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

FULL PUBLIC REPORT

POGOL VP 1100

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**Director
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FULL PUBLIC REPORT

POGOL VP 1100

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Huntsman Corporation Australia Pty Ltd (ABN 67 083 984 187)
61 Market Road
Brooklyn Victoria 3012

NOTIFICATION CATEGORY

Limited: Polymer with Number Average Molecular Weight > 1000

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical name

Other name

CAS number

Molecular formula

Structural formula

Molecular weight

Spectral data

Polymer constituents and impurities

Detail of use

Introduction Volume

Identity of recipients

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Hydrolysis as a Function of pH

Particle Co-efficient

Adsorption/Desorption

Dissociation Constant

Particle Size

Flash Point

Flammability Limits

Autoignition Temperature

Explosive Properties

Reactivity

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

Commercial Evaluation Permit CEC-671, October 2005.

NOTIFICATION IN OTHER COUNTRIES

None known.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in POGOL VP 1100

METHODS OF DETECTION AND DETERMINATION

Remarks The notified polymer is a complex reaction product and there are no specific methods

relating to its detection and determination. However, diagnostic IR and NMR and GPC data were provided (ChemicalAnalysis (2005) and Huntsman Corporation 2004).

3. COMPOSITION

DEGREE OF PURITY
> 95%

	HAZARDOUS IMPURITIES/RESIDUAL MONOMERS	
Chemical Name	Sodium Hydroxide	
CAS No.	1310-73-2	Weight % 0.5
Hazardous Properties	<u>Classification</u> Corrosive: R35 <u>Concentration cutoffs</u> Conc≥5%: C; R35 ≥2%Conc<5%: C; R34 ≥0.5%Conc<2%: Xi; R36/38 (HSIS, 2005) Note that notifier has applied a higher classification of R41.	

ADDITIVES/ADJUVANTS
None.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
The notified polymer is not expected to lose monomers, impurities or other reactants during normal conditions of use. The notified polymer decomposes over the temperature range 120-150°C at 101.3 kPa.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer is manufactured locally.

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

Year	1	2	3	4	5
Tonnes	300 - 1000	300 - 1000	300 - 1000	300 - 1000	300 - 1000

USE
The notified polymer is used as a polymer precursor and as a chemical intermediate.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Not applicable as notified polymer is manufactured in Australia.

IDENTITY OF MANUFACTURER/RECIPIENTS
The manufacturing and storage sites are located in Sydney, NSW.

TRANSPORTATION AND PACKAGING
The majority of the notified polymer is transported by road from the manufacturing site to the warehouse and port facilities for export.

The notified polymer for export is transported in 22 tonne isotanks. It is also stored in 205 L closed head mild steel drums of pack weight 190 kg for site limited use. The isotanks have temporary storage in the warehouse facility. Drum stock is stored at the manufacturing facility only.
The product containing the notified polymer is also packed in 205 L closed head mild steel drums of pack weight 190 kg for site-limited use.

It is recommended that the notified polymer to be stored away from strong oxidising agents as a safety precaution.

5.2. Operation description

Synthesis of the notified polymer

The manufacture of the notified polymer involves the following process steps at the manufacturing site:

Charging of raw material to a reactor and followed by reaction which is conducted at 130 - 140°C under pressure. Once the polymerisation reaction is complete, the manufactured polymer is transferred to either 22 tonne isotanks or 205 L closed head mild steel drums of pack weight 190 kg via dedicated pipe work. The notified polymer is synthesised in batch lots of 22 tonnes.

During transfer from reactor to drums the notified polymer is in a molten state and solidifies in the drums.

The reactor, transfer tank and pipe-work are rinsed with water. The notified polymer as well as some residual reactants are discharged to sewer.

The notified polymer is either transferred to a storage warehouse for export or retained at the manufacturing site for use as a chemical intermediate.

Use as polymer precursor

The molten form of the notified polymer (800 kg per batch), sodium hydroxide other materials are added to a reactor and the reaction is conducted at 130 - 140°C under pressure. The polymer mixture is discharged from the reactor to drums via a holding tank and dedicated pipe-work. It is estimated that 800 kg per batch of the notified polymer is used in this operation.

The reactor, transfer tank and pipe-work are rinsed with water and the rinsate is discharged to sewer. Empty drums containing residual amounts of the notified polymer are sent to a drum recycling operation.

