File No PLC/615

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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

MD 4011

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Baker Petrolite, a Division of Baker Hughes Australia Pty Ltd (ABN 20 004 752007) of 5 Walker Street, Braeside,Victoria 3195

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, Charge Density, Polymer Constituents, Residual Monomers/Impurities, and Site of Manufacture/Reformulation

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Flammability limits, autoignition temperature and explosive properties. The physical properties are driven by the solvents in the formulation.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
USA and Canada

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
MD4011
MD4011F (Intermediate product)

3. PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met (yes/no/not applicable)*
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. INTRODUCTION AND USE INFORMATION

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

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

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

USE

The notified polymer will be used in a wide variety of formulations as a demulsifier. Demulsifiers are designed to aid in the seperation of oil and water. The notified polymer will also be used in fuel additive formulations to prevent emulsion formation between water and petroleum products.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer will be imported from USA as an ingredient of a product in 55 gallon drums or totes tanks of various sizes (eg. 210 L drum or up to 2050 L tote) at a maximum concentration of 50%. The drums/totes will be taken to the customer site where they will be placed and stored on metal bulki bunds which are contained within a bunded area.

At the customer's site products containing the notified polymer will be generally transferred to a tote tank by means of gravity or by pumping, using quick-connect fittings and valves to prevent potential exposure to the product. The product is injected directly from the totes into the desired application, such as demulsifiers for oil field. The products are injected into the oil/water mixture to aid with phase separation. Specifically, the products help with the removal or water from oil. The notified polymer can also be used in fuel additive packages to prevent emulsion formation between water and petroleum products.

The maximum concentration of the notified polymer in fuel additive is 1.5 ppm.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

At the customer's site, worker exposure to the notified polymer is possible during opening and closing of drums, connecting and disconnecting transfer hoses, mixing and pumping operations. The possible routes of exposures are via dermal, inhalation and accidental eye contact.

However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers.

6.2. Summary of Public Exposure

The imported products containing the notified polymer will not be sold to the public. Therefore, public exposure may only occur during an unlikely transport accident where containers are ruptured.

There is a potential for dermal and less likely ocular exposure by the public during refilling vehicles with petroleum products. However, little exposure will occur due to the low concentration of the notified polymer in finished petroleum products (1.5 ppm) and the refilling activities are of short duration.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

The product is used in the oil industry as a demulsifier and also as a fuel additive. It is expected that close to 100% of the polymer import volume will be used as a fuel additive in the initial stages of its introduction. The vast majority of the polymer used in this manner will be combusted with the fuel in an internal combustion engine. During refilling of vehicles minor spillages are expected to occur.

The notifier indicates that the usage pattern may change over time to only 20% used as a fuel additive and 80% used in the oil industry. The notifier indicates that the demulsifier may be used at any stage of oil production activity. However, based on the notifier's literature (http://www.bakerhughes.com/bakerpetrolite/oilgas/emulsion_breakers.htm) it is expected that most will be used to separate water from oil at both land and marine platforms. The addition rate is expected to be < 100 ppm of the demulsifier. The separated water is expected to be treated before re-use or disposal. During the treatment, the oil phase entrained in the wastewater and containing the majority of the polymer is recovered to the level practicable. In marine applications the wastewater will be re-used or disposed of overboard, whilst in land based applications it is likely to be re-used to the level practicable before being disposed of to a tailings dam. It is likely that considerable amount (less than 5 ppm) of the notified polymer will remain in the wastewater. This will be further diluted when disposed of overboard.

The oil containing the polymer will be transported to an oil refining facility usually by pipeline. During the refining some of the polymer will partition to the sludge to be incinerated with the remainder being processed with the crude oil. The processing is likely to fully decompose the polymer, with any remainder likely to partition to the heaviest fractions of the refining process. These fractions may include fuel oils, lubricating oils and asphalt. The polymer will be combusted in the case of fuel oils, entrained in lubricating oils, with exposure to the environment occurring through incorrect disposal or fixed to the asphalt.

Exposure to the environment through spills during use in the oil industry may lead to direct contact with the aquatic environment. The polymer being water insoluble and designed to effect better phase separation between oil and water will therefore remain in the oil phase. Some of the oil phase may be collected for re-use or disposal during clean up of the spill.

Minor releases may occur from spills during refilling of totes at customer sites. These spills should be contained in bunded areas. Containers will be re-used without rinsing if they are refilled with the polymer product. Otherwise they will be rinsed with an organic solvent with the rinseate being incinerated.

