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

FULL PUBLIC REPORT

Polymer in DIST

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT

Polymer in DIST

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Clariant (Australia) Pty Ltd (ACN 069 435 552)
PO Box 23, Chadstone VIC 3148

NOTIFICATION CATEGORY

Limited-small volume: Polymer with NAMW < 1000 (1 tonne or less per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Part B: Chemical Name, Other Names, CAS Number, Molecular and Structural Formula, Molecular Weight, Spectral Data, Purity, Impurities (Hazardous/Non-hazardous), Additives/Adjuvants, Use.

Part D: Identity and Composition of Polymer.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

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

Adsorption/desorption, Hydrolysis, Dissociation constant, Partition coefficient

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT

Not applicable

NOTIFICATION IN OTHER COUNTRIES

Canada 2000, USA 2001

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in DIST, DIST, DIST ST 36.001, DIST (9S1001), Dispergator ST 36.001
Drimarene Blue K2RL CDG (< 10% notified polymer)

3. COMPOSITION

DEGREE OF PURITY

Non-Confidential

> 60%.

DEGRADATION PRODUCTS

No degradation during normal use of the notified polymer.

During combustion, hazardous oxides of carbon and sulfur may be released.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

No natural loss of monomers or reactants during normal handling and usage.

4. INTRODUCTION AND USE INFORMATION

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

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>	<1	<1	<1	<1	<1

USE **Non-Confidential**

A component of a finished dyestuff product Drimarene Blue K2RL CDG.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY

Melbourne either by sea or air

IDENTITY OF MANUFACTURER/RECIPIENTS **Non-Confidential**

Clariant Australia Pty Ltd and approximately six other industrial dye houses

TRANSPORTATION AND PACKAGING

By truck in either palletised or individual packages of ≤ 25 kg/pack

5.2. Operation Description

The notified polymer will not be manufactured in Australia. It will be imported as a component of a finished dyestuff product and delivered to the Clariant warehouse for storage or repackaging prior to distribution to dye houses. At the dye houses, dye operators will prepare batch quantities of the dye (~ 2 kg), together with sodium hydroxide and acetic acid for dissolving in water and blending with other dyes if necessary. The liquid dye may be manually poured via a delivery chute into the dyeing machine or poured into a holding tank for pumping into the dyeing machine.

After addition of the dye to the machinery, the system is enclosed. The fabric dyeing process occurs in 5 stages involving pre-scouring, rinsing, dyeing, rinsing and a softening stage. All 98% of the dye is exhausted when it becomes fixed to the fabric fibres. The notified polymer is expected to be removed from the fabric during rinse phases and remain in waste liquors.

5.3. Release

RELEASE OF CHEMICAL AT SITE

Except in cases of accidents, release of the polymer during storage, handling and transportation would be minimal because the dye product containing the notified polymer is to be imported and will not be reformulated in Australia. Should an accident occur, the small size of the transport containers (25 kg or less) will limit the amount of notified polymer released. The notifier estimates a total of 40 g/year of notified polymer may remain as container residues adhering to the plastic lining of the dyestuff packaging. It is expected that these residues will be disposed of in landfill.

RELEASE OF CHEMICAL FROM USE

The notified polymer in the dyestuff product is expected to be released into the sewer via trade wastewater treatment facilities following the dyeing process at customer sites. The fabric dyeing process takes place in dye bath water in 5 stages involving 1000 L of water per stage or a total volume of 5000 L of water. Batches of cloth are dyed approximately once a week. The dyestuff is added at a rate of up to 1% (1 kg) for each 100 kg of fabric requiring 1000 L of liquor. Consequently, the concentration of notified polymer released following the dyeing process will be <20 mg/L ($1000 \text{ g dye} \times <10\% \div 5000 \text{ L}$). In calculating this value it is assumed that no polymer is retained in the dyebath or fixed onto the fabric.

5.4. Disposal

It is expected all of the notified polymer will be used in the dyeing process, and thus the need for disposal of the substance will be limited to spills. It is recommended that spills should be disposed of by incineration.

