

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

POLYMER OF LOW CONCERN PUBLIC REPORT

Polymer in FLODRILL™ PP 1878 NA

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Australian Government 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 Australian Government Department of the Environment and Energy.

This Public Report is 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**

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Table of Contents

SUMMARY	2
CONCLUSIONS AND REGULATORY OBLIGATIONS.....	2
ASSESSMENT DETAILS.....	4
1. APPLICANT AND NOTIFICATION DETAILS.....	4
2. IDENTITY OF POLYMER	4
3. PLC CRITERIA JUSTIFICATION	4
4. PHYSICAL AND CHEMICAL PROPERTIES.....	4
5. INTRODUCTION AND USE INFORMATION.....	5
6. HUMAN HEALTH RISK ASSESSMENT.....	5
7. ENVIRONMENTAL RISK ASSESSMENT	5
BIBLIOGRAPHY	6

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
PLC/1545	SNF (Australia) Pty Ltd M-I Australia Pty Ltd	Polymer in FLODRILL™ PP 1878 NA	No	≤ 100 tonnes per annum	Additive in drilling cement for oil and gas well casings

CONCLUSIONS AND REGULATORY OBLIGATIONS

Human Health Risk Assessment

Based on the assumed low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the health of workers and the public.

Environmental Risk Assessment

Based on the assumed low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Health and Safety Recommendations

- 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.

- In the interest of occupational health and safety, the following precautions should be observed for use of the notified polymer as introduced in powder form:
 - The level of atmospheric nuisance dust should be maintained as low as possible. The Safe Work Australia exposure standard for atmospheric dust is 10 mg/m³.
- A copy of the 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

- Prevent from entering into soil, ditches, sewers, waterways and/or groundwater;
- Spills and/or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

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;
 - the notified polymer is intended to be used in coal seam gas (CSG) related applications;or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the notified polymer has changed from additive in drilling cement for oil and gas well casings, or is likely to change significantly;
 - the amount of notified 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.

Safety Data Sheet

The SDS of the product containing the notified polymer was provided by the applicant. The accuracy of the information on the SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

Applicants

SNF (Australia) Pty Ltd (ABN: 32 050 056 267)
298 Broderick Road
LARA VIC 3212

M-I Australia Pty Ltd (ABN: 67 009 214 162)
Level 11, 251 Adelaide Terrace
PERTH WA 6000

Exempt Information (Section 75 of the Act)

Data items and details exempt from publication include: chemical name, CAS number, molecular and structural formulae, molecular weight, polymer constituents, residual monomers/impurities, use details and import volume.

2. IDENTITY OF POLYMER

Marketing Name(s)

Polymer in FLODRILL™ PP 1878 NA

Other Name(s)

None

Molecular Weight

Number Average Molecular Weight (Mn) is > 10,000 g/mol

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</i>
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. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20 °C and 101.3 kPa	Granular white solid when introduced in powder form; clear to slightly yellow liquid when introduced in solution
Melting Point/Glass Transition Temperature	Not determined; thermal decomposition expected at > 150 °C
Density	0.1 – 0.6 kg/m ³
Water Solubility	Not determined; expected to be water soluble as a salt
Dissociation Constant	Not determined; expected to ionise under environmental conditions as a salt
Particle Size†	Expected to be similar to PLC/1397 at 316 – 1906 µm; volume weighted mean = 973.804 µm

Reactivity Stable under normal environmental conditions

Degradation Products None under normal conditions of use

† Based on an analogue chemical (Polymer in FLODRILL™ CMA 2153) previously assessed by NICNAS (PLC/1397).

5. INTRODUCTION AND USE INFORMATION

Maximum Introduction Volume of Notified Chemical (100%) Over Next 5 Years

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

Use

The notified polymer will not be manufactured in Australia. It will be imported in either powder form at > 95% concentration or in aqueous solution at < 30% concentration. The notified polymer will be used as a fluid-loss additive in drilling cement for oil and gas well casings at concentrations < 5%. The notified polymer will not be used in coal seam gas (CSG) related applications.

6. HUMAN HEALTH RISK ASSESSMENT

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

Although not considered in this risk assessment, NICNAS notes that the notified polymer contains an impurity that is classified as hazardous according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia. This chemical is present in the notified polymer as introduced above the cut off concentrations for classification and this has been recorded on the SDS.

The notified polymer has a high molecular weight > 10,000 g/mol and a relatively large particle size (> 100 µm) if introduced in powder form. Thus while exposure to the dust may occur, inhalation into the lower respiratory tract is not expected. The notified polymer is expected to be water soluble and therefore if inhaled at low levels is likely to be cleared from the upper respiratory tract readily through mucociliary action. Small proportions of the notified polymer may reach the lower respiratory tract, but it should still be readily cleared from the lungs unless high levels are inhaled. When high concentrations of the notified polymer are inhaled, it is likely to be cleared from the lungs, but this may be slower and temporary respiratory impairment is possible. The expected use of dust masks by workers handling the notified polymer in powder form should reduce inhalation exposure levels and hence lower any risk of temporary lung overloading.

The polymer will not be available to the public.

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

7. ENVIRONMENTAL RISK ASSESSMENT

No ecotoxicological data were submitted. 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. The notified polymer contains functionality that dilutes the chelating effect, which results in significantly reduced toxicity to algae (Boethling & Nahbolz, 1997).

The notified polymer will be imported into Australia as powder, or as a 30% water solution, for reformulation into a fluid-loss additive in drilling cement for use in conventional oil and gas well

formations. Local blending and repackaging of the formulation containing the notified polymer into cement additive is expected to occur within enclosed automated systems. Release of the notified polymer during reformulation in Australia is expected to be limited to accidental spills or leaks and residue in import containers. Spilt material and container residue are expected to be collected and disposed of in accordance with local government regulations, most likely to landfill.

The notified polymer will be used in cementing processes in conventional oil and gas well formation operations. The cement additive containing the notified polymer will be mixed into the cement slurry at the site of application, then pumped directly into drilling wells to form cement casings. Once cured, the notified polymer will be irreversibly bound within the cement matrix, and will share the fate of the cement. Residues in empty containers are expected to be rinsed, and the rinse added to subsequent cement slurries. Empty containers will be disposed of in accordance with local government regulations, most likely to landfill.

Based on its very high molecular weight and chemical structure, the notified polymer is not expected to be readily biodegradable. However, due to its high molecular weight and its expected water solubility the notified polymer is unlikely to cross biological membranes, and is therefore not expected to bioaccumulate. The notified polymer will share the fate of the cement within which it is bound, and is not expected to be bioavailable or mobile. In landfill, the notified polymer is expected to eventually degrade by biotic and abiotic processes to form water and oxides of carbon, nitrogen, sulphur and sodium salts.

Therefore, based on its assumed low hazard and assessed use pattern in cement casings for conventional oil and gas well formations, the notified polymer is not considered to pose an unreasonable risk to the environment.

BIBLIOGRAPHY

Boethling, RS & Nabholz VJ (1997) Chapter 10 Environmental Assessment of Polymers under the U.S. Toxic Substances Control Act. In: Hamilton, JD Sutcliffe R ed. Ecological Assessment of Polymers Strategies for Product Stewardship and Regulatory Programs, 1st ed. New York, Van Nostrand Reinhold, pp 187-234.