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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Quacoat SCX 1520

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

FULL PUBLIC REPORT**Polymer in Quacoat SCX 1520****1. APPLICANT**

Quaker Chemical (Australasia) Pty Ltd of 15 Park Road SEVEN HILLS NSW 2147 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, **Polymer in Quacoat SCX 1520**.

2. IDENTITY OF THE CHEMICAL

Other Name(s): Polymer in Quacoat SCX 1520

3. PHYSICAL AND CHEMICAL PROPERTIES

The following physical and chemical properties were provided for a 10 to 30% solution, of the notified polymer in water, unless otherwise indicated.

Appearance at 20°C and 101.3 kPa:

white solid flakes (notified polymer)
off white viscous liquid

Melting Point/Glass-transition Temperature:

93°C

Density:

1 150 kg/m³

Water Solubility:

see comments below

Partition Co-efficient (n-octanol/water):

not determined

Hydrolysis as a Function of pH:

see comments below

Flammability Limits:

not flammable

Autoignition Temperature:

not determined

Explosive Properties:

not explosive

Reactivity: not reactive

Particle Size Distribution: not applicable
range - μm

Comments on Physico-Chemical Properties

The notifier states that the polymer is soluble. The polymer contains carboxylic acid salt functionalities and the water solubility of the polymer will depend on the pH of the medium. At low pH values, at which the polymer exists predominantly in the free carboxylic acid form, the solubility in water is expected to be very low. However, at higher pH the carboxylic acid groups will be deprotonated and the resulting water solubility of the polymer will be higher. In the formulated product, Quacoat SCX 1520, the polymer is present in the deprotonated form as a mixed ammonium and DEAE salt. About 25% of the polymer is in this form, which accounts for the solubility.

It is unclear whether the notified polymer is likely to undergo hydrolytic decomposition in the environmental pH range of 4 to 7, due to its solubility. However, it is noted that there is low exposure to the aquatic compartment.

4. PURITY OF THE CHEMICAL

Degree of purity: > 90%

5. USE, VOLUME AND FORMULATION

The polymer in Quacoat SCX 1520 will not be manufactured in Australia. The notified polymer will be imported as a mixture in water, and will be reformulated locally into water-based coatings for industrial use as a corrosion inhibitor for solid metal and galvanised surfaces. The final concentration of the notified polymer in the coating products will be approximately 3.6%. The anticipated import volumes of the notified polymer over the next five years are 10.4 to 20.8 tonnes per annum.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported at a concentration of 10 to 30% in an aqueous mixture, which will be packed in 218 kg steel drums. These will be transported and stored at the customer's site where it will be reformulated. Two to four waterside and transport workers and 1 to 2 warehouse workers will be handling unopened drums of SCX 1520, and are only likely to be exposed in the event of an accident or leaking packaging.

Five to 10 workers may be exposed to the notified polymer during reformulation into a variety of water based surface coating products. Quacoat SCX 1520 would typically be pumped into a closed mixing vessel, to which other surface coating

components would be added. The product in the mixing vessel will be blended using mechanical agitators under local exhaust ventilation.

Following dispersion, the surface coating (containing the notified polymer at a final concentration of ~3.6%) would be pumped to automated filling lines for packaging into 218 kg plastic-lined steel drums or 10 kL bulk tankers. Transfer and packaging processes are automated and enclosed, hence, worker exposure to the notified polymer should be minimal.

At the two customer sites, the product containing the notified polymer is pumped to an on-site storage tank which either automatically feeds spray equipment (brush roller) or a dip tank. The former process is fully automated, enclosed, continuous and recycled. The latter process is also fully automated and local exhaust ventilation is positioned over the dip tank to vent any fumes and worker exposure to the notified polymer should be minimal. Workers will mainly be exposed to the notified polymer during cleaning and maintenance of the equipment.

Occupational exposure to the notified polymer would be greatest during formulation, cleaning and maintenance of spray equipment. In this situation inhalational, dermal and ocular exposure may occur. Application of surface coating using fully automated systems would result in minimal worker exposure. Dermal exposure to the notified polymer may occur during application of surface coatings using a brush roller or dip tank. Inhalational exposure is not expected to occur during application with a brush roller or when using a dip tank, although drips and splashes into the eyes may occur during application.

