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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Beckosol 13-030

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For Enquiries please contact the Administration Coordinator at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA

Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA

Telephone: (61) (02) 577-9466 **FAX (61) (02) 577-9465**

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Beckosol 13-030

1. APPLICANT

A C Hatrick Chemicals Pty Ltd of 49-61 Stephen Road BOTANY NSW 2019, has submitted a limited notification statement with their application for an assessment certificate for Polymer in Beckosol 13-030. The notified chemical will be used as a component of industrial coatings.

2. IDENTITY OF THE CHEMICAL

Polymer in Beckosol 13-030 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore 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 and the Summary Report.

Other names:	short/medium oil length alkyd
Trade name:	Beckosol 13-030, 42635 (formulation)
Number-average molecular weight:	> 1000
Maximum percentage of low molecular weight species (molecular weight < 1000):	10%
(molecular weight < 500):	2%
Method of detection and determination:	infrared (IR) spectroscopy and GPC for evaluation of molecular weight

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	clear amber liquid with odour characteristic of white spirit (formulation)
Melting point:	not available
Specific gravity:	1.287 kg/m ³ 1.020 kg/m ³ (formulation)

Vapour pressure:	not available
Water solubility:	not available
Partition co-efficient (n-octanol/water):	not available
Hydrolysis as a function of pH:	not available
Adsorption/desorption:	not available
Dissociation constant:	does not dissociate
Flash point:	not available
Flammability limits:	not available
Autoignition temperature:	not available
Explosive properties:	not available
Reactivity/stability:	low reactivity, will degrade when in contact with oxidising agents

Comments on Physico-Chemical Properties

The vapour pressure of the polymer is likely to be negligible based on the structure (no functionalities likely to confer solubility) and formula of the polymer, these factors would also indicate a low water solubility. Hydrolysis is unlikely at neutral pH due to expected low water solubility. The presence of certain linkages indicate that hydrolysis (saponification) would occur at alkaline pH. The notified chemical contains no dissociable hydrogens or basic functionalities.

The polymer would burn in a general fire and is likely to give off CO and CO₂.

The partition coefficient for the polymer was not determined. Given the anticipated low water solubility the expected value of log K_{ow} would be high, though it would be difficult to measure.

No information was provided on the adsorption/desorption properties of the chemical. Given the polymer's anticipated low water solubility and high partition coefficient it is expected that it will strongly adsorb to or be associated with soils.

4. PURITY OF THE CHEMICAL

Degree of purity:	> 90%
Residual monomers:	< 5% maximum
Toxic or hazardous impurities:	Components classified as hazardous (irritant) in <i>List of Designated Hazardous Substances</i> are below the concentration required for a mixture to be classified as hazardous.
Non-hazardous impurities (> 1% by weight):	present

Additives/Adjuvants:

Chemical name:	solvent naptha (medium)
Synonyms:	white spirit
CAS No.:	64742-88-7
Weight percentage:	39-41%

not listed in *List of Designated Hazardous Substances* (1) or Sax and Lewis (3), however on Toxline (2) there is reference to a white spirit (CAS No. 8052-41-3) of similar composition as having eye, skin and respiratory irritant potential also chronic exposure is associated with irreversible effects on the central nervous system. White spirit is of variable composition and there is some argument for the applicability of the toxicity data for the “similar” white spirit to other solvent naphthas. There is an exposure standard listed for the “similar” white spirit (CAS No. 8052-41-3) of TWA 790 mg/m³ in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* (4) and this is also listed on notifier’s Material Safety Data Sheet (MSDS), again as a precautionary information. The white spirit (CAS No. 64742-88-7) in the formulation Beckasol 13-030 is not listed on the accessed databases and with no toxicological evidence to the contrary the formulation is not classified as hazardous according to the Worksafe Australia *Approved Criteria for Classifying Hazardous Substances* (5).

5. USE, VOLUME AND FORMULATION

The notified polymer is imported as a component of the formulation Beckosol 13-030. The imported formulation will be blended with pigments and other additives and extended with additional aliphatic or aromatic solvents to produce a fire retardant coating. This coating is to be used for application to marine vessels in situations such as on the pressure hulls of submarines.

It is expected that 2 tonnes of the formulation will be imported in the first year rising to 5 tonnes/annum by the fifth year. This corresponds to 1.2 tonnes and 3 tonnes/annum of the notified polymer being imported in the first and fifth years.

