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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

PUBLIC REPORT

Poly(oxy-1,2-ethanediyl), α -(phenylmethyl)- ω -hydroxy-

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (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 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.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This 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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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
LTD/1821	Halliburton Australia Pty Ltd	Poly(oxy-1,2-ethanediyl), α -(phenylmethyl)- ω -hydroxy-	ND*	≤ 100 tonnes per annum	Component of drilling fluids

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia, or the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

Human health risk assessment

Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental risk assessment

On the basis of the reported use pattern, the notified polymer is not considered to pose an unacceptable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
 - Avoid contact with eyes
- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
 - Safety goggles

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the (M)SDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS) as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling are not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Emergency procedures

- Spills and/or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe 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 polymer 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 polymer has a number-average molecular weight of less than 1000;or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from a component of drilling fluids, or is likely to change significantly;
 - the amount of polymer being introduced has increased, or is likely to increase, significantly;
 - the polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the polymer 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 (M)SDS of a product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Halliburton Australia Pty Ltd (ABN: 73 009 000 775)
Level 17, 444 Queen Street
BRISBANE QLD 4000

NOTIFICATION CATEGORY

Limited: Synthetic polymer with $M_n \geq 1,000$ Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: molecular and structural formulae, molecular weight, analytical data, degree of purity, polymer constituents, residual monomers, impurities, use details and import volume.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows: all physico-chemical endpoints except melting point

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

Canada, China, Japan and USA

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Aquatone-S (contains $\leq 60\%$ notified polymer)

CAS NUMBER

26403-74-7

CHEMICAL NAME

Poly(oxy-1,2-ethanediyl), α -(phenylmethyl)- ω -hydroxy-

OTHER NAME(S)

Ethoxylated benzyl alcohol

MOLECULAR WEIGHT

$> 1,000$ Da

ANALYTICAL DATA

Reference IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY

$> 95\%$

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Colourless to yellowish liquid*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	42 °C - 11.1 °C*	Measured Provided by notifier
Boiling Point	> 205 °C at 101.3 kPa*	(M)SDS

Density	1,100 kg/m ³ at 20 °C*	(M)SDS
Vapour Pressure	< 1.3 × 10 ⁻² kPa at 20 °C*	Provided by notifier
Water Solubility	Soluble at 20 °C	(M)SDS
Hydrolysis as a Function of pH	Not determined	The notified polymer contains hydrolysable functionalities. However, no significant hydrolysis is expected to occur in the environmental pH range of 4 – 9
Partition Coefficient (n-octanol/water)	Not determined	Expected to be low, based on the water solubility
Adsorption/Desorption	Not determined	Due to its high water solubility and expected low partition co-efficient the notified polymer is not expected to adsorb to soils/sediment
Dissociation Constant	Not determined	The notified polymer does not contain any functional groups that are expected to dissociate in water
Flash Point	~205 °C*	(M)SDS
Flammability	Not determined	Not expected to be flammable based on flash point
Autoignition Temperature	Not determined	Not expected to autoignite
Explosive Properties	Not determined	Contains no functional groups that imply explosive properties
Oxidising Properties	Not determined	Contains no functional groups that imply oxidising properties

* Data for the imported product containing ≤ 60% notified polymer in aqueous solution

DISCUSSION OF PROPERTIES

Reactivity

The notified polymer is expected to be stable under normal conditions of use.

Physical hazard classification

Based on the limited submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

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

The notified polymer will not be manufactured in Australia. The notified polymer will be imported into Australia as a component of a formulated product in aqueous solution at ≤ 60% concentration.

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

Year	1	2	3	4	5
Tonnes	1-100	1-100	1-100	1-100	1-100

PORT OF ENTRY

Adelaide, Brisbane, Melbourne and Fremantle

TRANSPORTATION AND PACKAGING

The product containing the notified polymer will be imported in 19 L or 208 L drums and transported by truck and/or by ship to on-shore and/or off-shore drilling sites.

USE

The notified polymer will be used as a component of water-based drilling fluids for on-shore and off-shore drilling applications.

OPERATION DESCRIPTION

The notified polymer will be imported into Australia as a component of a formulated product at $\leq 60\%$ concentration. There will be no further formulation of the notified polymer. However, during end-use in off-shore or on-shore well drilling operations, the product containing the notified polymer will be mixed with other ingredients and then incorporated into the fluid system. The mixture will then be pumped into the well, where it will disperse within the drilling fluid system. After the completion of drilling operations, the drilling mud containing the notified polymer is expected to be pumped out for disposal, recycling, or re-use for both on-shore and off-shore settings. Most handling and use of the product containing the notified polymer is expected to occur outdoors.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Rig engineer	< 1	70
Drill rig worker	< 1	70

EXPOSURE DETAILS

Transport and storage workers are not likely to be exposed to the product containing the notified polymer except in the case of an accident involving damage to the sealed containers of the product.

Dermal and ocular exposure of workers to the notified polymer may occur during transfer, mixing of the product to prepare the treatment mixture, connecting the pump lines, pumping of the treatment mixture into the well and during maintenance and cleaning of equipment. Inhalation exposure is not expected given the low vapour pressure of the notified polymer. Workers are anticipated by the notifier to wear appropriate personal protective equipment (PPE) while handling the product including impervious rubber gloves, rubber apron, chemical goggles/glasses and if necessary a face shield. Moreover, operations will be performed in ventilated areas.

