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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Liquitint® Aquamarine

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Walk Off Mats Asia Pacific P/L, ABN: 14 002 708 830
U7/95 O'Sullivan Beach Rd., Lonsdale
South Australia, 5160
and
Albright &Wilson (Australia) Ltd, ABN: 36 004 234 137
22 Davis Rd, Wetherill Park,
New South Wales, 2164

NOTIFICATION CATEGORY
Limited: Polymer with NAMW ≥ 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 (NAMW and WAMW)
Spectral Data
Composition
Import Volume
Use Details

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows:
Melting Point/Boiling Point
Specific Gravity/Density
Vapour Pressure
Flash Point
Flammability Limits
Autoignition Temperature.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
No

NOTIFICATION IN OTHER COUNTRIES
China (2002) and Brazil-Consumer (2000)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Polymer in Liquitint® Aquamarine

METHODS OF DETECTION AND DETERMINATION

METHOD	IR and UV Visible spectroscopy
Remarks	Peaks consistent with proposed structure.

3. COMPOSITION

DEGREE OF PURITY
>84%

DEGRADATION PRODUCTS
The polymer is stable under normal conditions of use.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
The residual monomers and impurities are likely to be of low volatility and as such loss during use is not expected.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported as a liquid (up to 40% notified polymer) by sea in 18 kg high-density polyethylene pails or 210 L drums.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	< 1	< 1	< 1	< 1	< 1

USE
The notified polymer will be used as a colorant (<1% notified polymer) in industrial and household cleaners and laundry products.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Sydney, New South Wales or Melbourne, Victoria

IDENTITY OF MANUFACTURER/RECIPIENTS
The product containing the notified polymer will be warehoused at site(s) located in Sydney New South Wales.

TRANSPORTATION AND PACKAGING
The imported liquid product Liquitint® Aquamarine (up to 40% notified polymer) will be imported in 18 kg high density polyethylene pails or 210 L drums and transported by road to the warehouse(s) for storage until required. The end-use products (<1% notified polymer) will be typically transported in by road in 1–2 L plastic containers to retail outlets and industrial users Australia-wide.

5.2. Operation description

The notified polymer is not manufactured in Australia. Blending or packaging of the product containing the notified polymer occurs in Australia. Retail and cleaning/laundry workers will handle the finished products containing the notified polymer.

Blending and packing
The 20 L pails or 210 L drums of liquid product containing the notified polymer (up to 40%) will be transported by forklift or manually as required from the warehouse to the production area. At the blending plant the imported liquid product containing the notified polymer is transferred manually from the drum to the blending tank. This is typically achieved by manually opening the drum and measuring out the product containing the notified polymer. In some operations this may occur by largely automated means whereby by the drum is lanced and the contents automatically transferred by transfer

lines to the blending tank. During the blending process, the product containing the notified polymer is pumped automatically through to the blending tank (closed system) to formulate a variety of cleaning products that contains the notified polymer (<1%). The end-use products containing the notified polymer are characteristically packed by means of automated and enclosed filling systems into 1–2 L plastic containers.

5.3. Occupational exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Transport	unknown	unknown	< once per week
Warehouse and Storage	5	0.5 hour	once per week
Reformulation (Blending)	10	8 hours per day	50 days per year
Maintenance and Cleaning	5	< 8 hours per day	< 50 days per year

Exposure Details

Transport and warehousing

Transport, warehouse and stores personnel will wear protective equipment (overalls/ industrial clothing and gloves as appropriate) when receiving and handling consignments of the imported product containing the notified polymer (up to 40% notified polymer). The product will be handled in the warehouse by forklift handling of pails or drums or manual handling of individual packages. During transport and warehousing, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

Blending and packing

The main routes of exposure to the notified polymer (up to 40% notified polymer) are dermal and accidental ocular exposure during manual measuring and transferring of the imported product to the blending tank.

It is possible that dermal and accidental ocular exposure may also occur if manual intervention is required during the automated blending and packaging operations and if the packaging is accidentally breached. Maintenance workers will have intermittent dermal and the potential for accidental ocular exposure to the notified polymer when performing maintenance/cleaning of the equipment in general.

All workers involved in handling the imported product and blended product will wear personal protective equipment (PPE) such as safety glasses, safety boots, PVC/latex gloves, protective clothing, if necessary. The blending operations occur in a closed system under local exhaust ventilation (LEV). All production operators are trained in the appropriate operational procedures and precautions. All workers have access to the MSDS.

