

File No: LTD/1030

July 2002

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

**FULL PUBLIC REPORT**

**Polymer in Cemerol R-515M and R-520MC-37**

This Assessment has been compiled 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) is administered by the National Occupational Health and Safety Commission which also conducts the occupational health and safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and Heritage and the assessment of public health is conducted by the Department of Health and Ageing.

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**Director  
Chemicals Notification and Assessment**

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## **FULL PUBLIC REPORT**

### **Polymer in Cemerol R-515M and R-520MC-37**

#### **1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Sika Australia Pty Limited  
55 Elizabeth Street  
Wetherill Park DC NSW 2164

NOTIFICATION CATEGORY

Limited: Polymer with NAMW  $\geq 1000$  (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Identity of chemical  
Composition

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

Commercial Evaluation Permit, Permit No. 511, April 2002

NOTIFICATION IN OTHER COUNTRIES

None

#### **2. IDENTITY OF CHEMICAL**

MARKETING NAME(S)

Polymer in Viscocrete 1200NT (containing 20% notified polymer)  
Polymer in Cemerol R-515M (containing 40% notified polymer)  
Polymer in Cemerol R-520MC-37 (containing 40% notified polymer)

#### **3. COMPOSITION**

DEGREE OF PURITY

>50%

#### **4. INTRODUCTION AND USE INFORMATION**

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

The notified polymer will not be manufactured in Australia. It will be introduced at 40% concentration as a component of concrete additive products, Cemerol R-515M or Cemerol R-520MC-37. The concrete additive will be reformulated to obtain a cement admixture, Viscocrete 1200NT, containing 20% notified polymer. The cement admixture will be further diluted and mixed to obtain a ready to use mixed concrete containing 0.068% notified polymer.

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>	150	150	150	150	300

USE

The notified chemical will be used as a superplasticiser for concrete mixtures. End use products (EUP) include ready mix concrete and precast concrete for mining and tunnelling shotcreting\*.

## **5. PROCESS AND RELEASE INFORMATION**

### **5.1. Distribution, Transport and Storage**

PORT OF ENTRY  
Sydney, NSW

IDENTITY OF MANUFACTURER/RECIPIENTS  
Sika Australia Pty Limited  
55 Elizabeth Street  
Wetherill Park DC NSW 2164

#### TRANSPORTATION AND PACKAGING

Cemerol R-515M or Cemerol R-520MC-37 will be imported by sea in 205L drums or 1000 L intermediate bulk containers (IBC). It will be transported to the notifier's warehouse in NSW by road where the product will be stored, and reformulated into Viscocrete 1200NT. Viscocrete 1200NT will be transported by road in 250 L drums or 1000 L IBC transport containers and redistributed to the notifier's interstate warehouse and deposited into customers onsite storage tanks for further processing into a concrete mixture for end use.

### **5.2. Operation Description**

#### *Formulation of concrete admixture*

Cemerol R-515M or Cemerol R-520MC-37 will be formulated into concrete admixtures prior to distribution to the notifier's warehouses and other customers. It will be mechanically pump into a 16 tonne vessel and mixed with other ingredients to obtain Viscocrete 1200NT, a concrete admixture containing 20% notified polymer. Viscocrete 1200NT is automatically fed into 205L drums or 1000 IBC transport and storage containers. During the formulation process, plant operators collect samples for QC analysis by the laboratory staff.

#### *End use*

Concrete batching plants are automated and the mixing process is enclosed. Viscocrete 1200NT will be pumped from the transport containers into customer's onsite storage tanks. It will be added to the initial batching water using an electronic dispensing unit to obtain a concrete mixture for end use. The concrete mixture containing 0.068% notified polymer is gravity fed into concrete transport trucks via a hopper.

For precast concrete plants, mining and tunnelling shotcretors, the manufacture of concrete is similar to the above processes. However, once the concrete mixture is manufactured, it is fed into mouldings for precast concrete or fed into a machine via a hopper.

