

File No: PLC/193

February 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Sokalan SK 3.2

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 National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, National Occupational Health and Safety Commission, 92-94 Parramatta Road, Camperdown NSW 2050, between the following hours:

Monday - Wednesday	8.30 am - 5.00 pm
Thursday	8.30 am - 8.00 pm
Friday	8.30 am - 5.00 pm

Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

For enquiries please contact the Administration Coordinator at:

Street Address: 92 -94 Parramatta Rd CAMPERDOWN NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, SYDNEY NSW 2001, AUSTRALIA
Telephone: (61) (02) 9577 9514 FAX (61) (02) 9577 9465

Director
Chemicals Notification and Assessment

TABLE OF CONTENTS

FULL PUBLIC REPORT	3
1. APPLICANT.....	3
2. IDENTITY OF THE CHEMICAL	3
3. POLYMER COMPOSITION AND PURITY	3
4. PLC JUSTIFICATION	3
5. PHYSICAL AND CHEMICAL PROPERTIES.....	3
Result	3
Comments	3
5.1 Comments on physical and chemical properties.....	4
6. USE, VOLUME AND FORMULATION	4
7. OCCUPATIONAL EXPOSURE.....	4
<i>Transport and storage</i>	4
<i>Formulation of Concrete Admixture</i>	5
<i>Quality Analysis</i>	5
<i>End use</i>	5
8. PUBLIC EXPOSURE.....	5
9. ENVIRONMENTAL EXPOSURE	5
9.1. Release	5
9.2. Fate.....	6
10. EVALUATION OF HEALTH EFFECTS DATA.....	6
11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA	6
12. ENVIRONMENTAL RISK ASSESSMENT	7
13. HEALTH AND SAFETY RISK ASSESSMENT	7
13.1. Hazard assessment	7
13.2. Occupational health and safety	7
13.3. Public health.....	8
14. MSDS AND LABEL ASSESSMENT.....	8
14.1. MSDS.....	8
14.2. Label	8
15. RECOMMENDATIONS	8
16. REQUIREMENTS FOR SECONDARY NOTIFICATION	9
17. REFERENCES	9

FULL PUBLIC REPORT**Polymer in Sokalan SK 3.2****1. APPLICANT**

BASF Australia Ltd of 500 Princes Highway, Noble Park, Victoria 3174 (ABN 62 008 437 867) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) **Sokalan SK 3.2**.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

Marketing names: Sokalan SK 3.2

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

Property	Result	Comments
Appearance	Brown liquid	
Boiling point	Not determined	
Density	1.09 at 20°C	
Water solubility	Not determined	See comments below.
Particle size	Not applicable	
Autoignition temperature	> 200°C	

Flammability	Not applicable
Explosive properties	Not explosive
Stability/reactivity	Partial hydrolysis may occur. See comments below.
Hydrolysis as function of pH	Not determined

5.1 Comments on physical and chemical properties

Water solubility was not determined for the notified polymer. However, the polymer is claimed to be dilutable in all proportions with water. The polymer stability is uncertain as the concrete in which the polymer is to be used is alkaline. Therefore there is the potential for partial hydrolysis of the polymer.

6. USE, VOLUME AND FORMULATION

Use:

The polymer is intended to be used as a plasticiser additive for concrete.

Manufacture/Import volume:

The product containing the notified polymer will be imported in 1000L intermediate bulk containers or 204L steel drums at a rate of 300 tonnes (120 tonnes of notified polymer) per year.

Formulation details:

The notified polymer will be imported as a 40% aqueous solution and formulated into concrete admixtures at 0.3-0.4%. The product is mechanically pumped into a 16 tonne main processing vessel where mixing takes place. The product is drained from here into 1000L intermediate bulk containers for delivery to end-use customers such as ready mix and precast concrete plants and mining and tunnelling shotcretors.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Transport and storage</i>		
<i>Transport of Imported Solution (2 workers)</i>		
Dermal and/or ocular	Accidental breach of bulk containers or drums containing 40% polymer.	No exposure controls specified.
<i>Storage and Transport of Admixture from Customer Site to End-use Site (5 workers)</i>		
Dermal and/or ocular	Accidental breach of bulk containers containing 0.3-0.4% polymer.	No exposure controls specified.