5.3. Occupational Exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport workers	2	0.5 hours per day	24 days per year
Warehouse staff	4	0.25 hours per day	24 days per year
Manufacturing process workers	2	0.5 hours per day	72 days per year
Laboratory technicians	2	1 hour per day	72 days per year
Drum recyclers	2	1 hour per day	72 days per year

Exposure Details

Manufacture

The notified polymer is discharged from a reactor to a holding tank via dedicated pipe-work. It is then transferred from the holding tanks to either isotanks or steel drums through an automated drum filling line.

Some of the notified polymer is used at the manufacturing facility as a chemical intermediate. It is melted and then transferred to a reactor via a vacuum dip-leg.

The main occupational exposures are during the packaging operation and the introduction of the molten polymer into the reactor. These operations may cause dermal and ocular exposure arising from any accidental spillage of the liquid (molten) form of the polymer. These potential hazards are significantly reduced given that factory manufacturing staffs are required to wear personal protective equipment such as hard hats, chemical goggles, overalls, safety boots and protective gloves. Safety showers and eye wash stations are located near the reactor and packaging areas.

Spills of the notified material are absorbed with sand, soil or vermiculite, swept up and transferred to sealed drums for disposal.

Analysis

Exposure to the notified chemical may occur mainly via skin contact while sampling and testing the notified polymer. Exposure is expected to be minor as small samples are handled. In addition, testing is performed in fume hoods and laboratory technicians are required to wear personal protective equipment such as safety goggles, laboratory coat and enclosed footwear.

Storage/Transport

Exposure to these workers is minimal as they are handling the solid form of the polymer stored in either 205 L sealed drums or 22 tonne isotanks. They may be exposed to it if there was a spill. Such an accidental release is dealt with as described in the 'manufacture' section above. Workers involved in these activities wear overalls and safety boots.

Drum Recycling

The empty steel containers containing the notified polymer are forwarded to a drum recycler. Disposal workers rinse the drums with water to remove residual polymer prior to reconditioning the drums. Residue levels are expected to be low and ocular and dermal exposure is minimal. Workers involved in this activity wear overalls, safety goggles and safety boots.

5.4. Release

5.4.1 RELEASE OF CHEMICAL AT SITE

Potential releases of the notified polymer can occur from wash out of the reactor and pipe-work with water. Wash out water at the manufacturing site is sent to a pre-treatment holding pond before discharge to sewer. It is estimated that for a 22 tonne batch of notified polymer, around 220 kg of it would be discharged to sewer through reactor and pipe-work washouts. This equates to an average release of 4620 kg/annum to sewer from the manufacturing operation.

5.4.2 RELEASE OF CHEMICAL FROM USE

The notified polymer will either be exported or reused at the manufacturing facility. The release of chemical from use is described in section 5.4.1. The notified polymer never leaves the site except for export.

5.5. Disposal

Drums containing residual levels of the notified polymer are forwarded to drum recyclers. The drums are rinsed with water and the rinsate treated to remove the organic fraction which is incinerated. The cleaned drums are reused. It is estimated that approximately 160 kg /annum of the notified polymer will be incinerated as a result of the drum recycling process.

Isotanks containing residual levels of the notified polymer will be cleaned offshore prior to reuse.

5.6. Public Exposure

Manufacture of the notified polymer and use as a polymer precursor will occur under controlled conditions in a chemical manufacturing facility. No exposure to the general public is expected from these processes. The remainder of the notified polymer will be exported.

Storage and transport is not expected to result in any public exposure as the notified polymer is either stored in sealed drums or isotanks. However, a spill of the material arising from a transport accident may potentially result in public exposure.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	White waxy solid
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Melting Point/Freezing Point	42°C
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Method	United States Pharmacopeia (USP) Method 741 for melting range of temperature.
Remarks	Full test report not provided.
TEST FACILITY	Huntsman LLC Austin Laboratories (2005)
Boiling Point	Not determined .
Remarks	The notified polymer decomposes over the temperature range 200°C at 101.3 kPa. No test report provided.
Density	1100 kg/m ³ at 50°C
Method	ASTM D1475 method used with a pycnometer measurement device.
Remarks	Full test report not provided.
TEST FACILITY	Huntsman LLC Austin Laboratories (2005)
Vapour Pressure	1 x 10 ⁻⁷ kPa at 35°C
Method	United States Environmental Protection Authority (EPA) test guideline OPPTS 830.7950. Dynamic Method
Remarks	Full test report not provided.
Water Solubility	900 g/L at 20°C
METHOD	In House Method, using the OECD 105 flask Method Protocol.
Remarks	Solubility was conducted at 20°C and pH 10. Determination of soluble polymer component was determined via gravimetry with allowance for the chemical impurities in the sample. No chemical instability was noted during the test.
TEST FACILITY	Huntsman LLC Austin Laboratories (2005)
Hydrolysis as a Function of pH	Not determined.
REMARKS	The notified polymer contains a hydrolysable group that may degrade in the acidic part of the typical environmental pH range of 4 – 9.
Partition Coefficient (n-octanol/water)	Not determined.
Remarks	The notified polymer is composed of a distribution of oligomers of varying molecular weight. These oligomers will have varying solubility in both water and n-octanol and determination of a partition coefficient is impractical. Given the high molecular weight of the notified polymer it is unlikely to cross biological membranes. Based on the solubility, the polymer is likely to partition to the aqueous phase.
Adsorption/Desorption	Not determined
Remarks	Given the high water solubility of the notified polymer it is not expected to adsorb onto moist soil types.
Dissociation Constant	Not determined
Remarks	The notified polymer does not contain any ionisable groups at environmental pH.
Particle Size	Not determined
Remarks	The notified polymer is a waxy solid.
Flash Point	Not determined
Remarks	It is considered that the polymer is a combustible solid but does not exhibit flammability properties due to its very low vapour pressures e under normal use