Cleaning operations involve flushing the mixer and trucks with water. The wash water is recycled into ensuing concrete batches.

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\*Shotcrete (n) is a mixture of aggregate and Portland cement, conveyed by compressed air at high pressure to the nozzle of a spray gun, where water is added. The wet mixture is then sprayed in place and may be carved or troweled almost immediately.

### 5.3. Occupational exposure

#### *Number and Category of Workers*

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hr/day)</i>	<i>Exposure Frequency (days/year)</i>
Waterside	5-10	2	5
Transport drivers	5-10	2	5
Warehouse/Storage workers	2-5	2	1
Plant operators/Laboratory staff (involved in manufacture and testing of admixtures)	5-10	8	1
Plant operators (concrete batch mixing)	10-20	8	200

#### *Exposure Details*

During concrete admixture formulation, exposure at 20-40% notified polymer will be predominantly dermal with limited ocular exposure from spills when connecting and disconnecting transfer pumps, drumming of concrete admixture and collecting samples for QC analysis. Coveralls, safety goggles, boots, face shield, apron and impervious gloves will be used during the above activities.

During concrete batch mixing, limited dermal and ocular exposure to the low concentration of the notified polymer (0.068%) will be expected since concrete batching plants will be automated and the mixing process will be enclosed. Exposure to cleaning operators will be predominantly dermal when mixer and trucks are flush out with water. Similar PPE as above will be used during concrete batching, and dispensing, and cleaning operations.

Transport and waterside workers will not be exposed to the notified polymer.

Once the concrete has set, the notified polymer will be trapped within the concrete and will not be available for exposure.

### 5.4. Release

#### RELEASE OF CHEMICAL AT SITE

During reformulation, release of the notified polymer to the environment may occur from residues in transport containers, spills and leaks, cleaning equipment. The notifier has estimated the release from these sources as follows:

Residues in transport containers	205 L drums (2%) 164 kg polymer/container	600 kg/year
	1000 L (1%) 4 kg polymer/container	300 kg/year *
Spills and leaks		400 kg/year
Cleaning of equipment	16 tonne mixer 1.6 kg polymer/mixer	30 kg/year *
		<b>Total: 1330 kg/year</b>

\* these quantities will be recycled

The above estimates are based on 150 tonnes of polymer being imported in 205 L drums (732 drums) and 150 tonnes being imported 1000 L containers (150 IBCs), half of which will require reformulation.

Spillage during normal operating procedures will be contained by plant bunding and will be soaked up with adsorbent material before being transported off-site for disposal by landfill. All washings from the cleaning of equipment will be collected and disposed of to a liquid waste treatment facility by a licensed waste contractor. There will be no release to sewer.

## RELEASE OF CHEMICAL FROM USE

Residues in transport containers	205 L drums (2%) 1.64 kg/container, 40% polymer	600 kg/year
	1000 L (1%) 4 kg/container, 40% polymer	300 kg/year
	205 L drums (2%) 0.82 kg/container, 20% polymer	300 kg/year
	1000 L (1%) 5 kg/container, 20% polymer	150 kg/year
Spills and leaks		200 kg/year
Cleaning of equipment	276 batches, 10 kg polymer/batch	30 kg/year
<b>Total:</b>		<b>4310 kg/year</b> <b>(1.4% of the total volume)</b>

Empty transport containers are rinsed with water and the resulting rinsate is added into subsequent concrete mixtures. Wash water from the cleaning of equipment is added to an onsite settling tank and the clear water is recycled. Any spilt polymer is contained within bunding and is collected by using absorbent material, which is disposed of to landfill. There is no release of polymer to sewer or receiving waters.

### 5.5. Disposal

Any unused polymer that is not recycled will be disposed of in local landfill. Notified polymer that is trapped within set concrete and is not available for release. Any unused wet cement will be allowed to dry before disposal to landfill. Similarly any old treated concrete from demolition operations will be disposed of to landfill.