Formulation of Concrete Admixture

Filling of Mixing Vessel (4 workers)

Dermal and/or ocular	Spillage during manipulation of pump line between import bulk container and mixing vessel.	Coveralls, safety goggles, boots, face shield, apron and impervious gloves; Closed pump lines; Exhaust ventilation.
----------------------	--	---

Decanting of Admixture into Intermediate Bulk Containers (2 workers)

Dermal and/or ocular	Spillage during manipulation of pump line between mixing vessel and bulk containers.	Coveralls, safety goggles, boots, face shield, apron and impervious gloves. Closed pump lines; Exhaust ventilation.
----------------------	--	---

Quality Analysis

Sampling of Imported Product and Admixture (1 worker)

Dermal and/or ocular	Spillage during sampling of imported product (40% notified polymer) and admixture (0.3-0.4% notified polymer)	Coveralls, safety goggles, boots, face shield, apron and impervious gloves. Exhaust ventilation.
----------------------	---	--

End use

Adding Admixture to Concrete

Dermal and/or ocular	Spillage during manipulation of pump line between bulk containers and concrete mixing vessels.	No exposure controls specified.
----------------------	--	---------------------------------

Concrete Transport and Pouring

Dermal and/or ocular	Spillage of concrete (0.17% notified polymer).	No exposure controls specified.
----------------------	--	---------------------------------

8. PUBLIC EXPOSURE

It is expected that during transport, storage and industrial use, exposure of the public to the notified chemical will be minimal, except in the event of an accidental spill. There is likely to be a high level of public exposure arising from dermal contact with finished concrete structures containing the notified polymer at approximately 0.17%.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Release of the new polymer is expected to be minimal, unless exposure occurs through accidental spillage.

Reformulation at customer site

Spillage during normal operating procedures will be contained by plant bunding and will be soaked up with absorbent material before being transported off-site for disposal by incineration or landfill. No release is expected from washing of concrete mixing trucks or equipment used to formulate the concrete admixture as all washings are recycled into

subsequent concrete mixtures. It is expected that 80% of the Sokalan SK 3.2 will be supplied in returnable intermediate bulk containers, so no waste is expected from these. The remaining 20% will be supplied in non-returnable drums. Of this, maximum residue per drum will be approximately 1–2 %, therefore it is expected that up to 480 kg of the new polymer will be disposed of to landfill in this way. Other losses of the polymer will occur in unused concrete. However, in this situation the polymer will be bound into the concrete matrix and not available for release into waterways.

Release due to spills and equipment cleaning during end uses is estimated to be 1%.

Therefore release from:	- ready mix application	= 720 kg
	- precast concrete application	= 240 kg
	- mining shotcreting application	= 240 kg
	Total	= 1.2 tonnes

Release of the polymer from final uses is estimated to be 0.1 %. Therefore release from:

- ready mix application	= 72 kg
- precast concrete application	= 24 kg
- mining shotcreting application	= 24 kg
Total	= 120 kg

9.2. Fate

The majority of the notified polymer will be bound within the matrix of the concrete and once hardened, will remain immobile. Its fate will be linked to the disposal of the concrete fabrications into which it has been incorporated. The concrete rubble from building demolitions is usually directed to landfill where the notified polymer is expected to remain immobile and not leach out.

If the spilt material cannot be recycled, it is likely to end up in landfill, along with spill clean-up absorbants. Container residue may be disposed of to landfill if it cannot be recycled. Given the solubility, the notified polymer is not likely to adsorb to soil but to leach.

