File No PLC/555

23 December 2005

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Melflux 2651F

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
International Sales and Marketing (ABN 36 467 259 314) of 262 Highett Road, Highett, Victoria, 3190

NOTIFICATION CATEGORY
Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:
Chemical Name, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents and Residual Monomers/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: 2003
Canada: 2003

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Meflux 2651F

MOLECULAR WEIGHT (MW)
Number Average Molecular Weight (Mn) >10000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION
The notified polymer contains only low concern functional groups.

Criterion	*Criterion met (yes/no/not applicable)*
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Not applicable
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported into Australia in 15 kg paper bags with polyethylene-coating.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	20	20	20	20	20

USE
Plasticiser (dispersant) for cement based construction materials.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

No specific customers have presently been identified for the notified polymer. A typical operation description is provided below.

Powdered Product Formulation
The bags containing the notified polymer are cut open and the polymer powder is transferred into an additive silo from where it is dosed into the powder mixer. Such transfer is typically expected to be undertaken manually. Other additives together with cementitious binders and aggregates (fillers) are typically added to the mixer at this time.

The formulated powder product containing up to 0.5% notified polymer is bagged or filled in 15 kg bags or 1 tonne supersacks and palleted for shipment to industrial customers Australia-wide. Such bagging and filling is expected to be automated.

End Use
The dry mortar mix containing up to 0.5% notified polymer is transferred into the mortar mixer where it is mixed with water and other ingredients to produce fresh mortar typically containing 0.05% notified polymer. Finished fresh mortar is then poured into place or troweled for subsequent manual finishing. Mortar may also be applied using high pressure shotcrete systems.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

The following categories and numbers of workers that may be exposed to the notified polymer are broadly estimated for the typical types of workers (and exposure scenarios):

Number and Category of Workers			
Category of Worker	*Number*	*Exposure Duration Hours/Day*	*Exposure Frequency*
Powdered Product Formulation			
Formulation	1 per plant	4	10 days/year
Filling	1 per plant	8	10 days/year
End users			
Mixing	-	0.5	40 days/year
Application	-	0.5	220 days/year

Powdered Product Formulation
Dermal, ocular and inhalation exposure to the powdered notified polymer could occur during the opening and transfer of the notified polymer. However, exposure to significant amounts of the notified polymer is limited because of the personal protective equipment (PPE) (goggles, gloves and dust mask) worn by workers. Exposure to the notified polymer during filling operations is expected to be low due

to the low concentration of the notified polymer (< 0.5%) and the use of PPE.

End Use
Dermal, ocular and inhalation exposure to the powdered notified polymer could occur during the mixing of the mortar. However, exposure to significant amounts of the notified polymer is limited due to the low concentration of the notified polymer (< 0.5%). Dermal exposure is expected to be the main route of exposure during application of the mortar, however, again exposure is expected to be low due to the low concentration of the notified polymer (typically 0.05%) and the avoidance of contact with the cement.

6.2. Summary of Public Exposure

The notified polymer is intended only for use in industry.

There is likely to be a high level of public exposure arising from dermal contact with finished concrete structures containing the notified polymer typically at 0.05%. However, the polymer will be bound within the matrix of the concrete and therefore public exposure to the notified polymer is expected to be negligible.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

Transport and handling.
There is potential for accidental environmental release during transport and handling of the notified polymer. Should release occur, it is expected that spilt notified polymer would be physically contained, collected and subsequently disposed of to secure landfill.

Powdered Product Formulation.
During formulation, the notified polymer is mixed with other ingredients to form dry mortar products containing a maximum of 0.5% w/w notified polymer. The formulated products are then packaged into 15 kg bags or "supersacks" containing up to 1 tonne. Potential environmental release may arise from accidental spills during formulation and from the cleaning of equipment. It is expected that up to 1% of notified polymer may be released through these processes. This is expected to be disposed of to landfill.

End-use.
The formulated products are then transported to end-users, where the bags are unloaded, and emptied into suitable mixing vessels, where water and other ingredients are added to form the finished mortar. Once the mortar has cured, the notified polymer is effectively bound within the mortar matrix and environmental release is not expected. Possible environmental release may arise from wind dispersal of the dry formulated products during container opening and transfer. Due to the very low concentration of the notified polymer within the end-use products, this is unlikely to be a significant route of environmental exposure

Residue in bags.
It is expected that up to 1% (up to 200 kg) of the total quantity of imported notified polymer will remain as residue in bags. It is expected that this residual notified polymer will be disposed of to landfill or by incineration.

6.3.2. Environmental Fate

Mortar.
The ultimate fate of the notified polymer will be linked to the disposal of construction materials from building demolition, which are usually directed to landfill.

Landfill.
In landfill, the uncured notified polymer is expected to associate with the soil matrix and sediments and hydrolyse and or slowly degrade through abiotic and biotic processes to water, oxides of carbon and simple calcium and sodium containing compounds or salts. Notified polymer that is contained within a mortar matrix is expected to be eventually released and undergo the above degradation processes.