6. PHYSICAL AND CHEMICAL PROPERTIES

The physico-chemical properties listed below are for the polymer solution DIST, unless otherwise specified. Full test reports were not provided.

APPEARANCE AT 20°C AND 101.3 kPa Brown liquid with no odour

BOILING POINT 100°C at 101.3 kPa

REMARKS No further information provided on test method and test facility.

DENSITY 1100-1150 kg/m³ at 20°C, 101.3kPa

REMARKS No further information provided on test method and test facility.

VAPOUR PRESSURE Not determined

REMARKS The notified polymer is a sodium salt and not expected to vaporise.

WATER SOLUBILITY Soluble in all proportions

REMARKS No test was conducted. The notified polymer contains sulfonated and carboxylic acid groups which are expected to give its water solubility.

HYDROLYSIS AS A FUNCTION OF pH Not available

REMARKS Saponification has been tried at different pH (5, 7, 9, 11, 13). The determination of monomers by back titration (acid number) has failed. No logical results were obtained.

PARTITION COEFFICIENT (n-octanol/water) Not determined

REMARKS The notified polymer is not expected to partition into the n-octanol phase given its high water solubility.

ADSORPTION/DESORPTION Not determined

REMARKS The notified polymer is not expected to bind to soils given its high water solubility. No adsorption to sludge was encountered during the Inherent Biodegradability test.

DISSOCIATION CONSTANT Not determined

REMARKS The notified polymer is a sodium salt and expected to remain dissociated substantially in water.

PARTICLE SIZE Not applicable

REMARKS The notified polymer is a liquid.

FLASH POINT No flash point up to the boiling point

REMARKS No further information provided on test method and test facility.

FLAMMABILITY LIMITS Not applicable.

Remarks The notified polymer is not expected to be flammable.

AUTOIGNITION TEMPERATURE	Not applicable.
REMARKS	The notified polymer is not expected to self-ignite.
EXPLOSIVE PROPERTIES	Not applicable.
REMARKS	The notified polymer is not expected to pose an explosion hazard given its low vapour pressure.
REACTIVITY	No hazardous reactions or incompatibilities known.
REMARKS	The notified polymer is expected to be stable.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted.

8. ENVIRONMENT

8.1. Environmental fate

8.1.1. Ready biodegradability

TEST SUBSTANCE	DIST ST 36.001 LP 15
METHOD	OECD TG 301 F Ready Biodegradability: Manometric Respirometry
Inoculum	Not reported
Exposure Period	Not reported
Auxiliary Solvent	Not reported
Analytical Monitoring	Not reported
Remarks – Method	The submitted data consisted of only a translated summary of a test study.
CONCLUSION	The notified polymer was found to be not readily biodegradable because only 53% degradation was attained after 28 days.
TEST FACILITY	R & D Textile Chemicals Bio laboratory, Clariant (Switzerland) AG (1999)

8E. Inherent biodegradability

TEST SUBSTANCE	ST 36.001 LABORTYP (DIST)
METHOD	Inherent Biodegradability: Zahn-Wellens/EMPA Test, Procedure 302 B, adopted on 17 July 1992.
Inoculum	Activated sludge from municipal sewage treatment plant
Exposure Period	28 days
Auxiliary Solvent	None
Analytical Monitoring	DOC with a Shimadzu 5050 TOC-Analyzer using NPOC-mode
Remarks – Method	Activated sludge, mineral nutrients, and the test substance were incubated in a glass vessel placed on an orbital shaker. The degradation of the test material was monitored at regular intervals by determination of the dissolved organic carbon (DOC). A readily biodegradable reference substance, diethylene glycol, was used as the positive control.

RESULTS

<i>Test substance</i>		<i>Diethylene glycol</i>	
<i>Day</i>	<i>% degradation</i>	<i>Day</i>	<i>% degradation</i>
14	59	14	99
28	63	28	100

Remarks - Results	The test substance was degraded by 63% after 28 days with the maximum degradation attained at the end of the incubation period. No significant adaptation period was observed. No adsorption of the test substance onto sludge or glass surfaces was observed, 3 hours after the start of the test.
CONCLUSION	The test substance is inherently biodegradable under the conditions of the OECD guidelines used.
TEST FACILITY	BMG Engineering Ltd, Ifangstrasse 11, CH-8952 Zurich-Schlieren, Switzerland (1999a).

