The containers will be inspected for damage/leaks and then stored in a dangerous goods storage area which is appropriately bunded prior to delivery to a customer site. No reformulation will occur in Australia.

At the customer site, the product will be injected via an electronic diaphragm dosing pump into the process recirculating water, which is immediately diluted to between 1000-5000 ppm. Once the product comes into contact with 'live' paint, the polymer become inactive. This will prevent blockages, contamination or balance problems within the painting process.

The polymer will finally be bound to the paint particles, which either sink to the base of the pit and/or be removed out of the system using sludge removal equipment.

5.3. Occupational exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport & Storage	6-8	2-3 hours/day	4 days/year
Plant Operators	6-8		
Chemical feeding		1 hour/day	230 days/year
Chemical monitoring – Quality control		8 hours/day	230 days/year
Spray painters		8 hours/day	230 days/year

Exposure Details

Transport and storage workers will handle the import product in steel drums using forklift. Packaging is kept sealed until delivery to the customer site. Exposure of these workers to the notified polymer would be only in the event of an accident.

All transfers from containers will be undertaken via pumps and/or transfer hoses, and thus chemical feeding operators are not expected to be exposed to the notified polymer.

Quality control staff may be potentially exposed to the notified polymer when involved in sampling and testing chemical formulations containing the polymer. However, they will handle only small quantities of the polymer and will wear laboratory coats, safety glasses and impermeable gloves.

Spray painters will wear appropriate PPE including respirators, chemical glasses, face shields, rubber gloves, chemical resistant aprons and safety boots. They are unlikely to come into contact with the process recirculating water or the notified polymer which is present at very low concentrations in the water. The use of local and general engineering controls such as ventilation at the paint spray booth also help minimise worker exposure.

5.4. Release

RELEASE OF CHEMICAL AT SITE
Not applicable.

RELEASE OF CHEMICAL FROM USE

Eventually the entire import volume of the notified polymer will be released to the environment. Empty import containers and any residual polymer they contain (9 kg per annum) will be disposed of in landfill.

5.5. Disposal

The sludge containing the bound notified polymer will be dewatered prior to disposal in secure landfill.

5.6. Public exposure

It is expected that during transport, storage and industrial use, exposure of the general public will be minimal, except in the event of an accidental spill. Spills of Detac 2420 should be collected with non-sparking tools. They should be contained and absorbed with inert material, eg. sand or earth, and placed into appropriate sealed and labelled containers. Leaking containers should be over-drummed. Contaminated surfaces should be scrubbed with detergent solution and the washings retained as contaminated waste. Appropriate protective equipment should be worn to prevent the breathing of vapours, mists or sprays and contact with the skin and eyes. Disposal should be in accordance with local State and Federal regulations via a licensed waste contractor.

As a component of a wastewater treatment product for industrial uses, the notified polymer will not be sold to the public. Once used in the professional spray booths, the notified polymer will be contained in sludge and disposed of by a licensed waste contractor to landfill. Consequently, public exposure to the notified polymer is unlikely.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Brown liquid
Melting Point/Boiling Point	No data available
Density	1.071 kg/m ³ at 21°C for Detac D2420
Remarks	No data were available for the polymer.
Vapour Pressure	2.40 kPa (water)
Remarks	No data were available for the polymer.
Water Solubility	Not determined
Remarks	The notifier states that as the polymer exists as a chloride salt of a quaternary ammonium derivative of a tannin, it is expected to be highly soluble in water.
Hydrolysis as a Function of pH	Not determined
Remarks	The polymer does not contain any groups capable of hydrolysis in the environmental pH range of 4-9.
Partition Coefficient (n-octanol/water)	Not determined
Remarks	The expected high water solubility of the polymer due to its likely hydrophilic nature is an indicative of partitioning into the aqueous phase.
Adsorption/Desorption	Not determined
Remarks	The polymer contains positively charged quaternary ammonium groups that are likely to bind strongly with negatively charged soil particles. Therefore, despite its

high water solubility the notified polymer is not expected to be mobile in soil.