Once the formulated cleaning products are packaged for distribution, no further worker exposure is expected except when packaging is accidentally breached.

End-use

While the notifier gives no details, it is estimated that a large number of retail and cleaning/laundry workers may potentially be exposed to the notified polymer (<1%) by means of end-use cleaning products. Dermal exposure is expected to be the main route of exposure but inhalation exposure to aerosols could occur if products include spray cleaning products. It is expected that use of the end-use products by cleaning/laundry workers would be similar (albeit more frequent) to the pattern of public exposure. The level of PPE used by cleaning workers is likely to vary and would include gloves in a number of cases.

Retail workers would only be exposed to the notified polymer (<1%) in the case of inadvertent breach of the packaging. In the event of an accident, spills will be removed in accordance with the manufacturers instructions.

5.4. Release

RELEASE OF CHEMICAL AT SITE

The notified polymer will be imported into Sydney or Melbourne and transported by road to a

distributor. From here, it is then transported to reformulation sites, again by road. During the transport and handling operations, only accidental release through mishap is expected. Any spilt notified polymer is expected to be physically contained, collected and subsequently disposed of to secure landfill.

At the reformulation site, the notified polymer is removed from the import containers and held in a storage tank. The import containers are then rinsed, with water and the rinsate will be emptied into the storage container, also. Rinsed import containers, with negligible residual notified polymer are then expected to be disposed of to secure landfill.

From the storage tank, the notified polymer is then fed into a closed mixer/blender and incorporated with other ingredients. From here it is subsequently bottled using an automatic filling machine. Release to the environment may occur at this time from the unlikely event of spills and from the routine cleaning and maintenance operations. Large spills are expected to be contained by standard physical engineering means, and collected using absorbent pads, which would then be disposed of to secure landfill. Small spills and releases from equipment cleaning and maintenance operations are expected to be disposed of to sewer as trade waste.

RELEASE OF CHEMICAL FROM USE
The notified polymer is proposed to be used primarily as a colourant in household and industrial cleaners. As such, it is expected that apart from the very small quantity that is disposed of to landfill, as residual in containers or from major spills, effectively the entire quantity of imported notified polymer will be disposed of after use to sewer.

5.5. Disposal

The major route for disposal of the notified polymer will be to the sewer after use. A very small proportion of the total imported quantity is expected to be disposed of to landfill, as residual in containers.

5.6. Public exposure

The notified polymer will be incorporated into household cleaning/laundry products at up to 1% that will be used widely by consumers. There is the potential for low level albeit regular dermal and accidental ocular contact by the public with the notified polymer during use of cleaning products. Inhalation of aerosols could occur during use of spray cleaning/laundry polymers.

There could be incidental dermal exposure to detergent liquid itself through splashes or contamination of the outside of the packaging. Dermal exposure may also occur through inadvertent use of products to wash hands.

Accidental oral exposure of young children to cleaning products is also possible.

It is expected that some consumers would wear gloves for certain cleaning tasks while others would not. However, exposure to the notified polymer will be minimized by the low concentration (<1%) of the notified polymer in the consumer products.

The public would only be exposed to concentrations up to 40% notified polymer in the event of an accident during transport involving extensive breakage of the imported product.

6. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is introduced as an aqueous solution at a concentration of up to 40% (Liquitint® Aquamarine).

Appearance at 20ºC and 101.3 kPa	Dark blue liquid with sweet odour (Liquitint® Aquamarine)
Boiling Point	100ºC at 101.3 kPa (Liquitint® Aquamarine)

METHOD In-house procedure.
Remarks None

TEST FACILITY Milliken Chemical (1999)

Density 1130 kg/m^3 at 24.6ºC (Liquitint® Aquamarine)

METHOD In-house procedure.
Remarks None.
TEST FACILITY Milliken Chemical (1999)

Vapour Pressure Not determined.

Remarks This has not been measured for the notified polymer, but it is expected to be very low based on the structure due to the polymer's relatively high molecular weight.

Water Solubility The polymer is completely soluble in water.

Remarks No test result has been provided, but the notified polymer (up to 40% notified polymer) is introduced as an aqueous solution.