8.2. Ecotoxicological investigations

8.2.1. Acute toxicity to fish

TEST SUBSTANCE	DIST (9S1001)
METHOD	OECD TG 203 Fish, Acute Toxicity Test - Limit Test/Static conditions.
Species	<i>Poecilia reticulata</i> (Guppy)
Exposure Period	96 hours
Auxiliary Solvent	None
Water Hardness	7.7 to 8.3 mg CaCO ₃ /L
Analytical Monitoring	None
Remarks – Method	Tests were performed under static conditions against seven fish per concentration comprising one control containing no test substance and one nominal concentration of 100 mg/L. The test material was added directly to the test medium. No analysis of the test concentrations was performed due to the expected high stability, water solubility and negligible vapour pressure of the test substance.
RESULTS	
LC50	> 100 mg/L at 96 hours.
NOEC (or LOEC)	> 100 mg/L at 96 hours.
Remarks – Results	No fish mortalities were observed after the 96 hour exposure period, and no abnormal behaviour was evident. The report notes that based on binomial theory, the absence of mortality provides at least 99% confidence that the LC50 is >100 mg/L.
CONCLUSION	The test substance is not toxic to fish at the concentration and test conditions used in the study.
TEST FACILITY	BMG Engineering Ltd, Ifangstrasse 11, CH-8952 Zurich-Schlieren, Switzerland (1999b).

8.2.2. Inhibition of microbial activity

TEST SUBSTANCE	DIST (9S1001)
METHOD	OECD TG 209 Activated Sludge, Respiration Inhibition Test.
Inoculum	Activated sludge from a municipal sewage treatment plant
Exposure Period	3 hours
Concentration Range	125, 250, 500, 1000 and 2000 mg/L
Nominal	

Remarks – Method	Microorganisms were exposed under aerobic, static conditions to the test substance, and two blank controls, using a prepared stock solution diluted to the required concentrations. A reference substance, 3,5-dichlorophenol, was used to test the validity of the test system. The oxygen content was measured with an oxygen electrode inserted into the test vessels 3 hours from the start of the test at 10-15 minute intervals. No chemical analysis of the test concentrations was conducted. Nominal concentrations were used to calculate endpoint values.
RESULTS	
IC50	> 2000 mg/L
NOEC	> 2000 mg/L
Remarks – Results	At 2000 mg/L of test substance, a respiration inhibition of 20% was observed. At all other concentrations, no significant toxic effects were evident as the respiration rates were the same as those determined for the two blank controls. The reference substance EC ₅₀ was 6.2 mg/L, confirming the viabilities of the activated sludge and test conditions.
CONCLUSION	The test substance is not toxic to microorganisms in sewage sludge.
TEST FACILITY	BMG Engineering Ltd, Ifangstrasse 11, CH-8952 Zurich-Schlieren, Switzerland (1999c).

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

Usage patterns indicate that, following the dyeing process, all of the imported volume of polymer will be released into the sewer via trade waste treatment plants from up to six customer sites. The notified substance is water soluble, and hence, in wastewater treatment facilities, it is expected to remain in the water compartment. The notified polymer is a salt and its physical and chemical properties indicate that it is unlikely to partition into the atmosphere or onto organic phases in these facilities.

The expected concentration of notified polymer released from the dyebath into the trade waste treatment pit at each customer site is <20 mg/L for each batch of fabric dyed. The notified polymer is not readily biodegradable, but is inherently biodegradable, with 63% of the substance degraded by sewage microorganisms over a 28-day period, suggesting that some degradation of the polymer may occur in treatment facilities prior to release into the sewer.

The concentration of notified polymer released from the dyebath will be reduced by dilution upon release into the trade waste treatment plant and again when released into the domestic sewer. A worst case scenario predicted environmental concentration (PEC) for each point source of release into on-site industrial wastewater treatment facilities, assuming a dilution factor of 10, is <2.0 mg/L, and for the domestic sewage system, assuming a dilution factor in the sewer of 50, is <0.04 mg/L. Once released from sewage treatment facilities into natural waterways, the substance would again be diluted by an amount depending on the size of the receiving waters.

