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

FULL PUBLIC REPORT

Scaleguard 60116

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**Scaleguard 60116****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)
ONDEO Nalco Australia Pty Ltd
3 Anderson St
BANKSMEADOW NSW 2019

NOTIFICATION CATEGORY
Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:

- Chemical name
- Other names
- CAS number
- Molecular formula
- Structural formula
- Polymer constituents
- Details of use

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)
None

NOTIFICATION IN OTHER COUNTRIES
Canada (1996)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Scaleguard 60116

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Meets Molecular Weight Requirements	Yes
Meets Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. 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>	120	120	120	120	120

USE

The notified chemical will be used in pulp and paper milling processes.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer is imported as a 42% solution in water in 1000 L IBCs or 1500 L Porta-feed containers. Local manufacture may take place in the future depending on demand.

Local manufacture will be limited to the Botany site in batches of 10 tonnes. The solution containing the notified polymer will be handled at temperature between ambient and 70°C. Following quality control, the product containing the notified polymer is transferred to IBCs or Porta-feed containers for distribution to customer sites.

Application of the product containing the notified polymer involves gravity drainage transfer from IBC to storage tanks at the customer's site prior to incorporation into paper pulp digester. Where a porta-feed system is in place the product containing the notified polymer will be dosed straight from the Porta-feed container. The product is dosed via pump and flexible piping into a process water line, which enters the paper pulp digester. The concentration of notified polymer present in the final process water is approximately 20-50ppm.

Ultimately the notified polymer is incorporated into the "liquor" stream, which contains other organics such as resins, and is burned as boiler fuel.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

Manufacture

- Waste generated from manufacture and repacking (if commenced in the future) will be handled by the effluent system at Botany. Waste solutions will be pH adjusted (7 to 9), solid removed in sludge pits, analysed and diluted to the Sydney Water License Agreement limits prior to discharge to Malabar.
- The notified polymer in waste streams is expected to be adsorbed to any solids present and be removed via the sludge pits or in the solids removal system at Malabar.
- Reactor boilouts will be carried out after every batch. The worst-case release of the notified polymer to the Botany effluent system is expected to be 50 kg per year.
- Spills will be controlled by storing the notified polymer in bunded areas.

End-Use

- No release of the notified polymer is expected during application (via a closed circuit) into the pulp digester. The polymer is destroyed when the "liquor" stream is burnt as a boiler fuel. Residue from liquor burning may be disposed of to landfill. Release of the notified polymer to waterways is not expected via this path.
- Notified polymer associated with pulp may be present in paper and cardboard products at low concentrations.

6.2. Summary of Occupational Exposure

Manufacture

- Incidental skin contact with the notified polymer during manufacture post-formulation transfer to

IBCs and tote boxes through disconnection of hoses and pump equipment.

- Quality control chemists may be exposed dermally to small amounts of the polymer solution for a duration of 3-4 hours per batch.
- Chemical operators responsible for drawing samples for the QC chemist may also be exposed to small amounts of the polymer solution for short periods.
- Workers are expected to wear gloves, protective clothing and eye protection during these operations.

Transport & Storage

- Exposure to the polymer solution containing 42% notified polymer is not expected to occur during transport and storage except in the unlikely event of an accident where the container may be breached.

End-Use

- The main source of exposure is expected to occur at the user's site where the contents of the IBC are transferred via gravity drainage to on-site storage. This transfer takes place approximately every 2-3 days for approximately 20 minutes per transfer. Dermal exposure is likely to result from drips and splashes of the polymer solution (42% notified polymer) from faulty or poorly attached hoses or during their connection/disconnection.
- Incidental dermal exposure may also occur during maintenance and calibration of dose pumps for approximately 20 minutes per day.
- Workers are expected to wear gloves, protective clothing and eye protection during these operations as recommended in the MSDS.

6.3. Summary of Public Exposure

The notified polymer is intended only for use in industry, however, some residual notified polymer may be present in low concentrations in paper and paperboard products that come into contact with dry foods.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	The product containing the notified polymer is a colourless to pale amber hazy viscous liquid.
Melting Point/Glass Transition Temp	Not applicable. Notified polymer is always in aqueous solution.
Density	1328-1344 kg/m ³ at 25°C
Water Solubility	Soluble. Imported as a 42% solution in water.
Dissociation Constant	Not determined.
Particle Size	Not applicable. Notified polymer is always in solution.
Reactivity	Stable under normal environmental conditions.
Degradation Products	None expected.

The notified polymer has no groups which might be expected to undergo hydrolysis in the environmental pH range of 4 to 9. Its high solubility and likely hydrophilic nature are indicative of partitioning to the aqueous phase and high mobility in soil. However, it will adsorb to soils due to the anionic character.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data were submitted.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. However, the MSDS indicates that the notified polymer is a slight skin and eye irritant.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted except for the following results taken from the MSDSs of similar polymers:

<i>Characteristics of Surrogate Polymer</i>	<i>Endpoint</i>	<i>Result and Conclusion</i>
1. MW=3,000 Based on similar material	Biodegradability (OECD Confirmatory Test)	Elimination>70% Biodegradable
	Fish Toxicity (Golden Orfe)	EC50 >100 mg/L
2. MW=70,000	Biodegradability (OECD Confirmatory Test)	Elimination>70% Biodegradable
	Fish Toxicity (<i>Leuciscus idus</i>)	EC50 >100 mg/L
	Daphnia Toxicity	EC50 >100 mg/L
	Algal Toxicity	EC50 >100 mg/L
	Inhibition of Bacterial Respiration	EC10 (18 h) = 180 mg/L
3. MW=50,000	Biodegradability (OECD 302B)	Elimination>70% Biodegradable
	Fish Toxicity	EC50 >100 mg/L
	Inhibition of Bacterial Respiration (Warburg Test)	NOEC 1000 mg/L

All results were indicative of low toxicity. However, it is noted that two of the surrogate polymers have much higher molecular weights than that of the notified polymer.