Dissociation Constant	Not determined
Remarks	The polymer is fully dissociated in water and is expected to remain so in the environmental pH range of 4 to 9.
Particle Size	Not applicable
Remarks	The polymer is imported as a <30% solution.
Flash Point	93°C P-M (C-C) for Detac D2420
Remarks	Test was not conducted for the polymer.
Flammability Limits	Not flammable
Remarks	Test was not conducted.
Autoignition Temperature	Not expected to auto-ignite
Remarks	Test was not conducted.
Explosive Properties	Not explosive
Remarks	Test was not conducted.
Reactivity	Stable
Remarks	The polymer is expected to be stable under normal conditions.

7. TOXICOLOGICAL INVESTIGATIONS

<i>Endpoint and Result</i>	<i>Assessment Conclusion</i>
Rat, acute oral LD50 >5000 mg/kg bw	low toxicity
Genotoxicity - bacterial reverse mutation	non mutagenic

7.1. Acute toxicity – oral

TEST SUBSTANCE	Notified polymer
METHOD	US EPA Acute Oral Toxicity – Limit Test.
Species/Strain	Rat/Sprague-Dawley
Vehicle	Test substance used as supplied.
Remarks - Method	Same as OECD TG 401 Acute Oral Toxicity – Limit Test.

RESULTS

<i>Group</i>	<i>Number and Sex of Animals</i>	<i>Dose mg/kg bw</i>	<i>Mortality</i>
I	5/female	5000	0
II	5/male	5000	0

LD50	>5000 mg/kg bw
Signs of Toxicity	One male rat had a soft stool on the day of dose administration. All animals appeared normal from days 2-15 and gained weight throughout the study period.
Effects in Organs	Gross necropsy revealed two masses on the liver and a swollen prostate in one male rat. A clear fluid-filled mass on the right kidney was noted in

Remarks - Results	one female. These findings were not considered treatment related. No abnormalities were noted in the remaining animals.
CONCLUSION	The notified polymer is of low toxicity via the oral route.
TEST FACILITY	FDRL Food & Drug Research Laboratories (1993)
7.2. Genotoxicity – bacteria	
TEST SUBSTANCE	Notified polymer
METHOD	<i>Salmonella</i> /Mammalian Microsome Reverse Mutation Assay (Ames test) with Confirmatory Assay (Plate incorporation method)
Species/Strain	<i>S. typhimurium</i> : TA1535, TA1537, TA1538, TA98, TA100.
Metabolic Activation System	S9 fraction from Aroclor 1254 induced rat liver.
Concentration Range in Main Test	a) With metabolic activation: 100, 333, 667, 1000, 3330, 5000 µg/plate. b) Without metabolic activation: 100, 333, 667, 1000, 3330, 5000 µg/plate.
Vehicle	Deionised water
Remarks - Method	No significant protocol deviations.
RESULTS	
Remarks - Results	In both an initial and a confirmatory assay, test substance (up to 5000 µg/plate) did not cause a positive increase in the number of histidine revertants per plate of any of the tester strains either in the presence or absence of S9 activation. Positive controls responded appropriately confirming the sensitivity of the test system.
CONCLUSION	The notified polymer was not mutagenic to bacteria under the conditions of the test.
TEST FACILITY	HWA Hazleton Washington Inc. (1993)

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted. The notifier indicates that the notified polymer is likely to be toxic to bacteria, therefore, the biodegradation potential cannot be determined

8.2. Ecotoxicological investigations

8.2.1. Acute toxicity to fish

TEST SUBSTANCE	Notified polymer
METHOD	OECD TG 203 Fish, Acute Toxicity Test
Species	Rainbow Trout (<i>Oncorhynchus mykiss</i>)
Exposure Period	96 h

