

File No SAPLC/143

October 2012

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

PUBLIC REPORT

Polymer in SCR-500/SCR-500L

This Self Assessment has been compiled by the applicant and adopted by NICNAS 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), administered by the Department of Health and Ageing and the Department of Sustainability, Environment, Water, Population and Communities have screened this assessment report. The data supporting this assessment will be subject to audit by NICNAS.

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 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:

Street Address:	Level 7, 260 Elizabeth Street SURRY HILLS NSW 2010, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888
Website:	www.nicnas.gov.au

**Director
NICNAS**

TABLE OF CONTENTS

SUMMARY	3
CONCLUSIONS AND REGULATORY OBLIGATIONS	3
ASSESSMENT DETAILS	4
1. APPLICANT AND NOTIFICATION DETAILS	4
2. IDENTITY OF CHEMICAL	5
3. PLC CRITERIA JUSTIFICATION	5
4. PHYSICAL AND CHEMICAL PROPERTIES	5
5. INTRODUCTION AND USE INFORMATION	5
6. HUMAN HEALTH IMPLICATIONS	6
6.1. Exposure Assessment	6
6.2. Toxicological Hazard Characterisation	6
6.3. Human Health Risk Assessment	6
7. ENVIRONMENTAL IMPLICATIONS	6
7.1. Exposure Assessment	7
7.2. Environmental Hazard Characterisation	7
7.3. Environmental Risk Assessment	7

SUMMARY

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

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
SAPLC/143	Halliburton Australia Pty Ltd	Polymer in SCR-500/SCR-500L	No	< 0.5 tonnes per annum	Component of oil and gas well cements

CONCLUSIONS AND REGULATORY OBLIGATIONS

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.

Level of Concern for Public Health

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

Environmental risk assessment

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

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer when in the powdered form:
 - Use in a well-ventilated area
- 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:
 - Use of low-dust handling techniques
 - Avoid contact with skin, eyes, and clothing
- 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 if the potential for significant inhalation exposure is expected:
 - Respiratory protection

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 in accordance with all applicable laws.

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 polymer 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 polymer, 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 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 notified polymer has changed from a component of oil and gas well cements, or is likely to change significantly;
 - the amount of polymer being introduced has increased, or is likely to increase, significantly;
 - the notified polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the notified 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 notifier has provided an (M)SDS as part of the notification statement. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT

Halliburton Australia Pty Ltd (ABN: 73 009 000 775)
53-55 Bannister Road
CANNING VALE WA 6155

NOTIFICATION CATEGORY

Self Assessment: Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Chemical Name, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities and Use Details.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

USA

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

SCR-500 (60-100% notified polymer)

SCR-500L (10-30% notified polymer)

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (NAMW) >10,000 Da

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</i>
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	White to yellow solid
Melting Point/Glass Transition Temp	Not available due the highly cross-linked nature of the polymer.
Density	1480 kg/m ³ at 20°C
Water Solubility	Not determined. Expected to be water soluble based on the presence of hydrophilic functional groups and use in aqueous systems.
Dissociation Constant	Not determined. The notified chemical contains functionality that is expected to dissociate under the conditions of use (pH 4-12)
Particle Size	<1 to 480 microns; mean: 196.5 microns (SCR-500)
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use.
Comments	The products containing the notified polymer are incompatible with strong oxidizers.

5. INTRODUCTION AND USE INFORMATION

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

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

USE AND MODE OF INTRODUCTION AND DISPOSAL

Mode of Introduction

The notified polymer will be imported as a solid (SCR-500), contained in multi-walled paper bags, and as a solution (SCR-500L) in plastic pails or plastic drums. The products will be imported into Perth, Adelaide, Melbourne and Brisbane and stored at the notifier's warehouse before being transported by truck (on-shore) or by ship (off-shore) to well site field locations.

Reformulation/manufacture processes

The notified polymer will not be manufactured or reformulated in Australia.

Use

The products containing the notified polymer (at up to 100% concentration) are cement retarders used for high temperature oil and gas well cementing applications. The cement retarders provide more stable and consistent cement thickening times, thereby improving the reliability of the cement seal.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

OCCUPATIONAL EXPOSURE

At the well site field locations, dry cement will be conveyed in an enclosed system to a blender to make the cement slurry with water and the product containing the notified polymer. The slurry will then be injected down the well hole to cement the well.

Dermal, ocular and potential inhalation exposure of workers may potentially occur during cement blending processes involving the notified polymer. However, exposure to significant amounts of the notified polymer is expected to be limited because of the automated processes, engineering controls, and personal protective equipment worn by workers.

PUBLIC EXPOSURE

The notified polymer is intended only for use in industry and as such public exposure to the notified polymer is not expected. The notified polymer used for cementing the well will be bound up in the cement matrix, and hence will not be mobile in the environment and exposure is unlikely to occur.