Worker exposure to the notified polymer in dried surface coating is likely to be minimal, as the polymer will be encapsulated as part of the cured coating film.

7. PUBLIC EXPOSURE

The diluted polymer product will be applied to solid metal and galvanised surfaces. Following application the notifier claims the polymer will be tightly bound to the substrate and will not leach out. Public contact with the polymer will be minimal and only occur on occasions when the metal or galvanised material containing the notified polymer is installed or in accidental circumstances. In such instances the polymer, which has a high number-average molecular weight (NAMW), should pose negligible hazard to the public.

Minor public exposure may result from disposal of unused polymer product, or accidental spillage of the product during transport, storage, dilution and application. However, adequate measures are described by the notifier in the Material Safety Data Sheet (MSDS) to minimise the risk of public exposure during disposal, or in the event of accidental spillage.

8. ENVIRONMENTAL EXPOSURE

. Release

Reformulation

Reformulation of the polymer will occur at a single site in New South Wales. The notifier estimates that the reformulation process will utilise 99% of feed chemicals. Therefore, only 1% of the import volume will be lost due to spills, leaks, cleaning, etc. This represents a maximum of 200 kg of the notified polymer per year. All effluent will be treated onsite in a waste treatment plant. In the plant the pH of the effluent is adjusted to 2.4 to 4.5, resulting in the protonation and precipitation of the polymer as the carboxylic acid form. As a result of this treatment the notifier estimates that greater than 98% of the polymer will be removed from solution through adsorption to sludge, based on previous experience with similar polymers. The sludge will be disposed of to Lidcombe Aqueous waste treatment plant.

The notifier has estimated that a maximum of 0.4% of the product will remain in the empty drums. This would correspond to a maximum of 85 kg of the notified polymer per annum. It is standard practice at the Quaker Chemicals site to rinse the empty drums with water at a washing station. This wash is routed to the onsite waste treatment plant. The rinsed drums are compacted and disposed of by a licensed waste contractor

Application

The coating will be applied using either a dip tank or brush roller process. It is standard practice to use plastic drop sheets to catch any spills and leaks at the customers' sites where the coating material will be applied. The coating cures quickly and the drop sheets are replaced daily and disposed of to landfill. The notifier estimates that losses from application will be greater than 0.5%, corresponding to approximately 100 kg per annum of the notified polymer.

The notifier estimates that a maximum of 0.7% of the coating would remain in the empty drums. Approximately 40% of the formulated coatings will be supplied in drums. This corresponds to a maximum of 60 kg per annum of polymer left in empty drums. The coating remaining in the drums would be allowed to cure and the drums will be crushed and disposed of as scrap metal.

. Fate

The fate of the majority of the notified chemical will share that of the coatings into which it is formulated. The coatings when cured will share the fate of the metal surfaces to which they have been applied. Hence, the final environmental fate of the polymer will be mostly landfill.

Waste generated from the application of the coating (containing a maximum of 160 kg per annum of the notified polymer) will be consigned to landfill as the cured coating. In landfill it is anticipated that the coating will remain stable. Hence, the polymer will be trapped within the coating matrix and not be mobile.

A small amount (< 285 kg per annum) of the notified polymer in the carboxylic acid form, will be disposed of to approved landfill bound to sludge from the reformulators waste treatment plant. The low water solubility of the polymer in carboxylic acid form indicates lateral movement and leaching from landfill sites is not expected.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided which is acceptable for polymers of low concern with a NAMW greater than 1 000 according to the Act.

Biological membranes are not permeable to polymers of very large molecular size and therefore bioaccumulation of the notified polymer is not expected (3,4).

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is incorporated into coatings and applied to metal substrates. Such coated objects will be consigned to landfill or recycled at the end of their useful life and the coating containing the notified substance will share their fate. In landfill the polymer is expected to be immobile when bound within the coating matrix.