Hydrolysis as a Function of pH

METHOD OECD TG 111 Hydrolysis as a Function of pH.

pH	*T (°C)*	*$t_{½}$ < days>*
4	30°C	194
4	40°C	185 ± 16
7	30°C	89.8
7	40°C	59.6 ± 4.1
9	30°C	38.2
9	40°C	35.4 ± 2.2

Remarks In a preliminary test, the notified polymer was found to hydrolyse at pH 9.0 at 50°C. Therefore, the test was carried out at two different temperatures and three separate pH's, with duplication of the 40°C tests.
TEST FACILITY Milliken Chemical (2004a)

Partition Coefficient (n-octanol/water) log Pow = -0.489 at 20ºC

METHOD EPA Product Properties TG, OPPTS 830.7550, Partition Coefficient (n-octanol/water), Shake Flask Method.
Remarks Shake Flask Method. 50 g of water and n-octanol were placed in a 250 mL separatory funnel. 1 g notified polymer was added, and the mixture was thoroughly shaken for 30 seconds. The layers were allowed to separate and each layer was analysed spectrophotometrically.
TEST FACILITY Milliken Chemical (2004b)

Adsorption/Desorption log K_{oc} = 9.744 <Estimated>

METHOD QSAR.
Remarks The QSAR program removed the metal to allow estimation, and warned that the K_{OC} of the tested structure may be sensitive to pH. The estimated K_{OC} represents a best-fit to the majority of experimental values.
TEST FACILITY PCKOCWIN Program (v1.66)

Dissociation Constant Considered completely dissociated throughout the environmental pH range of 4-9.

Remarks The notified polymer is imported as an aqueous solution of a salt, and is therefore considered to be completely dissociated

Particle Size Test not conducted. The notified polymer is introduced in

liquid.

Flash Point >95ºC at 101.3 kPa (Liquitint® Aquamarine)

METHOD	In-House
Remarks	Determined using Cleveland Open Cup apparatus.
TEST FACILITY	Milliken Chemical (1999)

Flammability Limits

Remarks	Test not conducted. The notified polymer is imported only as an aqueous solution. Based on the flash point, the notified polymer as introduced is not considered to be a flammable liquid.

Autoignition Temperature

Remarks	Test not conducted. The notified polymer is imported only as an aqueous solution.

Explosive Properties

Remarks	Test not conducted. The notified polymer contains functional groups which may infer explosive properties, however, polymers containing similar structural untis have not been found to be explosive.

Reactivity

Remarks	The notified polymer is stable under normal conditions of use

7. TOXICOLOGICAL INVESTIGATIONS

Endpoint and Result	*Assessment Conclusion*
Genotoxicity – bacterial reverse mutation	non mutagenic

7.1. Genotoxicity – bacteria

TEST SUBSTANCE	Liquitint® Aquamarine (up to 40% notified polymer)
METHOD	OECD TG 471 Bacterial Reverse Mutation Test. EC Directive 2000/32/EC B.13/14 Mutagenicity – Reverse Mutation Test using Bacteria. Plate incorporation procedure
Species/Strain	*S. typhimurium*: TA1535, TA1537, TA98, TA100, TA102
Metabolic Activation System	S9 fraction from phenobarbitone and β-naphthoflavone induced rat liver
Concentration Range in Main Test	a) With metabolic activation: 50-5000 µg/plate b) Without metabolic activation: 50-5000 µg/plate
Vehicle	Sterile distilled water
Remarks - Method	Statement of GLP. No protocol deviations reported. Formulated concentrations were adjusted to allow for the water content of the test material.

RESULTS

Metabolic Activation	*Test Substance Concentration (µg/plate) Resulting in:*			
	Cytotoxicity in Preliminary Test	*Cytotoxicity in Main Test*	*Precipitation*	*Genotoxic Effect*
Absent				
Test 1	>5000	>5000	>5000	Negative
Test 2	>5000	>5000	>5000	Negative
Present				Negative
Test 1	>5000	>5000	>5000	Negative
Test 2	>5000	>5000	>5000	Negative