RESULTS

Concentration mg/L Nominal	Number of Fish	% Mortality				
		6 h	24 h	48 h	72 h	96 h
0	20	0	0	0	0	0
6.25	20	0	10	20	20	20
12.5	20	0	10	20	30	35

25.0	20	0	10	55	80	90
50.0	20	0	10	80	95	100
100.0	20	0	25	90	95	100

LC50 12.59 mg/L at 96 hours (CI of 9.8-15.78 mg/L)

NOEC < 6.25 mg/L

Remarks – Results The tests on fish were performed using a static methodology and observations were performed at 3, 6, 24, 48, 72 and 96 hours. The test was performed using ten specimen fish per loading rate at a temperature of 12°C. The tests were conducted using test substance made up at nominal concentrations of 6.25, 12.5, 25, 50 and 100 mg/L. After 96 h, between 20 and 100 % mortality was observed across the nominal test concentration range. Fish also exhibited sub-lethal effects such as quiescence, spasms, surfacing, laboured respiration, dark discoloured and erratic swimming from as early as 6 hours post test initiation, lasting through to 96 h. The 96-h LC50 for the notified polymer to *Oncorhynchus mykiss* is 12.59 mg/L as determined by Probit analysis.

CONCLUSION The ecotoxicity data indicates the notified polymer is slightly toxic to fish.

TEST FACILITY ASI Aqua Survey Inc. (1993a)

8.2.2. Acute/chronic toxicity to aquatic invertebrates

TEST SUBSTANCE Notified polymer

METHOD OECD TG 202 Daphnia sp. Acute Immobilisation Test

Species *Daphnia magna*

Exposure Period 48 hours

RESULTS

Concentration mg/L Nominal	Number of <i>D. magna</i>	% Immobilised	
		24 h	48 h
0	20	0	0
62.5	20	0	20
125.0	20	0	25
250.0	20	0	65
500.0	20	20	75
1000.0	20	45	85

LC50 211.4 mg/L at 48 hours (CI of 139-308 mg/L)

NOEC < 62.5 mg/L

Remarks - Results The tests on daphnia were performed using a static methodology and observations were performed at 24 and 48 hours. The test was performed using ten daphnia per loading rate at a temperature of 20 °C. The tests were conducted using test substance made up at nominal concentrations of 62.5, 125, 250, 500 and 1000 mg/L. After 96 h, between 20 and 85 % mortality was observed across the nominal test concentration range. Furthermore, the notifier indicates that daphnia also exhibited sub-lethal effects such as quiescence. The 48-hour LC50 for the notified polymer to *Daphnia magna* is 211.4 mg/L as determined by Probit analysis.

CONCLUSION The ecotoxicity data indicates the notified polymer is practically non-toxic to daphnia.

TEST FACILITY ASI Aqua Survey Inc. (1993b)

8.2.3. Algal growth inhibition test

TEST SUBSTANCE	Notified polymer
METHOD	OECD TG 201 Alga, Growth Inhibition Test.
Species	<i>Selenastrum capricornutum</i>
Exposure Period	72 hours
Concentration Range	0.78, 1.56, 3.13, 6.25, 12.5, 25 mg/L
Nominal	
RESULTS	Algae were exposed to the notified polymer at a nominal concentration of 0.78, 1.56, 3.13, 6.25, 12.5, 25 mg/L under constant illumination and shaking. After 72 h, there was significant inhibition of algal growth and biomass. The 72-h EC50 for the notified polymer to <i>Selenastrum capricornutum</i> is 5 mg/L based on growth inhibition. The NOEC of 0.78 mg/L was based on growth inhibition and cell abnormalities. The change in cell numbers (growth inhibition) were caused by an algistatic effect of the test substance on the algal cells, determined by the reversal of growth inhibition when test solution containing maximum growth inhibition was diluted below a concentration which did not effect growth.
CONCLUSION	The ecotoxicity data indicates the notified polymer is moderately toxic to algae.
TEST FACILITY	ASI Aqua Survey Inc. (1993c)

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The notified polymer will be used in wastewater treatment of paint spray booths. Once in solution, the notified polymer will bind and remove the paint particles from solution. The resulting sludge will be collected and disposed of by a certified waste management company. The sludge containing the bound notified polymer will be dewatered prior to disposal in secure landfill. Therefore, eventually the entire import volume of the notified polymer will be released to the environment. In landfill, the notified polymer will remain bound to the paint and pose minimal risk to the environment. The unbound polymer is water soluble and is therefore expected to be mobile in both the terrestrial and aquatic compartments. However, because of its cationic nature, the notified polymer is expected to eventually associate with the soil matrix and sediments.