It is anticipated that the amount of the notified polymer released to the environment will be low. A small amount (< 285 kg per annum) will be disposed of to landfill in the carboxylic acid form of the polymer, bound to sludge from the reformulators waste treatment plant, as the result of the reformulation into coatings. In the carboxylic acid form the polymer will have low water solubility and leaching from landfill sites is not expected.

An additional small quantity (< 160 kg) of the notified polymer will be disposed of to landfill as waste from the application of the coatings to metal substrates. This waste polymer will be bound within the cured coating matrix and is not expected to be mobile in landfill.

The overall environmental hazard of the polymer is expected to be low.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

The notified polymer has a NAMW of greater than 1 000 and should not, therefore, be able to cross biological membranes and cause adverse health effects. The levels of low molecular weight species (NAMW < 1 000, < 1%) are not expected to cause adverse health effects. The level of residual acrylate monomers is approximately less than 0.2%, and while two monomers are considered hazardous according to the *List of Designated Hazardous Substances* (1), the residual levels are below threshold cutoffs (1), even when potential cumulative

effects are taken into account. It can be concluded that there is a low risk of adverse health effects to workers during transport, storage, formulation or application of the notified acrylic polymer as a component of the coating product. There will be even less risk from coming into contact with the crosslinked/cured polymer after application to metal and galvanised surfaces.

There is negligible potential for public exposure to the notified polymer arising from storage, transportation, reformulation and application. Coating material containing the notified polymer applied to solid metal and galvanised surfaces will be rapidly cured, and the notified polymer will be tightly bound within the matrix of the coating. Public exposure to the notified polymer from coated metal galvanised surfaces is likely to be minimal.

12. RECOMMENDATIONS

To minimise occupational exposure to the Polymer in Quacoat SCX 1520 the following guidelines and precautions should be observed during the reformulation and application stages using the product Quacoat SCX 1520:

- Safe practices, as should be followed when handling any chemical formulation, should be adhered to - these include:
 - minimising spills and splashes;
 - practising good personal hygiene; and
 - practising good housekeeping and maintenance including bunding of large spills which should be cleaned up promptly with absorbents and put into containers for disposal.
- It is expected that, in the industrial environment, protective clothing conforming to and used in accordance with Australian Standard (AS) 2919 (6) and protective footwear conforming to Australian/New Zealand Standard (AS/NZS) 2210 (7) should be worn as a matter of course. In addition, it is advisable when handling chemical formulations containing the notified polymer to wear chemical-type goggles (selected and fitted according to AS1336 (8) and meeting the requirements of AS/NZS 1337 (9)), impermeable gloves (AS 2161) (10) should be worn to protect against unforeseen circumstances.
- A copy of the MSDS should be easily accessible to employees.

13. MATERIAL SAFETY DATA SHEET

The MSDS for the emulsion containing the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (11).

This MSDS was provided by the notifier as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the notifier.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act secondary notification of the notified shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. National Occupational Health and Safety Commission, 1994. *List of designated hazardous substances* [NOHSC:10005(1994)], AGPS, Canberra, 1994
2. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment', [NOHSC:1003(1995)], in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service Publ., Canberra.
3. Anliker, R., Moser, P. & Poppinger, D 1988 "Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors". *Chemosphere* 17(8):1631-1644.
4. Gobas, F.A.P.C., Opperhuizen, A. & Hutzinger, O. 1986 "Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation". *Environmental Toxicology and Chemistry* 5:637-646.
5. National Occupational Health and Safety Commission, *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008], AGPS, Canberra, 1994.
6. Standards Australia, 1987. *Australian Standard 2919 - 1987 Industrial Clothing*, Standards Association of Australia Publ., Sydney, Australia.
7. Standards Australia, Standards New Zealand 1994. *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

8. Australian Standard 1336-1982. *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, 1982.
9. Australian Standard 1337-1984. *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.
10. Australian Standard 2161-1978. *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.
11. National Occupational Health and Safety Commission, 1994. *National Code of Practice for the Completion of Material Safety Data Sheets*, [NOHSC:2011(1994)], AGPS, Canberra.