Remarks - Results	The vehicle control plates gave counts of revertant colonies generally within the normal range. All of the positive control polymers used in the test induced marked increases in the frequency of the revertant colonies, both with and without metabolic activation. Thus, the sensitivity of the assay and the efficacy of the S-9 mix were validated. The test material caused no visible reduction in the growth of the bacterial background lawn at any dose level. The test material, therefore, was tested up to a maximum does level of 5000 µg/plate. A blue colour was observed at and above 150 µg/plate, however, this did not prevent the scoring of revertant colonies. No test material precipitate was observed on the plates at any dose treated in either the presence or absence of the S-9 mix. No significant increases in the frequency of revertant colonies were recorded for any of the bacterial strains with any dose of the test material either with or without metabolic activation.
CONCLUSION	The notified polymer was not mutagenic to bacteria under the conditions of the test.
TEST FACILITY	SafePharm (2005)

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

Modelled data was provided for two shortened versions of notified polymer, one with a small polymer chain (A), and one without the polymer chain (B). These results, were determined using ECOSAR v0.99g (© 2000, US Environmental Protection Agency), and have been summarised in the following table.

Test Substance	Organism	Duration	End Point	Predicted mg/L
(A)	Fish	14 d	LC50	978.831
(B)	Fish	14 d	LC50	94.511
(B)	Fish	96 h	LC50	42.038
(B)	Daphnid	48 h	LC50	49.482
(B)	Green Algae	96 h	EC50	33.454
(B)	Mysid Shrimp	96 h	LC50	4.592

These estimates should be treated with caution, due to them being related to much smaller polymers. Further it is unclear how reliable ECOSAR is for the structure type (based on neutral organics). However, as the notified polymer is a strong colourant, release to the aquatic environment may potentially cause local transient inhibitory growth effects on aquatic plants, including algae, by a reduction of available light.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The notified polymer will be imported into Sydney, where it will be reformulated with other ingredients to form household and industrial cleaners, of which the notified polymer is a colourant. Nearly all of the notified polymer will be disposed of to sewer after use, with only small quantities, including that proportion remaining as residual in containers and from major spills, being disposed of to landfill.

In sewer, some of the notified polymer is expected to associate with suspended particles and sediment. In landfill, the notified polymer is not expected to be mobile and should adsorb to sediment, where over time it should slowly degrade through biotic and abiotic processes to simple carbon and nitrogen based compounds.

Based on the worst-case scenario of 100% notified polymer being released to the aquatic environment via the sewer, with nil removal, predicted environmental concentrations (PECs) of the notified polymer have been calculated:

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Annual quantity of polymer released to sewer	1,000	kg/year
Days per year where release occurs	365	days/year
Daily polymer release:	2.74	kg/day
Water use	200.0	L/person/day
Population of Australia (Millions)	20.496	million
Daily effluent production:	4,099	ML
Dilution Factor - River	1.0	
Dilution Factor - Ocean	10.0	
PEC - River:	0.67	µg/L
PEC - Ocean:	0.07	µg/L

The potential for the notified polymer to bioaccumulate is low due to its high level of water

solubility and will be limited due to the diffused release to sewer Australia wide.

9.1.2. Environment – effects assessment

The PNEC has been calculated based on the Mysid Shrimp modelled end point, as shown below, using a conservative assessment factor of 1000.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
LC50 (Mysid Shrimp).	4.59	mg/L
Assessment Factor	1,000.00	
PNEC:	4.59	µg/L

9.1.3. Environment – risk characterisation

The Risk quotient (RQ) values, where RQ = PEC/PNEC, for freshwater and marine receiving environments have been calculated for the "worst case" scenario, as shown in the table below.

Risk Assessment	PEC µg/L	PNEC µg/L	Q
Q - River:	0.67	4.592	0.146
Q - Ocean:	0.07	4.592	0.015

As the RQ for both river and marine receiving waters are below 1.0, the proposed diffuse use of the notified polymer, at current expected import volumes, is unlikely to pose an unacceptable risk to the aquatic environment.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Dermal contact will be the main route of exposure although eye contact by means of inadvertent splashes is also possible, inhalation exposure could occur during use of spray cleaning products. Given the molecular weight range of the notified polymer, and high water solubility absorption through intact skin is not expected to be significant.

Transport and warehousing

The notified polymer is imported as a solution (<40% notified polymer) in high-density polyethylene pails and steel drums and is warehoused at distributor(s) prior to supply to manufacturer(s) as required. Consequently, exposure to the notified polymer (<40% notified polymer) is not expected during transport, warehousing and storage provided the pails and drums containing the notified polymer unless packaging is accidentally breached.

