File No PLC/409

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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

DCA 229

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Director
Chemicals Notification and Assessment

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
GE Betz Pty Ltd (ABN: 84 001 221 941)
69-77 Williamson Road
INGLEBURN NSW 2565

NOTIFICATION CATEGORY
Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical name
Other names
CAS number
Molecular formula
Structural formula
Number Average Molecular Weight
Weight Average Molecular Weight
Weight Percentage of Polymer Species with MW<1000 and MW<500
Charge Density
Polymer Constituent
Residual Monomers and Impurities

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
USA, Canada

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
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3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met (yes/no/not applicable)*
Meets Molecular Weight Requirements	Yes
Meets Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	3	22	22	22	22

USE

The notified polymer will be imported as a component of an aqueous polymer dispersion at a concentration of 50%. The main use of the notified polymer will be as a scale inhibitor in cooling tower water treatment. A minor use for the notified polymer will be as a super plasticiser in concrete.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

Repackaging and Reformulation

The notified polymer will be imported in 205 L drums or 1500 L intermediate bulk containers (IBC). It will be transported from the dockside to a chemical warehouse, where it is stored in a bunded area. The polymer is either repackaged and reformulated at the same site or distributed to customers in the original containers.

Repackaging of the notified polymer will involve decanting the 205 L drum into purpose built 1200 L doubled skinned semi-bulk containers (SBC). The containers and drums are transferred by forklift from storage sites to fully bunded blending rooms. Blending operators open the drums and connect pumping equipment and transfer lines between the 205 L drum and the 1200 L SBC. Once the transfer is complete the pumping equipment is removed and reconnected to the next drum. At the end of the repackaging, the SBC is sealed and prepared for transport. The pumping equipment, transfer lines and empty drums are rinsed out by the operator.

During the reformulation, the imported chemical is diluted to customer specification (range unknown). The notified polymer is pumped into blending tanks, diluted with water and refilled into the supply containers.

Formulation of notified polymer as plasticiser for concrete and cement additive

The notified polymer will be formulated into concrete admixtures before distribution to concrete batching plants.

The SBC are transferred from storage areas to dosing or application areas by forklift. The operator connects pumping equipment to the SBC. The notified polymer will be pumped into a 16 tonne vessel, and mixed with other ingredients to obtain an admixture containing 10% notified polymer. The

concrete admixture is automatically fed into 205 L drums or 1000 L IBC transport and storage containers.

End use of the concrete admixture
Concrete batching plants are automated and the mixing process is enclosed. The concrete admixture will be pumped from the transport containers to onsite storage tanks. The admixture is added to the initial batching water using an electronic dispensing unit to obtain a concrete mixture for end use. The concrete mixture containing 0.01% notified polymer is gravity fed into concrete transport trucks via a hopper.

End use of polymer as a scale control agent in water treatment
The notified polymer is supplied to end-users as a 50% solution or may be diluted to various concentrations. The supplied product is pumped to storage containers. The product is transferred from the storage containers by hand pumps or automatically dosed into the cooling towers.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

Environmental exposure may result from release during reformulation or repackaging at the notifier's site, or during use as a scale control agent in cooling towers and as a concrete additive. Releases from leaks and spills should be contained by bunding and soaked up with absorbent material for disposal to landfill. Releases from equipment cleaning and residues remaining in containers may enter the environment if not recycled or controlled and these releases were estimated at about 1200 kg/year by the notifier. When the polymer is contained in set concrete, little exposure is expected, with minor releases (~100 kg/year) from leaks and spills, equipment cleaning and container residues.

The major release is expected to be discharge from cooling towers in continuous bleed or blowdown or when systems are shut down and cleaned. As a worst case, where it is assumed that all is released and assuming cooling water represents 60% of the total effluent discharged from a facility, the concentration of the notified polymer in discharge water will be close to the feed rate of 1-3 mg/L. However, in practice, the maximum drift rate should be 0.2% of the recirculation rate resulting in a much lower release.

6.2. Summary of Occupational Exposure

Dermal and ocular exposure can occur during certain formulation processes. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers.