6.3.2. Environmental Fate

The fate of the polymer will be intrinsically bound to the product in which it is used. When used as a fuel additive it will be combusted to form oxides of carbon and water vapour. Any spills are likely to be immobile with the more volatile fuel evaporating leaving the polymer to undergo slow in-situ abiotic and biotic degradation to oxides of carbon and water vapour. The notifier states that the polymer does not cause adverse impact on fuel performance or emissions, however no data were submitted to support the claim. As the addition rate of the polymer to fuel is expected to be low, it is unlikely to have a significant impact on vehicle emissions.

When used in the oil industry the majority will be processed during the oil refining process. This is likely to cause the polymer to possibly fully decompose to simpler organic molecules, which will partition to the appropriate fraction according to their boiling point. Similarly any undecomposed polymer is likely to partition to the heaviest fractions of the distillation process such as fuel oil, lubricating oils and asphalt. The polymer will share the fate of these products and will be combusted, eventually degraded by biotic or abiotic processes associated with oil, or eventually undergo in-situ abiotic and biotic degradation associated with asphalt. In all cases, the products of combustion or decomposition will be oxides of carbon and water vapour.

Any oil remaining in the aqueous phase that is released from the marine environment from off-shore platforms will be dispersed and partition to the sediment phase where it eventually degrade by biotic and abiotic means.

Spills of oil containing the polymer will be collected to the level practicable. The remainder will eventually undergo degradation with the oil.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	The polymer is a dark amber gel like material. In solvent it is an amber coloured liquid.
Melting Point/Glass Transition Temp	Pour point is –17.8°C as formulated in MD4011
Density	9.98×10^2 kg/m^3 at 16°C as formulated in MD4011
Water Solubility	The polymer is not water soluble but is dispersible.
Dissociation Constant	The polymer contains anionic groups which are expected to display typical acidity with pKa of approximately 4.
Reactivity	Not applicable
Degradation Products	The polymer contains hydrolysable functional groups, but is not expected to react under normal conditions of use.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data were submitted:

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

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

The polymer contains potentially anionic functional groups. 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 anionic group is on alternating carbons of the polymer backbone. Whether this applies to the polymer is unclear, but it is unlikely to be significant. Further, the toxicity to algae is further reduced due to the presence of calcium ions, which will bind to the functional groups. The polymer is unlikely to cross biological membranes due to its insolubility and high molecular weight.

10. RISK ASSESSMENT

10.1. Environment

Due to the multiple pathways, which the polymer may be exposed to the environment it is difficult to calculate a Predicted Environmental Concentration (PEC). However it is likely that the distribution of the polymer will be quite dispersed.
No data were submitted on ecotoxicity. However as previously noted the polymer is likely to be at worst moderately toxic.

As a PEC and Predicted No Effect Concentration (PNEC) cannot be calculated, no risk quotient can be derived.

In marine applications, there will be a release of wastewater containing the polymer directly to the aquatic environment although the amount of polymer released to the environment is expected to be minimal. It is expected that less than 100 ppm of the polymer will be added to

emulsions. As the polymer is water insoluble, minimal amounts are expected to partition to the aqueous phase. Treatment of the wastewater designed to remove residual oil phase and particulates containing the polymer is expected to further reduce the amount of polymer from the wastewater before it is released. Wastewater disposed of overboard will be greatly diluted in the marine environment and is unlikely to present an unacceptable risk.

Based on the specified pattern of use, the notified polymer is not expected to pose an unacceptable risk to the environment.

10.2. Occupational Health and Safety

The notified polymer is of high molecular weight with low volatility. Worker exposure to the notified polymer is limited because of the engineering controls in place and personal protective equipment worn by workers. The notifier states that the polymer had been used overseas for the last 12 years as a demulsifier and there were no reported cases of incidence of adverse health effects from the use of the notified polymer. Therefore, based on the information provided by the notifier and the use of PPE, occupational risk is considered 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

Members of the public may make dermal and less likely ocular contact with products containing the notified polymer. However, the risk to public health will be less because the notified polymer is present at low concentrations and used intermittently.

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 Low 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.

- 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.

Environment

Disposal

- The notified polymer should be disposed of by authorised incineration.

Emergency procedures

- Spills/release of the notified polymer should be handled by physical containment and where possible physically transferred to an appropriate container. Use of adsorbent material (diatomaceous earth, sand etc.) for small spills or large spill residues is appropriate for terrestrial spills. Collected material should disposed by authorised incineration.

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.