temperature (ie 1×10^{-7} kPa at 35°C).

Autoignition Temperature

Not determined.

Remarks As diethylene glycol (a lower molecular weight analogous polyethylene glycol chemical) has an autoignition temperature of 229°C, it is expected that the notified polymer exhibits a significantly higher autoignition temperature (expected to be > 200°C) and it is unlikely to be encountered during normal conditions of use (ie between 0 and 50°C).

Explosive Properties

Not determined

Remarks Not expected to detonate as a result of heat, shock or friction based on the observation of analogous polyethylene glycol chemicals.

Reactivity

Remarks The notified polymer is stable in water and air at temperatures below 120°C. It does not exhibit any oxidising properties. When heated, the notified polymer decomposes to carbon dioxide and carbon monoxide.

Charge Density

Not determined

Remarks The notified polymer does not contain any ionisable group.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted

8. ENVIRONMENT

8.1. Environmental fate

No test data for environmental fate endpoints were submitted. Non-ionic polymers of NAMIW > 1000 are of low concern to the aquatic compartment.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The notified polymer will be manufacture in Australia and will be either exported or have a site limited use as a chemical intermediate. The synthesis and process of notified polymer will be in one location.

Potential releases of the notified polymer can occur from wash out of the reactor and pipe-work with water. Wash out water at the manufacturing site is sent to a pre-treatment holding pond before discharge to sewer. It is estimated that for 22 tonne batch of notified polymer, around 220 kg of it would be discharged to sewer through reactor and pipe-work washouts. This equates to an average release of 4620 kg/annum to sewer from the manufacturing operation.

Drums containing residual levels of the notified polymer are forwarded to drum recyclers. The drums are rinsed with water and the rinsings treated to remove the organic fraction which is incinerated. The cleaned drums are reused. It is estimated that approximately 160 kg/annum of the notified polymer will be incinerated as a result of the drum recycling process.

Isotanks containing residual levels of the notified polymer will be cleaned offshore prior to reuse.

Worst-Case Predicted Environmental Concentration (PEC) Values

Based on the typical use of the notified polymer expected per day, assuming that the whole formulation waste (4620 kg/year) is discharge to one STP in Sydney, NSW, and assuming

minimum or no partitioning to sludge within the sewage treatment works as the discharge levels are below the solubility limit.

Process or Dilution Factor	One Point Discharge
Typical notified chemical wasted per year	4620 kg
Number of day per year	260
STP daily Volume	140 ML
Concentration in effluent from sewage treatment plant	127 µg/L
Predicted environmental concentrations (PECs) in receiving waters	
Ocean (Dilution Factor 1:10)	
PEC	13 µg/L
River (Dilution Factor 1:1)	
PEC	127 µg/L

Note that notified polymer is:

- Not volatile, and therefore, does not dissipate into air
- Highly water-soluble
- Should be ready biodegradable (based on data obtained for an analogue having similar chemical composition and molecular weight).

Therefore, any non biodegraded chemical should remain within the aquatic environment. The polymer is expected to have low affinity for the organic phases and component of soils and sediments, and be highly mobile in soils.

The notified polymer is unlikely to bioaccumulate due to the high molecular weight and water solubility.

9.1.2. Environment – effects assessment

While a PNC/PNEC calculation is not possible and there are no ecotoxicological studies conducted on the notified polymer, it is assumed that the notified polymer has an ecotoxicological profile equivalent to similar molecular weight polyethylene glycols, which is considered not to be harmful to aquatic environment (LC₅₀ values of > 5000 mg/L).