Based on an import volume of 1 tonne/annum, and assuming 10 % of this will be not removed during sewage treatment processes, the daily release to receiving waters in Sydney is estimated to be 0.4 kg/day (based on 250 days of use). Assuming a Sydney population of 3.5 million and that each person contributes an average 150 L/day to overall sewage flows, the predicted concentration in sewage effluent is estimated as 0.76 µg/L.

When released to receiving waters the concentration is generally reduced by a further factor of at least 10, and so the Predicted Environmental Concentration (PEC) is around 0.076 µg/L.

9.1.2. Environment – effects assessment

The notified polymer is practically non-toxic to daphnia, slightly toxic to fish and moderately toxic to algae. However, the majority of the polymer is expected to bind irreversibly with paint and be removed from the aqueous compartment. In addition, bioaccumulation is not expected due to the high water solubility of the polymer and its limited exposure to the aquatic compartment.

A predicted no effects concentration (PNEC) can be determined when at least one acute EC50 for each of the three trophic levels is available (i.e. fish, daphnia, algae). The PNEC is calculated by taking the EC50 value of the most sensitive species, and dividing this value by an assessment safety factor of either 100 (OECD) or 1000 (EU). Using a worst case scenario safety factor of 100, the PNEC is 50 µg/L.

9.1.3. Environment – risk characterisation

The PEC/PNEC ratio for the aquatic environment, assuming use in Sydney, is 0.002. This value is significantly less than 1, indicating no immediate concern to the aquatic compartment.

The above considerations indicate there will be a minimal risk to the environment when the notified polymer is used in the manner and levels indicated by the notifier.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Transport and storage workers would be exposed to the notified polymer only in the event of an accident as the import product will be shipped in secure steel drums. When spillage occurs, the MSDS advises that spills be absorbed or contained with appropriate material and be disposed of in accordance with State/Territory regulations. Therefore, exposure of transport and storage workers is determined to be negligible.

At the customer site, chemical feeding operators are also not expected to be exposed to the notified polymer since all transfers from the import containers will be undertaken via pumps and/or transfer hoses. In addition, the potential exposure duration will be short, approximately 1 hour per day.

Quality control staff will wear laboratory coats, safety glasses and impermeable gloves when involved in sampling and testing chemical formulations containing the notified polymer. On this basis, the potential exposure of these workers would be low as they will handle only small quantities of the polymer.

Spray painters are not expected to come into contact with the process recirculating water which contains the notified polymer at very low concentrations. They will wear appropriate PPE including chemical goggles, rubber gloves, overalls and safety boots. The paint spray booth will also be equipped with adequate ventilation to minimise occupational exposure.

9.2.2. Public health – exposure assessment

The notified polymer will not be sold to the public. It is for industrial uses in wastewater treatment of the paint spray booth and will eventually be disposed of in landfill with sludge. Therefore, the public exposure is assessed to be negligible.

9.2.3. Human health - effects assessment

The notified polymer has been shown to have a low acute oral toxicity in rats (LD50 >5000 mg/kg bw) and not a mutagen in a bacterial reverse mutation assay (Ames test). The notified polymer is not known to exacerbate any existing health conditions.

Based on the available data, the notified polymer would not be classified as hazardous in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b).