### 5.6. Public exposure

Public exposure may occur during a transportation accident. In the event of a large spill, the spill should be absorbed with inert material such as dry sand or vermiculite and prevented from entering sewers or stormwater drains, waterways or soils. Small spills should be wiped up with absorbent tissues or cloth. The waste material should be collected and disposed of by incineration or to landfill as permitted by local regulations.

There is likely to be a high level of public exposure arising from dermal contact with finished concrete structures containing the notified polymer. However, the notified polymer would be trapped in the concrete structure and will not be available for exposure.

## 6. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance at 20°C and 101.3 kPa** Brown semi viscous liquid

**Boiling Point** >100°C at 101.3 kPa

Remarks Test report not provided.

**Density** 1100 kg/m<sup>3</sup> at 20°C

Remarks Test report not provided.

**Vapour Pressure** Not determined.

Remarks The notified polymer has a high molecular weight and is not expected to have significant vapour pressure.

**Water Solubility** Not determined.

Remarks The notified polymer contains a high level of hydrophilic functional groups, which give the polymer water adsorbing and solubility properties, which are required for its superplasticizer function.

<b>Hydrolysis as a Function of pH</b>	Not determined.
Remarks	The notified polymer contains ester and amide ester groups, which can undergo hydrolysis under extreme temperature and pH conditions.
<b>Partition Coefficient (n-octanol/water)</b>	Not determined.
Remarks	Based on the structure and estimated high water solubility, the notified polymer is expected to partition into the water phase.
<b>Adsorption/Desorption</b>	Not determined.
Remarks	Despite its high water solubility, the notified polymer is expected to bind strongly to polar particles in the soil such as silicates.
<b>Dissociation Constant</b>	Not determined.
Remarks	The notified polymer contains >10% carboxylic acid functionality and is expected to have typical acidity. It also contains a number of tertiary nitrogen atoms which may be protonated at acidic pH and become cationic.
<b>Particle Size</b>	Not applicable.
Remarks	The notified polymer will be imported in liquid form.
<b>Flash Point</b>	>100°C
Remarks	Test report not provided.
<b>Flammability Limits</b>	Non-flammable.
Remarks	Test report not provided.
<b>Autoignition Temperature</b>	Not determined.
Remarks	The notified polymer is not expected to auto-ignite.
<b>Explosive Properties</b>	Not determined.
Remarks	The notified polymer does not have explosive properties.
<b>Reactivity</b>	Not determined.
Remarks	The notified polymer is stable under normal conditions of use.

## 7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted.

## 8. ENVIRONMENT

### 8.1. Environmental fate

No data were provided on the expected environmental fate of the notified polymer. Any of the concrete mix containing the notified polymer that has been mixed with water and not used is expected to dry out and disposed of to landfill. In landfill, mobility is unlikely to occur in the solidified form of the polymer in which it will be disposed of. As such, the polymer is not expected to leach into aquatic compartments via the soil environment. In normal environmental pH condition, no hydrolysis of the notified polymer is anticipated. The polymer is also not expected to readily biodegrade. Instead it will likely to undergo slow degradation processes.

Once applied to concrete the notified polymer will be incorporated into a hard, durable, inert mass and would not present a hazard to the environment. Concrete products containing the polymer are likely to be either recycled or placed into landfill at the end of useful life.

### 8.2. Ecotoxicological investigations

No ecotoxicity data were submitted.

## **9. RISK ASSESSMENT**

### **9.1. Environment**

#### **9.1.1. Environment – exposure assessment**

The main environmental hazard would arise from release of the notified polymer during reformulation, storage, transport and manufacture into EUP. The use of bunded containment minimises the risk of release at reformulation and storage sites. Up to 1330 kg of notified polymer may be released to the environment annually via release during re-formulation spills and leaks, cleaning of equipment and residues in transport containers. Up to 4310 kg of notified polymer may be released to the environment annually via release during formulation into the EUP, spills and leaks, cleaning of equipment and residues in transport containers. The total estimated environmental release is 5640 kg per annum. Approximately 1350 kg of the total environmental release would be recycled back into the EUP mixing process. The remaining amount of polymer will eventually be disposed of to landfill.

