File No PLC/757

26 February 2008

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Alcoflow 750

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Ageing, 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, Water, Heritage and the Arts.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also 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:

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
National Starch & Chemical Pty Ltd (ABN: 37 000 351 806)
7 Stanton Road
SEVEN HILLS NSW 2147

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, Residual Monomers/Impurities, Mode of Introduction, Use Details, Import Volume.

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

NOTIFICATION IN OTHER COUNTRIES
USA (2005), Canada (2007)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Alcoflow 750

MOLECULAR WEIGHT (MW)
Number Average Molecular Weight (Mn) >1000 Da.

REACTIVE FUNCTIONAL GROUPS
The notified polymer contains only low concern functional groups.

3. PLC CRITERIA JUSTIFICATION

Criterion	Criterion met
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
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. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: Clear, dark amber solution

Melting Point	0°C
Density	927.9 kg/m^3
Water Solubility	Completely soluble at 20°C

Dissociation Constant	pK_a = 4.25 (based on acrylic acid)
Reactivity	Stable under normal environmental conditions. The MSDS for the product containing the notified polymer states that storage should be between 5°C and 30°C. The product containing the notified polymer should not be allowed to freeze. Contact with strong oxidisers should be avoided.
Degradation Products	None under normal conditions of use. The notified polymer contains groups that might hydrolyse under severe conditions, but is expected to be stable under normal environmental pH of 4-9.

5. INTRODUCTION AND USE INFORMATION

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

Year	1	2	3	4	5
Tonnes	30 – 100	30 – 100	30 – 100	30 – 100	30 – 100

Use
The notified polymer will be reformulated into a water treatment solution to be used in the oil and extraction industry. It will be used to inhibit barite and/or calcite scale formation.

The notified polymer as a component (<40%) of Alcoflow 750 will be imported by sea and transported from the docks to industrial customers for reformulation.

After reformulation, the product containing the notified polymer (<20%) will be transported by road or ship to an onshore oil or gas extraction facility. This product will be added to water in a pipeline that is connected to an offshore extraction platform. The concentration of the notified polymer in the pipeline will be <0.00005% dependant on the condition of the water.

At the offshore platform the water containing the notified polymer will be pumped to the oil/gas bed where it will force the oil/gas back through pipes to an onshore facility. At the onshore facility, the water containing the notified polymer will be separated from the oil/gas in separation and settling tanks. After separation from the oil/gas, water containing the notified polymer will be combined with additional water from onshore bores and pumped back down to the oil/gas formation.

Mode of Introduction
The notified polymer will not be manufactured in Australia, but will be imported by sea in 200 L blue plastic drums as a component (<40%) of Alcoflow 750.

6. HUMAN HEALTH IMPLICATIONS

Hazard Characterisation
No toxicological data were submitted. The notified polymer meets the PLC criteria and therefore is assumed to be of low hazard.

Occupational Health and Safety Risk Assessment
Reformulation and Repacking imported product
Potential routes of exposure include accidental dermal and ocular exposure as a result of spills and splashes during insertion and withdrawal of the dip tube during transfer of the imported solution of the notified polymer (<40%) via pump from 200 L drums to a closed blending vessel. Similar routes of exposure are expected when transferring the final product containing the notified polymer (<20%) to 1000 L Intermediate Bulk Containers (IBCs) during connection and disconnection of hoses and quality control. Protective gloves, safety glasses and coveralls are expected to be worn by workers to minimise exposure. Exhaust ventilation is expected to be used to reduce any vapours or aerosols.

End user operation – Oil/Gas Production:
Potential dermal and accidental ocular exposure to <20% of the notified polymer may occur when manually attaching and detaching transfer lines from the IBCS to pipelines carrying carrying water from the onshore plant to the offshore platform and back again. The dosing process is fully enclosed and the water will be recycled

within the stainless steel pipes connecting the onshore plant and the offshore platform. Therefore, exposure is expected to be negligible once the product containing the notified polymer has been dosed into the steel pipes.
At the refineries, appropriate containment procedures (such as catching pans) and engineering controls (such as local exhaust ventilation) are expected to be in place to minimise exposure to refinery workers. These workers are expected to wear PPE such as safety glasses, gloves and overalls to minimise exposure. Exposure to the notified polymer in the final blended fuel is expected to be very low.

Overall, the OHS risk presented by the notified polymer is expected to be acceptable, based on the minimal exposure to workers and its assumed low hazard.