Only a small amount of the notified polymer is expected to enter the soil environment at landfill sites as a consequence of disposal of container residues. In landfill the polymer is expected to be mobile owing to its high water solubility and may leach through the soil profile. However, from a total import volume of <1 tonne per annum, it is expected <70 g per year of waste to be disposed of in landfill.

The polymer's high molecular weight and physicochemical properties would preclude movement across biological membranes, and hence the polymer should not bioaccumulate (Connell, 1990).

9.1.2. Environment – effects assessment

The results of the ecotoxicological tests showed the LC50 values were greater than 100 mg/L in both tests provided, indicating the notified polymer is not toxic to fish or sewage microorganisms.

9.1.3. Environment – risk characterisation

The notified polymer is not expected to pose any significant hazard to the environment. The low import volumes and the anticipated diffuse use of the product will ensure that the levels of release of the chemical to the environment will be low, and significantly lower than the levels of exposure shown not to be toxic to aquatic organisms. While the substance is not readily biodegradable, it is inherently biodegradable, and hence, the substance is not expected to persist in the environment, but to undergo microbial and abiotic degradation.

9.2. Human health

9.2.1. Occupational health and safety

OCCUPATIONAL EXPOSURE ASSESSMENT

The dyestuff product containing the notified polymer will be imported in 25 kg packs and delivered directly to the Clariant Australia warehouse. Two storemen will handle the packaged product and 2 dye plant operators may repackage the product for distribution to 6 dye houses. At each dye house, there will be other 2 operators (1 dye storeman and 1 dye operator) potentially exposed to the product, ie a total of 12 dye house personnel will be involved.

The product is transported by truck (1-4 consignments per year). A truck driver would not normally be required to handle packaging. Loading of trucks is carried out by storemen wearing appropriate protective equipment (overalls/industrial clothing and gloves) who will receive consignments and move them to the warehouse by forklift (1 hour x 4 times per year).

Weighing/repackaging of the dye product is occasionally required for small volume customer use. This involves opening of inner package linings, scooping and weighing contents and repackaging the required quantity. The operation will take place under an exhaust hood with two operators wearing appropriate skin, eye and respiratory protection (0.5 hour x 6 times per year).

At the customer dye house, dye storemen will also be involved in weighing out batch quantities of the dye (~2 kg) in a ventilated weighing station, wearing appropriate protective equipment. They are also required to prepare quantities of hazardous materials such as sodium hydroxide and acetic acid (0.5 hour x 12 times per year).

Dye operators will handle the batch quantity of the dye in open vessels for dissolving in water and blending with other dyes if necessary. The liquid dye may be manually poured via a delivery chute into the dyeing machine or poured into a holding tank for pumping into the dyeing machine. The operators will wear appropriate skin, eye and respiratory protection (0.25 hour x 50 times per year).

After addition of the dye to the machinery, the system is enclosed and all (98%) of the dye is exhausted onto the fabric. The notified polymer is expected to be removed from the fabric during rinse phases and remain in waste liquors. Operator exposure to any residues of the notified polymer on the fabric therefore is expected to be negligible. The dye operators are involved in controlling valves to pump dyes into the machines and to remove waste water at the end of the process but have no contact with the dyes during the process.

9.2.2. Public health

The notified polymer will be used industrially as a component of a dyestuff product. It will not be available for use by the general public. After dyeing and drying of the fabrics, the residue level of the notified polymer in the fabrics is very low. Therefore, public exposure to the notified polymer would be negligible. In cases of accidents during transportation the new polymer could be released from the packaging resulting in public exposure. However, the

collection of spills should be recycled if possible, or disposed of by incineration in accordance with government regulations.

9.2.3. Human health - effects assessment

No toxicological data was provided for the notified polymer. The high molecular weight and physicochemical properties of the notified polymer are likely to limit its absorption across biological membranes. Therefore, the toxicity of the polymer is anticipated to be low and it is unlikely to be a hazardous substance according to the Approved Criteria for Classifying Hazardous Substances (NOHSC, 1999).