No information was provided regarding the degradability of the notified polymer. It may partition between solution and sorbed phase (bound to aquatic sediments and organic particles in suspension) through the presence of reactive carboxyl and ether functional groups. Under these circumstances it is anticipated to degrade very slowly via biotic and abiotic processes. Polymers of high molecular weight are considered to be impermeable to biological membranes (Connell, 1990) and consequently bioaccumulation of the notified polymer is not expected.

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological information was provided.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

The majority of the notified polymer will be incorporated into the matrix of the concrete. Once solidified, the notified polymer is expected to pose minimum risk to the environment.

There is potential for up to 1.8 tonnes per annum of the notified polymer to be released into the environment as a consequence of spillage, drum residues and equipment washing. The spillage is expected to be dispersed and not restricted to a single site. This would minimise risk to the environment at any given time. If the spilt imported material or raw product cannot be recycled, it is likely to end up in landfill adsorbed to the inert material used for the spill clean-up (such as sand), where it is likely to leach out in a diffuse manner at low concentrations.

The main environmental hazard would occur from release of the notified polymer during storage or transport. The use of bunded containment minimises the risk of release at storage sites. The Material Safety Data Sheet (MSDS) adequately addresses spills and disposal.

A further environmental hazard could occur from release of untreated polymer-contaminated water into the aquatic compartment. This risk will be greatly reduced by the recycling of truck wash water for subsequent batches of cement.

The low expected environmental exposure of the notified polymer when integrated into concrete suggests the overall environmental hazard should be minimal.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer and so the polymer cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). However, due to its high molecular weight and presence of only low concern reactive functional groups, it is unlikely to be classified as a hazardous substance. The notified polymer meets the criteria for a Polymer of Low Concern and thus is unlikely to represent a health hazard.

13.2. Occupational health and safety

Exposure to the notified polymer is not expected during import and storage of the polymer solution nor storage and transport of the formulated concrete admixture to end-user sites. Import containers of polymer and containers of concrete admixture are not opened prior to formulation and end-use respectively and so occupational exposure of import/storage workers to the polymer would only be envisaged in the case of accidental puncture of containers.

For workers involved in formulation and quality analysis of the concrete admixture, the main exposure routes will be dermal and ocular from splashes and spills. Exposure is most likely to occur during connection and disconnection of pump lines for filling and emptying the main mixing vessel and during manual sampling of imported polymer and formulated admixture for quality analysis. The low likelihood of vapour or aerosol formation during transfer makes inhalation exposure to the notified polymer unlikely.

A combination of personal protective equipment worn by workers and engineering controls in the form of enclosed transfer lines and exhaust ventilation will control exposure to the polymer during formulation. The low possibility of exposure and the low health hazard associated with the notified polymer renders the health risk for these workers low.

Dermal and ocular exposure to the notified polymer may also occur during end-use when the admixture is transported to concrete formulators and added to concrete. At this point, the notified polymer is at low concentration (0.17%) and so the health risk for workers involved in this end-use would be assessed as low.

The polymer is unavailable for absorption by workers once the concrete is set.

13.3. Public health

Given the polymer's low reactivity, limited availability (industrial use only), high molecular weight, low concentration and biological unavailability in finished concrete structures, the risk to public health from exposure to the notified polymer throughout all phases of its life-cycle is considered to be low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the product containing the notified 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 part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. 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.

15. RECOMMENDATIONS

No specific precautions are required to control exposure to the notified polymer. However, in the interests of good occupational health and safety, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during use.
- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b),

workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of protective eyewear may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c) and other internationally acceptable standards.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

- (i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified chemical) becomes aware of any of these circumstances, they must notify the Director within 28 days; or
- (ii) the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

17. REFERENCES

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

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.

National Occupational Health and Safety Commission (1995) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]. In: Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999a) List of Designated Hazardous Substances [NOHSC:10005(1999)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999b) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994c) Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.