6.1.2. Public Exposure

The notified polymer is intended for industrial use on specific sites and therefore public exposure is not expected.

6.2. Human Health Effects Assessment

No toxicity data were submitted.

The notified polymer is of high molecular weight and has a low proportion of low molecular weight species (< 500 Da); hence absorption across biological membranes is not expected.

The notified polymer does not contain any known structural alerts of concern. However, the notified polymer has been classified by the notifier as a severe eye irritant based on analogue information. The notified polymer is also classified as a severe eye irritant on the ECHA Classification and Labelling Inventory. Irritation effects are expected to be greater where the notified polymer is of low molecular weight (< 1,000 Da) or contains a high proportion of low molecular species. Therefore, given the high molecular weight and low proportion of low molecular weight species of the polymer as notified, eye irritation effects may be limited for the notified polymer.

Health hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia, or the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

The notified polymer is expected to be of low hazard, presenting only as a potential eye irritant.

Workers may be exposed to the notified polymer at $\leq 60\%$ concentration. At these concentrations the notified polymer may have the potential to cause eye irritation effects. Workers are expected to wear PPE, including eye protection, when handling the notified polymer, which should reduce the risk of irritation effects.

Therefore, the risk of the notified polymer to occupational health is not considered to be unreasonable given the assumed low hazard and the assessed use pattern.

6.3.2. Public Health

The notified polymer will be used in industrial settings only on specific sites and will not be available to the public. Therefore, when used in the proposed manner, the risk to public health is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer will not be manufactured or reformulated in Australia; therefore, there will be no release from these activities. Environmental release during importation, transport and distribution may occur as a result of accidental spills. In the event of a spill, the notified polymer is expected to be contained for disposal in accordance with local regulations. Small amounts of the notified polymer may remain as residues in empty containers, which are expected to be disposed of in accordance with local regulations.

RELEASE OF CHEMICAL FROM USE

Release of the notified polymer is expected to be minimal during its use as the product is only used in closed-loop water-based mud systems. Accidental release of the product will be handled by physical containment, collection, and disposed in accordance with applicable regulations.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer is expected to incorporate into the bulk drilling fluid in a closed-loop system during drilling operations. Once drilling activities at the well conclude, the fluid system is brought back to the surface and the drilling fluid is either recycled, reused or disposed of in accordance with local requirements.

Disposal of water-based muds is rare due to the high value of the fluid and the significant disposal costs. All reasonable means are taken to economically retain and reuse the fluids. The solids which have been generated through mechanical separation to recondition the fluid are expected to be sent to a disposal facility.

7.1.2. Environmental Fate

The product containing the notified polymer has reported 80% biodegradation over 28 days ((SDS, test report is not available). Therefore, in the event of an accidental release the notified polymer is expected to rapidly biodegrade and is not expected to persist in the environment. The notified polymer has a molecular weight greater than 1,000 Da and no significant percentage of low molecular weight constituents; it is not expected to be able to cross biological membranes and therefore is not expected to bioaccumulate. If released to the environment, bioaccumulation of the notified polymer is unlikely due to its high water solubility and expected low n-octanol/water partition coefficient. The polymer is not expected to sorb to soil/sediment based on its water solubility. Accidental surface spills that may result from storage or use at the well site are expected to result in negligible or very small release volumes given typical safety measures implemented during drilling operations (*i.e.*, physical barriers, available means to collect spills) and are not expected to reach aquatic systems.

7.1.3. Predicted Environmental Concentration (PEC)

The predicted environmental concentration (PEC) for the notified polymer has not been calculated since no significant release of the notified polymer to the environment is expected based on its reported use pattern.

Therefore, it is not appropriate to estimate a PEC as this concentration is not expected to reach ecotoxicologically significant levels.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted. However, the notified polymer is expected to have limited aquatic exposure due to its use pattern. The notified polymer is a non-ionic polymer which is generally of low concern to the environment. Therefore, the notified polymer has not been formally classified for its acute and long-term hazard under the Globally Harmonised System of Classification and Labelling of Chemicals (GHS, United Nations, 2009).

7.2.1. Predicted No-Effect Concentration

No significant release of the notified polymer to the aquatic environment is expected based on the reported use pattern. Therefore, a predicted no-effect concentration (PNEC) has not been derived.

7.3. Environmental Risk Assessment

A risk Quotient ($Q = \text{PEC}/\text{PNEC}$) value has not been calculated since neither PEC nor PNEC were derived. Bioaccumulation of the notified polymer is unlikely due to its high water solubility, low n-octanol/water partition coefficient and high molecular weight. The notified polymer will be used in a closed-loop drilling system and release of the notified polymer to the environment is expected to be minimal. As the drilling system will be recycled or sent to a disposal facility, it is highly unlikely that the notified polymer will reach the aquatic environment when used in either on-shore or off-shore drilling activities. Based on the assumed low hazard and the assessed use pattern of the notified polymer, it is not expected to pose an unreasonable risk to the environment.

BIBLIOGRAPHY

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

United Nations (2009) Globally Harmonised System of Classification and Labelling of Chemicals (GHS), 3rd revised edition. United Nations Economic Commission for Europe (UN/ECE), <http://www.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html >.