The formulation containing the notified polymer is currently marketed in the United States.

6. OCCUPATIONAL EXPOSURE

Occupational exposure to the notified polymer during transport and warehousing is unlikely and will only occur due to accidental leakage or spillage. The formulation containing the notified polymer (60%) dissolved in white spirit is imported in steel drums (200 L bung type) and will be supplied direct from the wharf or from store to customers of A C Hatrick.

At the customer's facilities the formulation will be used for the manufacture of fire retardant paint. The manufacturing will involve four main stages: laboratory development, paint mixing, QC testing and drum filling with the final paint formulation. The final paint product will contain approximately 30% of the notified polymer.

Laboratory development, which consists of manufacturing and testing of paint formulations, will be undertaken by two employees. They will be exposed to the notified chemical for 8 hours/day for 10 days/year. During paint manufacture employees will be potentially exposed for 8 hours/day for 30 days/year. The three processes in the manufacture of paint, paint makeup, QC testing and drum filling will each employ three personnel. The mixing process utilises mixers fitted with exhaust ventilation to capture volatiles, similarly drum filling has exhaust ventilation to capture vapours. The process of paint manufacture involves blending in a mixer, batch adjustment and testing, filtration then drumming.

As the polymer is not volatile the most likely route of exposure during the manufacture of the retardant paint is through eye or dermal contact if handled incorrectly, splashed or spilt. Exhaust ventilation and/or scrubbers are used during the manufacturing process. These devices are used to remove the volatile components in the workplace. The formulation contains a volatile component, white spirit, and, other volatile materials are added to formulate the paint. The use of this equipment will also reduce exposure to the notified chemical.

The paint is only used in an industrial setting and limited to two sites. The procedure is to thin the paint by the addition of solvent. This is added to the circulation tray and then the paint is used to coat the substrate. The paint is heat cured which will bind the notified chemical into a relatively inert matrix.

The paint is applied using an airless sprayer or roller system in a dedicated blast chamber with effective fume extraction. The main routes of exposure to the notified chemical during application will be the eye, skin and via inhalation. As organic solvents are used in the process, applicators use respiratory protection. Exposure to spray containing the notified chemical will also be reduced by down draft ventilation and fume extraction. Occupational exposure to the notified polymer during paint application will therefore be limited by measures to reduce exposure to the solvents used.

7. PUBLIC EXPOSURE

The imported product, which contains 59-61% by weight of the notified polymer, with the remainder 39-41% by weight being white spirit, will be imported by AC Hatrick Chemicals Pty Ltd and on-sold to a paint manufacturer. The notified polymer will be incorporated into fire retardant paint formulations that will be applied to the internal surfaces of submarine pressure hulls. The coating will be subsequently covered with a lining, leaving about 1% of the coating exposed. The notified polymer will be incorporated into the cured paint, and therefore leakage from the paint surface is expected to be minimal.

The notified polymer, will not be available to the public and the public will not be exposed to the notified polymer as it will be applied to the internal surfaces of submarines.

Minor public exposure may result from disposal of unused polymer/paint, or accidental spillage of the notified polymer or formulated paint during transport, formulation and storage. However, adequate measures are described by the notifier to minimise the risk of public exposure during formulation, disposal, or in the event of accidental spillage.

8. ENVIRONMENTAL EXPOSURE

Release

During transport significant spills of the polymer are not expected to occur. The Material Safety Data Sheet (MSDS) and material handling instructions provide directions for the proper containment, collection and disposal of wastes in accordance with local regulations.

Paint manufacture will be limited to one site in Queensland, with application of the paint occurring at two sites, one in South Australia and one in New South Wales. Release of the polymer during paint manufacture can occur as a result of spills during blending, and filling of paint containers. Should a spill occur it would be contained to the plant through bunding. The liquid will be absorbed with sand, earth or other absorbent. The used absorbent will be placed in suitable sealable containers and disposed of in accordance with local, state and federal regulations.

Empty drums will be disposed of by recycling via a drum reconditioner. Standard practice for drum reconditioners is to incinerate the contents of the drums, then wash and recycle the drums for other uses. Approximately 1% (30 kg per annum; based on maximum import rate of 5 000 kg and the Beckosol containing 60% of the notified polymer) of the polymer will be disposed of in this manner.