Public Health Risk Assessment
The notified polymer is intended only for use in industry and as such public exposure is not expected. Therefore, the risk presented by the notified polymer to public health is considered to be negligible given its assumed low hazard and the very low potential for public exposure.

7. ENVIRONMENTAL IMPLICATIONS

Environmental Hazard Characterisation
No ecotoxicological data were submitted.

Anionic polymers are known to be moderately toxic to algae. The mode of toxic action is over-chelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This may 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.

Environmental Release
Release of chemical at site
After importation by sea, the notified polymer will be transported via road without repackaging in the closed 200 L plastic drums; potential release would only be through accidental spills. It will be received and stored by the customer in an undercover area protected by bunding. Formulated water treatment solution containing <20% of the notified polymer will also be transported via road/ship in 1000 L IBCs to customers.

There is potential for spillage of the notified polymer during formulation and it is estimated that a maximum of 0.5% of the notified polymer may be lost during formulation, equal to <500 kg of the notified polymer per annum. Spills in the storage and production areas will be collected with inert absorbent material and disposed of through a licensed waste disposal contractor. No notified polymer will enter the sewer system. Residues from transfer lines, pumps etc (~0.2%) will be handled by the formulator's effluent system.

Residual product left in the drums (~0.5%) will be rinsed out with water and the rinsate will be fed into the mixing tank for production of future batches. The emptied drums will be disposed of by licensed drum contractors.

Release of chemical from use
The notified polymer will be used in the oil and gas field application by professional engineers. The application is a zero water discharge set-up. It is expected that the notified polymer will partition (>99%) into the aqueous phase within oil production pipelines.

The produced water that comes from the offshore production wells will be separated from the oil and gas onshore via large separators and settling tanks. It will then be combined with bore water from onshore bores and re-injected back down into the oil/gas formation offshore via water re-injection wells.

Any notified polymer in produced oil will be transported to the refinery and blended with crude oil to be used as feedstock for the refinery. It is expected that a very small amount of the notified polymer (< 0.000005%) will end up in feedstock and be consumed with it. Appropriate containment procedures and engineering controls are expected to be in place at the refineries to minimise exposure.

Empty IBCs will be returned to supplier for reuse.

Environmental Fate

The notified polymer is soluble in water and its high molecular weight indicates that it is unlikely to cross biological membranes and bioaccumulate. It is anticipated that prolonged residence in landfill will eventually degrade the notified polymer via the biotic and abiotic processes.

Environmental Risk Assessment
Limited environmental release of the notified polymer is anticipated during the reformulation of the product. Even in the case of accidental spillage, established environmental controls will be in place to minimise exposure. Residues remaining in containers are expected to be recovered. In the oil field application, there will be no discharge of "produced water" to the ocean except for leaks or accidental spills. The amount required for scale inhibition is expected to be low (< 0.00005% in water). Any leaks will be further diluted in the ocean and are unlikely to cause toxic effects to the aquatic organisms. Any residues present in the produced oil will eventually be consumed as feedstock in the refinery.

A very small quantity of the notified polymer is expected to be released to water and it is not possible to calculate a reasonable predicted environmental concentration (PEC).

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

8. CONCLUSIONS AND RECOMMENDATIONS

Human health risk assessment
Under the conditions of the occupational settings described, the risk to workers is considered to be acceptable.

When used in the proposed manner the risk to the public is considered to be acceptable.

Environmental risk assessment

The chemical is considered to pose an acceptable risk to the environment based on its reported use pattern.

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 *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)], 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.

Storage

- The following precautions should be taken by National Starch & Chemical Pty Ltd regarding storage of the notified polymer:
  - Avoid contact with strong oxidisers.
  - Keep away from sources of ignition – No smoking.
  - Do not allow to freeze.

Emergency procedures

- Spillage of the notified polymer should be avoided. Spillages should be cleaned up promptly with absorbents and put into containers for 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 chemical 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 notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

(2) Under Section 64(2) of the Act; if
  - the function or use of the chemical has changed from a scale inhibitor used in oil or gas extraction applications or is likely to change significantly;
  - the amount of chemical being introduced has increased from 100 tonnes, or is likely to increase, significantly;
  - if the polymer has begun to be manufactured in Australia;
  - additional information has become available to the person as to an adverse effect of the chemical 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 MSDS of products containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.