#### **9.1.2. Environment – effects assessment**

No ecotoxicity data were submitted. There will be limited release to the aquatic compartment.

#### **9.1.3. Environment – risk characterisation**

The new polymer will be used as an ingredient of concrete mixtures and most will eventually be incorporated into the matrix of the concrete. As such, the risk to the environment is expected to be minimal. The applicant has indicated that the polymer has a high water solubility, which suggests that any material released would eventually partition to water.

### **9.2. Human health**

#### **9.2.1. Occupational health and safety – exposure assessment**

Occupational exposure during concrete admixture formulation will be predominantly dermal. During concrete batch mixing, limited dermal contact to the notified polymer is also expected. However, the automated and enclosed transfer and mixing operations involved in concrete manufacture would limit occupational exposure to the notified polymer. The low concentration of the notified polymer in the EUP, and the use of engineering controls and PPE would ensure that occupational exposure to the notified polymer is low when used as a concrete additive.

Exposure of transport and waterside workers to the notified polymer will be unlikely unless accidental spill occurs.

#### **9.2.2. Public health – exposure assessment**

Exposure of the general public to the notified polymer as a result of transport or through environmental release is assessed as negligible. The notified polymer will only be used for industrial applications; therefore, the public will not come into contact with the imported (concentrated) polymer. There is likely to be a high level of public exposure arising from dermal contact with finished concrete structures containing the notified polymer. However, the finished concrete structures contain a very low concentration of the notified polymer. Also, due to the notified polymer being trapped in the finished concrete structure it is not available for exposure.

#### **9.2.3. Human health - effects assessment**

No toxicological data have been provided for the notified polymer. The notified polymer has high molecular weight and contains non-hazardous impurities and residual monomers. Therefore, the notified polymer is unlikely to be a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

#### **9.2.4. Occupational health and safety – risk characterisation**

The risk of adverse effects arising from exposure to the notified polymer is low due to its



expected low toxicity, low potential for exposure and low concentration in the end use product. The limited contact with the notified polymer during formulation, concrete manufacture and end use, the presence of engineering controls and the use of PPE would ensure that health risk posed by the notified polymer is low.

#### **9.2.5. Public health – risk characterisation**

High level of public exposure is expected from dermal contact with finished concrete structures containing the notified polymer. However, the finished concrete structures contain a very low concentration of the notified polymer. Due to the notified polymer being trapped in the finished concrete structure, it is not available for exposure. On this basis, there is unlikely to be any public health hazard posed by the notified polymer.

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

#### **10.1. Hazard classification**

Based on the available data the notified chemical is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

#### **10.2. Environmental risk assessment**

On the basis of the available information, the overall environmental hazard of the notified polymer is expected to be low.

#### **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 as a concrete additive.

### **11. MATERIAL SAFETY DATA SHEET**

#### **11.1. Material Safety Data Sheet**

The MSDS of the products containing the polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). 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 products containing the polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

## 12. RECOMMENDATIONS

### CONTROL MEASURES

#### Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer:
  - Enclosed and automated transfer and mixing operations.
  - Exhaust ventilation during manufacture of concrete products
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
  - Avoid splashing during transfer operations and cleaning of equipment.
  - 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 polymer:
  - Impervious gloves
  - Protective clothing which protects the body, arms and legs
  - Goggles or face shield
  - Protective foot wear
  - Apron

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.

#### Disposal

- All wastes containing the notified polymer should be disposed of in an approved manner by licensed waste contractors.

#### Emergency procedures

- Any spilt material must be contained and prevented from entering drains, streams or any water body. The material should be cleaned up and placed into a suitable container for later recycling or disposal by a licensed waste contractor.

### 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

National Occupational Health and Safety Commission (1999) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1999)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1994a) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.