Blending and packing

Due to the largely automated, controlled and enclosed nature of the blending and packaging process, minimal occupational exposure to the notified polymer (at a concentration up to 40%) is expected. However, dermal and accidental ocular exposure to the notified polymer (at a concentration up to 40%) could occur from inadvertent drips, splashes and spills during the manual addition of the imported product to the automated blending machine or via incidental leaks from the blending and packaging machine transfer hoses, fittings, and/or pumps (at a concentration less than 1%).

Potential exposure during blending and packaging operations will be of short duration and will not occur on a daily basis. Such exposure would be limited by the use of PPE such as latex gloves, safety glasses, helmet and safety boots.

End-use

Retail workers are unlikely to be exposed to the notified polymer (<1%) provided the end-use plastic containers containing the end-use products remain intact. In the event of an accident, spills will be removed in accordance with the manufacturers instructions.

Cleaning and laundry workers will be potentially exposed by dermal contact or accidental ocular or inhalation contact daily to the notified polymer however such exposure will be limited by the low level of the notified polymer (<1%) in the products, the use of gloves would further minimise dermal exposure.

Overall, on the basis of the engineering controls, industrial hygiene, safe work practices and personal protective equipment (and low concentration of the notified polymer in the end-use product), occupational exposure to the notified polymer is determined to be low.

9.2.2. Public health – exposure assessment

The notified polymer will be available to the public in household cleaning and laundry products. The public will be exposed potentially daily to <1% notified polymer whilst carrying out household cleaning and washing tasks.

While members of the public will make dermal contact and possibly accidental ocular and inhalation (by means of spray applications) contact, such exposure is assessed as low. This is on the basis that the notified polymer is present at low concentrations in the end-use product (<1% notified polymer). In addition, given the molecular weight of the notified polymer and high water solubility, absorption through intact skin is not expected to be significant.

Exposure from accidental ingestion is also considered to be low due to the low concentration

Overall, public exposure to the notified polymer is determined to be low.

9.2.3. Human health – effects assessment

Toxicological data for the notified polymer for the following health end points were submitted:

Mutagenicity

A reverse mutation test in *Salmonella typhimurium* (*in vitro*) indicated the notified polymer was not mutagenic to bacteria under the conditions of the test.

Toxicological data for the other endpoints has not been established. The high molecular weight and high water solubility indicates low potential to cross biological membranes. The polymer may have irritant effects.

Based on the available data, the notified polymer cannot be classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC 2004).

9.2.4. Occupational health and safety – risk characterisation

Blending and packaging

Dermal contact will be the main route of exposure with the potential for accidental ocular exposure. Although irritant effects cannot be ruled out at a concentration of up to 40% notified polymer. The OHS risk presented by the notified polymer is expected to be low, given the automated process and engineering controls implemented at blending and packaging facilities, the industrial hygiene, good work practices and safety measures including use of appropriate personal protective equipment by workers. Moreover, the notified polymer will be used at blending and packaging sites where operatives are familiar in using such products and good handling procedures and good housekeeping is the norm and workers wear personal protective equipment.

End Use

Although large numbers of retail cleaning and laundry workers will potentially be exposed to cleaning products containing the notified polymer the risk to these workers is considered to be low. The low concentration of the notified polymer (<1%) would limit any potential exposure to and any adverse local effects from the notified polymer. In addition absorption of the notified polymer through intact skin is not expected to be significant.

9.2.5. Public health – risk characterisation

There will be no significant public exposure to the notified polymer given the low concentration

of the notified polymer in the household cleaning products (<1%) and the expected low bioavailability of the polymer. In addition any adverse effects would be limited by this low concentration. Consequently, there is unlikely to be any significant public health risk posed by the notified polymer.

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

10.1. Hazard classification

Based on the limited available data the notified polymer is cannot be classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

10.2. Environmental risk assessment

On the basis of the PEC/PNEC ratio the polymer is not considered to pose a risk to the environment based on its reported use pattern and volume.

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 No Significant Concern to public health when used in household cleaning products as described.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

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 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 product containing the notified polymer 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

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 skin and eye contact

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced:
  - Wear suitable protective clothing
  - Wear suitable gloves
  - Wear safety glasses

  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

- The notified polymer should be disposed of by incineration or to landfill.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

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(1) of the Act; if
   - if the NAMW < 1000

or

(2) 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.

13. BIBLIOGRAPHY

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