9.1.3. Environment – risk characterisation

On the basis of the low expected aquatic toxicity, the notified polymer is unlikely to pose an unacceptable risk to the environment.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

The notified polymer is a white waxy solid at ambient temperature. It has a low vapour pressure and is chemically stable.

The notified polymer is supplied with a residual level of sodium hydroxide catalyst at 0.5% of the overall formulation. While the NOHSC Hazardous Substances Information System recommends a classification of R36 and R38 for sodium hydroxide at concentrations between 0.5 and 2.0%, Huntsman has increased the eye irritation classification from R36 to R41 for the formulation. Contact with eye fluids has the potential to partially dissolve the formulation and as it has a measured solution pH of 11, corrosive effects may occur.

The polymer is manufactured in Australia and is either exported or has a site-limited use as a chemical intermediate. The main occupational exposures occur in packaging operations and transferring the molten form of the polymer into a reactor. These activities may cause dermal and ocular exposure arising from any accidental spillage of the liquid (molten) form of the polymer. These potential hazards are significantly reduced given that factory manufacturing staff wear personal protective equipment.

The notified polymer is not classified as dangerous goods by any mode of transport. There may

be some occupational exposure to the notified polymer during transport and storage, but this is the result of any accidental release.

9.2.2. Public health – exposure assessment

Some of the notified polymer is used under controlled conditions in a chemical manufacturing facility and there is no exposure to the general public resulting from this process. The remainder is exported.

Storage and transport is not expected to result in any public exposure as the notified polymer is transported in isotanks for export or stored in sealed drums for site-limited use. There is no repackaging of the notified polymer after it has left the manufacturing facility.

9.2.3. Human health – effects assessment

The notified polymer has a molecular weight > 1000, which would reduce the possibility of its being absorbed across biological membrane but the notified polymer has significant quantity of low weight species. As the notified polymer contains a residual level of sodium hydroxide catalyst at 0.5% of the overall formulation it may have irritant properties.

Toxicological information was available for polyethylene glycols, claimed to be closely related but there are differences in the chemical structure. No toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 2004).

9.2.4. Occupational health and safety – risk characterisation

The polymer is manufactured in Australia and is either exported or has a site-limited use as a chemical intermediate. The main occupational exposures occur in packaging operations and transferring the molten form of the polymer into a reactor. These activities may cause dermal and ocular exposure arising from any accidental spillage of the liquid (molten) form of the polymer.

The overall occupational risk is considered low given that factory manufacturing staff wear PPE (hard hats, chemical goggles, overalls and protective gloves) during polymer formulation and when the polymer is used as a chemical intermediate.

9.2.5. Public health – risk characterisation

Public exposure to the notified polymer is expected to be negligible and therefore the risk to public health is also expected to be negligible.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

No toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 2004).

10.2. Environmental risk assessment

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

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

REGULATORY CONTROLS

Hazard Classification and Labelling

- The Office of the ASCC, Department of Employment and Workplace Relations (DEWR), should consider the following health hazard classification for the notified polymer as it is supplied as a mixture with 0.5% sodium hydroxide. The overall formulation is classified as hazardous with irritant classifications of:
 - R 38 (irritating to skin) and
 - R 41 (risk of serious eye damage)

The following safety phrases have been assigned to the formulation:

- S24/25 Avoid contact with skin and eyes
- S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified chemical as introduced:
 - Avoid contact with skin and eyes
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical as introduced:
 - In the manufacturing environment, protective equipment such as hard hats, chemical goggles, overalls, safety boots and protective gloves should be worn when handling this material. In the laboratory environment, personal protective equipment such as safety goggles, laboratory coat and enclosed footwear should be worn when handling this material.

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 chemical 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.

Disposal

The notified chemical should be disposed of by the following: Drums containing residual levels of the notified polymer should be forwarded to drum recyclers. The drums should be rinsed with water and the rinsings treated to remove the organic fraction which is incinerated. Isotanks containing residual levels of the notified polymer should be cleaned offshore prior to reuse.

Storage

- The following precautions should be taken regarding storage of the notified polymer :
 - It is recommended to store the notified polymer away from strong oxidising agents as a safety precaution.

Emergency procedures

- Spills/release of the notified polymer should be handled as described in the MSDS method of treatment: collect and seal in properly labelled containers for disposal. Wash area down with excess water to remove residual material.
- The liquid form of the polymer may present a greater potential for irritant effects. If direct contact with the liquid polymer occurs flush eyes and skin with water and seek medical attention..

12.1. 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 Section 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.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

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