Polymer antiscalants are found to have properties similar to those of natural humic matter (or Gelbstoffe) including high molecular weight, metal ion binding capacity, high stability and relatively high LC50. However, it cannot be excluded that antiscalants limit the availability of biologically essential trace metal ions (Hoepner and Lattermann 2002).

9.2. Environmental Hazard Assessment

Release of the notified polymer due to use in pulp digestion is not expected although low concentrations associated with pulp may be present in paper and cardboard products. If manufactured in Australia, the worst-case release of the notified polymer to the Botany effluent system is estimated to be 50 kg per year.

Minor amounts of the polymer contained in the residue from liquor burning will be disposed of to landfill. Although greater mobility is expected due to its high water solubility, the polymer may become immobile due to adsorption to soils and sediments. Based on the surrogate polymer test results the notified polymer is expected to biodegrade eventually through prolonged residence in an active landfill environment due to abiotic or slow biotic processes to give water vapour and oxides of carbon and sulphur and sodium salts. If released to the aquatic environment the notified polymer is expected to be adsorbed to solids due to its anionic character.

10. RISK ASSESSMENT

10.1. Environment

A predicted no effect concentration (PNEC) for aquatic ecosystems of > 0.1 mg/L (100 µg/L) has been derived by dividing the lowest surrogate LC50 value of 100 mg/L by an uncertainty (safety) factor of 1000 (as surrogate toxicity results only are available for three trophic levels). It is not possible to determine a meaningful predicted environmental concentration (PEC) value in order to assess the risk to aquatic organisms, as the use pattern of the notified polymer will result in limited if any exposure to the aquatic environment.

However, a worst-case scenario is considered that 50 kg the notified polymer is released to sewer annually and not removed during sewage treatment processes. Assuming a geographical location with a population equivalent to 25% of Australian population and each person contributing an average 200 L/day to overall sewage flows, the daily release to receiving waters is estimated to be 0.14 kg/day and the predicted concentration in sewage effluent is estimated as 0.0351 µg/L. Based on the respective dilution factors of 1 and 10 for inland and ocean discharges of effluents, the PECs of the notified polymer in freshwater and marine water may approximate 0.0351 and 0.0035 µg/L, respectively. The resulting worst-case risk quotients for the aquatic environment are $< 3.51 \times 10^{-4}$ and $< 3.51 \times 10^{-5}$ for freshwater and marine water, respectively. These values are significantly less than 1 and can be expected to be much lower due to adsorption of the notified polymer to solids in the aquatic environment.

While no ecotoxicity data on the notified polymer itself are available, due to the limited release to water, it is unlikely that the polymer would exist at levels which could pose a threat to aquatic organisms (at toxic levels or to limit the availability of essential nutrients). The high molecular weight and high water solubility indicate a low potential for bioaccumulation. Based on the proposed use pattern, the risk of the notified polymer to the environment is expected to be very low.

10.2. Occupational health and safety

The notified polymer is may be irritating to the skin and eye with prolonged contact, however, the OHS risk presented by the notified polymer is expected to be low due to its overall low toxicity and low potential for exposure during manufacture and dosing into process lines. Personal protective equipment worn by workers during manufacture and end-use will further reduce the risk of irritation.

10.3. Public health

The notified polymer will not be available to the public. Members of the public may make dermal contact with paper or paperboard products containing the notified polymer, and such products may also be used to package dry foods. However, the risk to public health will be negligible because the notified polymer is present at low concentrations (20-50ppm) and not expected to be released from the paper fibres.

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

11.1. Environmental risk assessment

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

11.2. Human health risk assessment

11.2.1. Occupational health and safety

There is low concern to occupational health and safety under the conditions of the occupational settings described.

11.2.2 Public health

There is negligible concern to public health when manufactured and used in the proposed

manner.

12. MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. RECOMMENDATIONS

REGULATORY CONTROLS

Hazard Classification and Labelling

- It is recommended that products containing more than 20% notified polymer carry the following safety directions on the label:
 - S24/25 Avoid contact with skin and eyes
 - S 37/39 Wear suitable gloves and wear eye/face protection

CONTROL MEASURES

Occupational Health and Safety

- 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.
- 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.

Environment

Disposal

- The notified polymer should be disposed of in an approved incinerator or waste treatment/disposal site in accordance with all applicable regulations.
- Do not dispose of wastes in local sewer or with normal garbage.
- Triple rinse (or equivalent) all containers and recycle, recondition or puncture and dispose of in a sanitary landfill or by other procedures approved by State and local authorities.

Emergency procedures

- Small spills/release of the notified polymer should be soaked up with absorbent material. Place residues in a suitable, covered, properly labelled container and wash the affected area.
- Large spills should be handled by containing the liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agent. Contact an approved waste hauler for disposal of contaminated recovered material.

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 subsection 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 subsection 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.

14. BIBLIOGRAPHY

Hoepner T & Lattermann S (2002) Chemical Impacts from Seawater Desalination Plants – a case study of the northern Red Sea. *Desalination*, 152:133-140.

Nabholz JV, Miller P & Zeeman M (1993) Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act (TSCA) Section Five. In: Landis WG, Hughes JS & Lewis MA ed *Environmental Toxicology and Risk Assessment*, ASTM STP 1179, American Society for Testing and Materials, Philadelphia, PA.