On the MSDS supplied, Detac D2420 is corrosive to the skin and eyes and will cause respiratory irritation if mists, sprays or vapours are inhaled. The NOHSC exposure standard for acetic acid is 10 ppm (TWA) and 15 ppm (STEL), and for hydrochloric acid 5 ppm (TWA). Swallowing will cause severe irritation or burning to the mouth, throat and gastrointestinal tract and may cause severe chest and abdominal pain, nausea, vomiting, diarrhoea, lethargy and collapse. Prolonged or repeated dermal exposures may cause primary irritant dermatitis and/or tissue necrosis. These effects are due to the solvent in the product and not the notified polymer.

9.2.4. Occupational health and safety – risk characterisation

The import product containing <30% notified polymer will be shipped in secure steel drums. In the event of an accident, damaged/leaking containers and spills will be contained and disposed of in accordance with the MSDS. Transport and storage workers would not experience any significant exposure, therefore the risk of adverse health effects is minimal.

At the customer site, all transfers of the product to the paint spray booth will be undertaken via pumps and/or transfer hoses. Connecting these pumps will take approximately 1 hour per day. Therefore, chemical feeding operators are not expected to be exposed to the notified polymer. In addition, given the industrial standard PPE worn, there would be no significant occupational health risks to these workers.

Quality control staff will handle only small quantities of the chemical formulations containing not more than 30% notified polymer. They will wear laboratory coats, safety glasses and impermeable gloves and will be trained in sampling and testing chemicals. Exposure therefore would be negligible. On this basis, the occupational health risk posed by the polymer is determined to be low.

Spray painters will wear appropriate PPE including chemical goggles, rubber gloves, overalls and safety boots during operation. They are not expected to come into contact with the process recirculating water which contains low concentrations of the notified polymer. Generally, there will be adequate engineering controls in the spray booth to minimise worker exposure. Taking all into consideration, it is determined that the notified polymer will not pose any significant health risks to these workers.

9.2.5. Public health – risk characterisation

With the public exposure to the notified polymer being unlikely, except in the event of an accidental spill, the risk posed by the notified polymer to public health throughout its life cycle is considered to be minimal.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

10.2. Environmental risk assessment

On the basis of the available information, the notified polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used in the proposed manner.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the imported product Detac D2420 (<30% notified polymer) 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 a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the imported product Detac D2420 (<30% notified polymer) 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.

12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

No specific measures are required for the notified polymer. However, in the interest of good occupational health and safety, the following guidelines and precautions should be observed for use of Detac D2420 (containing <30% notified polymer).

- Employers should implement the following engineering controls to minimise occupational exposure to DetacD2420:
 - Adequate ventilation in the paint spray booths. Worker exposure to acetic acid and hydrochloric acid should be maintained below the relevant NOHSC Exposure Standards.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to Detac D2420:
 - Impermeable/rubber gloves;
 - Chemical resistant apron/laboratory coats;
 - Goggles, face shields or safety glasses;
 - Vapour respirators if required.

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

Disposal

- The notified polymer should be disposed of in landfill.

Emergency procedures

- Spills/release of the notified polymer should be handled as outlined in the MSDS.

12.1. 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 Section 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.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

ASI (1993a) [Notified polymer] Acute effects on the rainbow trout, *Oncorhynchus mykiss* (Study no. 600120-103-2). New Jersey, Aqua Survey Inc. (unpublished report submitted by the notifier).

ASI (1993b) [Notified polymer] Acute effects on the cladoceran, *Daphnia magna* (Study no. 300120-103-2). New Jersey, Aqua Survey Inc. (unpublished report submitted by the notifier).

ASI (1993c) [Notified polymer] Acute effects on the freshwater green alga, *Selenastrum capricornutum* (Study no. 100120-103-2). New Jersey, Aqua Survey Inc. (unpublished report submitted by the notifier).

FDRL (1993) Acute exposure oral toxicity study of [the notified polymer] in Sprague-Dawley rats (Study no. 92.0640.019). New York, Food & Drug Research Laboratories (unpublished report submitted by the notifier).

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