9.2.4. Human health – risk characterisation

9.2.4.1 OCCUPATIONAL HEALTH AND SAFETY

No manufacture of the notified polymer will take place in Australia. It will be imported as a component of the dyestuff product, Drimarene Blue K2RL CDG, in 25 kg packs. Transport workers are usually not required to handle packaging and thus are unlikely to be exposed to the notified polymer under normal circumstances. Therefore, the risk of adverse health effects is minimal.

Loading of trucks (1 hour x 4 times per year) at the Clariant plant will be carried out by two storemen wearing appropriate protective equipment (overalls/industrial clothing and gloves). Two personnel involved in weighing/repackaging of the dye product will be potentially exposed to the notified polymer mainly via skin contact and inhalation (0.5 hour x 6 times per year). The operation will take place under an exhaust hood with the workers wearing appropriate skin, eye and respiratory protection. Considering the frequency of handling, work practices, protective equipment and engineering controls, the risk to these workers is determined to be low.

At the customer dye houses, there will be a total of 12 dye house personnel potentially exposed to the product when weighing out batch quantities of the dye (0.5 hour x 12 times per year). Weighing stations are expected to be well ventilated and the personnel involved should wear appropriate protective equipment. Dye operators will be also expected to wear appropriate skin, eye and respiratory protection to minimise exposure when handling the dye batch in open vessels. The liquid dye may be manually poured via a delivery chute into the dyeing machine or poured into a holding tank for pumping into the dyeing machine. After addition of the dye to the machinery, the system is enclosed. The dye operators are involved in controlling valves to pump dyes into the machines and to remove waste water at the end of the process but have no contact with the dyes during the process.

The notified polymer is expected to be removed from the fabric during rinse phases and remain in waste liquors. Operator exposure to any residues of the notified polymer on the fabric therefore is expected to be negligible.

In summary, during handling of the dyestuff product containing the notified polymer, workers should avoid inhalation of dusts, skin and ocular exposure. Weighing and repackaging of quantities of the dye should be carried out under an exhaust ventilation. A copy of MSDS should be readily available for referencing. Also, with the application of good work practices and use of appropriate skin, eye and respiratory protection, the notified polymer is not expected to pose a significant risk to workers.

9.2.4.2 PUBLIC HEALTH

The dyestuff product containing the notified polymer will not be available for use by the general public. The public will come into contact with the residue of the notified polymer remaining in the cotton fabrics after dyeing. However, due to its low residual level and expected low toxicity, the notified polymer is unlikely to pose a significant health risk to the public.

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

10.1. Environment

On the basis of the low environmental exposure and low environmental hazard, the notified polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.2. Health hazard

Based on the available data the notified polymer is not classified as hazardous under the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 1999).

10.3. Human health

10.3.1. Human health – Occupational health and safety

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

10.3.2. Human health – Public

There is No Significant Concern to public health when used in the proposed manner.

11. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer present in the product Drimarene Blue K2RL CDG:
 - An exhaust hood for weighing and repackaging stations.
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer in the product Drimarene Blue K2RL CDG:
 - Adequate operation training in safe work practices for formulators and dyehouse workers
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer in the product Drimarene Blue K2RL CDG:
 - Gloves,
 - Safety glasses,
 - Respiratory protection when handling granular dye stuff, and
 - Protective clothing.

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 any 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

- The notified polymer should be disposed of in accordance with those measures outlined in the MSDS. It is recommended that spills be disposed of by incineration.

11.1. 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.

12. MATERIAL SAFETY DATA SHEET

The MSDS for the dyestuff product Drimarene Blue K2RL CDG which contains <10% notified polymer was provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

13. BIBLIOGRAPHY

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BMG (1999b) 96-hour Acute Toxicity to *Poecilia reticulata* (Guppy) Limit Test (100 mg/L). BMG Report no. 563/b-99. BMG Engineering AG, Schlieren, Switzerland (Test report provided by the notifier).

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