6.3. Summary of Public Exposure

The notified polymer will not be available to the public. Members of the public may come into contact with the finished concrete structures containing the notified polymer. The polymer will not be available for exposure

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Yellow to amber liquid
Melting Point/Glass Transition Temp	4°C (aqueous solution)
Density	1185 kg/m^3
Water Solubility	575.6 g/L at pH 1, 1020 g/L at pH 7, 1000 g/L at pH 10 and 21°C Measured by observations of turbidity, clarity, etc. from a series of dilutions.
Reactivity	Stable under normal environmental conditions.
Octanol-Water Partition Coefficient (log Pow)	<0.97 HPLC method; the notified polymer eluted before the reference standard of benzyl alcohol which has a known log P of ~0.97.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

The following toxicological studies were submitted:

Endpoint	*Result*	*Classified?*	*Effects Observed?*
1. Rat, acute oral toxicity	LD50 >2000 mg/kg bw	No	Yes

8.1.1 Discussion of Observed Effects

No mortality was observed. Slight weight loss was observed in three females at day 14. Instances of diarrhoea and soiled anogenital areas were noted on the day of dosing.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. The result for acute oral toxicity supports the conclusion of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

The following toxicological studies were submitted:

Endpoint	*Result and Conclusion*
Ready Biodegradability	Not readily biodegradable
Fish Toxicity (Fathead minnow)	120-h NOEC = 2000 mg/L
Daphnia magna Toxicity	48-h NOEC = 2000 mg/L
Algal Toxicity (*Pseudokirchneriella subcapitata*)	96-h EC50 = 47 mg/L

9.1.1 Discussion of Observed Effects

Algal toxicity

After 96 h, the EC50 was 47 mg/L (95% confidence interval 32-67mg/L) for a water hardness of 20mg/L as $CaCO_3$; for water hardness of 144 mg/L as $CaCO_3$, the EC50 was >1000 mg/L based on cell numbers. This is considered harmful to aquatic life according to the Globally Harmonised System of Classification and Labelling of Chemicals. The results indicate that toxicity is dependent on water hardness and presumably arises from sequestrations of metal ions.

Ready biodegradability

After 28 days under OECD TG301D test conditions, the loss of oxygen indicated that only 3% biodegradation occurred which is less than the 60% required to classify the notified polymer as readily biodegradable. Therefore, under the conditions of the test, the notified polymer was not readily biodegradable.

9.2. Environmental Hazard Assessment

The polymer is to be used as a scale control agent in cooling towers and as a concrete additive. Environmental release may occur from several sources such as spills or leaks during reformulation and repackaging at the notifier's site or during use, residues remaining in containers, cleaning of equipment and discharges from cooling towers.

In the worst cases scenario of the entire annually imported amount of the notified polymer being released to sewers in the course of the year, the predicted environmental concentration (PEC) in river waters would be 15.5 μg/L with no removal by sewage treatment plants. Given that the most sensitive organism was freshwater green algae with a 96-h EC50 of 47 (32, 67) mg/L, the predicted no effect concentration (PNEC) is the EC50 divided by an assessment factor of 100, or 0.47 mg/L. Therefore the PEC/PNEC ration is 15.5/470 = 0.033 which indicates low hazard. Given the polymer's high water solubility, it is expected to remain in the water column and is not expected to bio ccumulate in organisms.

10. RISK ASSESSMENT

10.1. Environment

Based on a worst case scenario, the PEC/PNEC indicates that the risk of the notified polymer to the environment is expected to be low.

10.2. Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be present in formulations containing hazardous ingredients. If these formulations 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.

10.3. Public health

The notified polymer will not be available to the public. Members of the public may make dermal contact with finished concrete product containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is bound within a matrix and unlikely to be bioavailable.

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

10.2. Environmental risk assessment

The polymer is not considered to pose a risk to the environment based on its proposed 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 as described in the submission.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The notifier has provided MSDS in accordance with the schedule item B 12 of the *ICNA Act*. The accuracy of the information on the MSDS remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

  – 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 to landfill or a liquid waste treatment facility by a licensed waste contractor.

Storage

- The following precautions should be taken regarding storage of the notified polymer:
  – Keep containers closed when not in use.
  – Store in cool ventilated area away from oxidizers.

Emergency procedures

- Spills/release of the notified polymer should be absorbed or contained with a suitable absorbent material (eg. tissues, cloth, dry sand or vermiculite). Shovel into labelled sealable containers for subsequent safe disposal. Contaminated surfaces should be washed with a detergent solution with washings retained as waste.

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 subsection 64(1) of the Act; if
  – the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

(2) Under subsection 64(2) of the Act:
  - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.