6.2. Toxicological Hazard Characterisation

The notified polymer has been tested for acute oral and inhalation toxicity in rats and dermal toxicity in rabbits. The LD/LC50 values for all endpoints were above the highest concentration tested (Oral LD50, Dermal LD50, and Inhalation LC50 values were >5000 mg/kg bw, >2000 mg/kg bw, and >2 mg/L/4 hour, respectively) indicating low toxicity. The notified polymer was also evaluated for skin irritation potential in rabbits and the results of this study indicated that the notified polymer was practically non-irritating. Additionally, the notified polymer meets the PLC criteria, and can therefore be considered to be of low hazard.

The notified polymer has a high molecular weight ($M_n > 10,000$ Da) and will be introduced in the solid form (mean particle size 196.5 μm ; proportion in the respirable size range not specified) in one product. Based on the expected water solubility of the polymer, the notified polymer is expected to be cleared from the lungs, although high (and repeated) levels of exposure may take some time to clear and temporary respiratory impairment may occur.

6.3. Human Health Risk Assessment

OCCUPATIONAL HEALTH AND SAFETY

The OHS risk presented by the notified polymer is expected to be low, based on the expected minimal exposure to workers and the low hazard of the polymer. Although studies have indicated that the notified polymer is of low hazard, precautionary measures (as specified in the product SDS) should be taken when working with the notified polymer to minimise exposure, including gloves, coveralls, and safety goggles. In addition, when working with the notified polymer in the powder form, steps should be taken to avoid exposure to the polymer, if the potential for significant inhalation exposure exists.

PUBLIC HEALTH

As there will be no exposure of the public to the notified polymer or the product containing the notified polymer (and given the low hazard of the notified polymer), the risk to the public from exposure to the notified polymer is considered to be negligible and hence is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

The notified polymer will not be manufactured in Australia. Therefore, release to the environment will only occur through accidental spills or leaks of the storage containers during shipping, transport warehousing, and/or use at the well site. In the event of a surface release of the notified polymer, any spills will be contained and addressed using standard control measures (such as mopping up dry product or use of sand/sorbent materials). Empty storage containers containing notified polymer residues will be disposed of in accordance with all applicable laws.

ENVIRONMENTAL FATE

The notified polymer is water soluble, expected to be hydrolytically stable and not expected to biodegrade rapidly in seawater (SCR-500L: 1% in 28 d, OECD TG 306; OSPAR 2010). The notified polymer used for cementing oil and gas wells will be bound up in the cement matrix, and hence will not be mobile in the environment, making exposure unlikely to occur. Based on its very high molecular weight, the unbound notified polymer is expected to have a reduced mobility in soils and sediments. The notified polymer's high molecular weight will preclude absorption across biological membranes and thus it is unlikely to bioaccumulate. In a landfill, leaching of the notified polymer is not expected, given that it will be trapped in the concrete matrix. Ultimately, it will be degraded via abiotic or biotic pathways into water and oxides of carbon and inorganic salts.

7.2. Environmental Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. Anionic polymers are generally of low toxicity to fish and daphnia, however, they 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. Whether or not this applies to the notified polymer is unclear. However, the toxicity to algae is likely to be reduced due to the presence of calcium ions in the aquatic environment, which will bind to the functional groups. This is supported by environmental endpoints observed in testing conducted on the product, SCR-500L (10-30% notified polymer in water).

<i>Endpoint</i>	<i>Result</i>	<i>Test Guideline</i>
Fish Toxicity	LC50 = 2,500 mg/L	OSPARCOM 1995
Aquatic Invertebrate Toxicity	LC50 = 4,123 mg/L	ISO/TC147/SC5/WG2
Algal Toxicity	EC50 = 4,407 mg/L	ISO 10253
Sediment Reworker Toxicity	LC50 > 13,739 mg/kg	PARCOM 1995

Note: testing was conducted using marine species.

All results on marine test organisms were indicative of low hazard.

The acute toxicity and biodegradability potential of the notified polymer were evaluated previously using standardized tests in accordance with OECD and ISO protocols as part of the Harmonised Offshore Chemical Notification under OSPAR. All parameters recorded during the test were within protocol specifications. Additionally, NOECs were calculated for all organisms: fish – 1,800 mg/L; algae – 3,200 mg/L; aquatic invertebrate (crustacean) – 1,000 mg/L; and sediment reworker – 13,739 mg/kg. It is clear from these studies that the notified polymer has very low aquatic toxicity.

7.3. Environmental Risk Assessment

Under normal conditions of use, the notified polymer, used for well cementing, will be bound up in the cement matrix, and hence will not be mobile in the environment and exposure is unlikely to occur. Consequently, given the use pattern, the notified polymer is not considered to present an unreasonable risk to the environment.

In the event of a surface release of the notified polymer, any spills at the well site will be contained using standard control measures (such as containment berms, sand, sorbent materials, etc.). Such measures would prevent the migration of the notified polymer away from the well site, thereby greatly minimizing the likelihood of exposure to environmental receptors. Any waste is anticipated to be disposed of in accordance with all applicable laws.

The above considerations indicate minimal risk to the environment when the notified polymer is used

in the manner and levels indicated by the notifier. The notified polymer is not considered to present an unreasonable risk to the environment when it is stored, transported, used, recycled and disposed of in the proposed manner.