Incineration.
During incineration, the notified polymer is expected to be thermally decomposed to form water,

oxides of carbon, and simple calcium and sodium containing compounds or salts.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20ºC and 101.3 kPa	Yellowish powder
Melting Point/Glass Transition Temp	Not determined. The notified polymer is reported to decompose at temperatures > 180 ºC
Density	300-600 kg/m^3 (bulk density) 1040-1060 kg/m^3 (20% aqueous solution)
Water Solubility	$\geq$ 414 g/L (calculated) based on a 38% aqueous solution with a density of approximately 1.09 g/cm^3.
Dissociation Constant	The notified polymer contains acid functionality, which are expected to have typical acidity and remain largely dissociated except at the acidic end of the environmental pH range (4-9).
Particle Size	$\leq$ 500 µm. Exact particle size may depend on the drying process parameters. The notified polymer as supplied is typically sieved in order to eliminate particles > 500 µm.
Autoignition Temperature	410 ºC
Flammability limits	The notified polymer glowed from 200 ºC (up to the maximum tested temperature of 508 ºC).
Explosive Properties	Not explosive under the Australian Dangerous Goods Code (FORS, 1998). Lower Explosion limit: 40 g/m^3 Minimum oxygen content: 13% volume. Maximum pressure of explosion: 8.6 bar Deflagration index (K_{st}): 125 bar*m/s
Reactivity	Stable under normal environmental conditions. An analogous polymer was shown to be stable within a tested pH range of 1.2 to 9.
Degradation Products	None under normal conditions of use

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

The following toxicological test results for a similar polymer were reported in the MSDS:

Endpoint	*Result and Conclusion*
Rat, acute oral	low toxicity, LD50 > 2000 mg/kg bw
Rabbit, skin irritation	non-irritating
Skin sensitisation	no evidence of sensitisation
Genotoxicity – bacterial reverse mutation	non mutagenic

The above results are indicative of low hazard.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

The following ecotoxicological test result for a similar polymer was reported in the MSDS:

Endpoint	*Result and Conclusion*
Daphnia Toxicity	EC50 > 100 mg/L / 48 h

The above result is indicative of low hazard.

9.2. Environmental Hazard Assessment

From the limited data available, toxicity to aquatic organisms is likely to be very low. However, anionic polymers are known to be moderately toxic to algae. The mode of toxic action is overchelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This could apply to the notified polymer. However, the toxicity to algae is likely to be further reduced due to the presence of calcium ions, which will bind to the functional groups (Nabholz *et al*. 1993).

The notified polymer is not expected to cross biological membranes due to its high molecular weight and water solubility and is therefore not expected to bioaccumulate.

10. RISK ASSESSMENT

10.1. Environment

The notified polymer is imported in powder form and after formulation with other ingredients, is used as a plasticiser for cement based construction materials. The formulated product is mixed on-site with other materials to form mortar, which upon curing, effectively entraps the notified polymer in a solid-state matrix. Uncontrolled environmental release is expected to be limited to dispersion by wind during mixing and given the very low concentration of notified polymer within the formulated product, is not expected to be significant. Therefore, while it may be possible to determine the Predicted No-Effect Concentration (PNEC) for a similar polymer, it is not possible to determine the Predicted Environmental Concentration (PEC), and consequently, a PEC/PNEC calculation cannot be undertaken. However, based on exposure arguments, the PEC will be very low, and given the unlikely hazardous nature of the notified polymer to the aquatic environment, the risk to the aquatic environment is expected to be acceptable.

10.2. Occupational Health and Safety

Powdered Product Formulation

The OHS risk presented by the notified polymer is expected to be low due to limited exposure as a result of the use of PPE, and the predicted low toxicity of the notified polymer. The level of atmospheric nuisance dust should be maintained as low as possible. The NOHSC exposure standard for atmospheric dust is 10 mg/m^3.

End Use

The OHS risk presented by the notified polymer is expected to be low due to the low concentration of the notified polymer and the predicted low toxicity of the notified polymer. The level of atmospheric nuisance dust should be maintained as low as possible. The NOHSC exposure standard for atmospheric dust is 10 mg/m^3.

10.3. Public Health

Public exposure is expected to be negligible and hence the risk to public health is also considered to be negligible.

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

11.1. Environmental Risk Assessment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

11.2. Human Health Risk Assessment

11.2.1. Occupational health and safety

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

11.2.2. Public health

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

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. 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.

  Guidance on the handling of wet cement can be obtained from the Office of the Australian Safety and Compensation Council

- The level of atmospheric nuisance dust should be maintained as low as possible. The NOHSC exposure standard for atmospheric dust is 10 mg/m^3.

- 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 by incineration or to landfill.

Emergency procedures

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

13.1. 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.

14. BIBLIOGRAPHY

Nabholz JV, Miller P and 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 ed Environmental Toxicology and Risk Assessment, ASTM STP 1179, American Society for Testing and Materials, Philadelphia, PA.

FORS (Federal Office of Road Safety) (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 6th Edition, Canberra, Australian Government Publishing Service.