A 30% loss rate is typical when the paint is applied using spray equipment. This is either collected on drop sheets or reduced by air extraction. Roller application leads to a 10% loss that is observed as spatter onto drop sheets. These residues will be disposed of to secure landfill sites in accordance with local, state and federal regulations. Taking the worst case assumption, that all the paint is applied using

spray equipment (ie. a loss rate of 30% of the polymer), a maximum of 900 kg per annum of the polymer will be disposed of from paint application.

Approximately 5% by weight of the paint containing the notified polymer will remain in the empty paint containers. These containers will be disposed of to approved landfill. This will amount to less than 100 kg per annum.

Fate

Beckosol 13-030 is intended for use in the manufacture of industrial paint. The use of the formulation will be limited to two sites. The majority of the polymer will be applied to the interior of ships as a component of the paint.

A small amount of the notified polymer (< 30 kg per annum) will be incinerated as a result of drum recycling. Any incineration of the notified polymer is expected to produce water and oxides of carbon.

A maximum of 1000 kg of the polymer will be disposed of to approved landfill sites from the disposal of waste paint (mostly from collected overspray or spatter and a smaller amount from container residues). The polymer in the waste paint will be cured to a very high molecular weight and be highly crosslinked. Hence, it will have a low water solubility and would not be expected to be mobile or to degrade within landfill sites.

9. EVALUATION OF TOXICOLOGICAL DATA

For a synthetic polymer with number-average molecular weight (NAMW) > 1000, toxicology data are not required under the Act. None was provided by the notifier.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the Act.

The notified polymer is not likely to exhibit toxic characteristics in the environment because large polymers of this nature are not readily absorbed by biota.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The notified polymer is to be incorporated into an industrial paint for application to the interior of ships. Formulation is restricted to one site and application of the paint to two. It is anticipated that the amount of the notified polymer released to the environment will be low. Under normal use the polymer will only be released to the environment when it has been cured to a very high molecular weight and is highly crosslinked. Hence, it will have a low water solubility and would not be expected to be mobile or degrade within landfill sites.

The environmental hazard posed by the polymer is rated as negligible when manufactured into, and used in an industrial paint.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer has a NAMW of > 1000 and is therefore not expected to traverse biological membranes and constitute a toxicological hazard. Although the notified polymer contains low levels of a number of residual monomers (in total < 5%) and moderate levels of low molecular weight species (10% with NAMW < 1000), they are unlikely to present a toxicological hazard. No toxicological data on tests involving the notified polymer are available to confirm this. The notified polymer is expected to be insoluble in water and have a very low vapour pressure, and is not expected to lose constituents by volatilisation, exudation or leaching.

Occupational exposure to the notified chemical can occur during transport and warehousing, during reformulation and during final application. Exposure during transport and warehousing is unlikely and will only occur due to spillage or accidental release. During reformulation the imported formulation containing 60% of the notified chemical is added to a closed blending system from the 200 L drums in which it is imported. Other chemicals such as solvents and pigments are added prior to the paint drumming process. Due to the low volatility of the notified chemical, inhalational exposure will be limited; the main route of occupational exposure during this phase will be via the eye or skin due to splashing or spillage. The use of exhaust ventilation and/or scrubbers, necessary to reduce exposure to solvents, will also reduce exposure to the notified chemical. Similarly during application the use of personnel protective equipment to reduce exposure to the organic solvents used will also minimise exposure to the notified chemical. The paint is applied using airless sprayguns and rollers in a dedicated environment; this will minimise exposure to employees other than the applicators. The use of effective fume extraction and downdraft ventilation will further reduce occupational exposure to the applicators.

The notified polymer will be incorporated into fire retardant paints which will be applied to the internal surfaces of submarines. As such, the public will not be exposed to these paints or the notified chemical. The potential for minor public exposure exists during formulation, transport and disposal of the paint/polymer which is minimised by the recommended practices during these tasks.

A hazard assessment of the notified chemical on the basis of toxicological data was not undertaken as no data were supplied. On the basis of the chemical composition (including levels of hazardous residual monomers) and NAMW it is unlikely that the notified chemical would constitute a significant toxicological hazard. On this basis it is not classified as hazardous according to the criteria of Worksafe Australia. The imported formulation contains 40% white spirit. As a white spirit of similar composition is a skin and eye irritant and has been implicated in CNS damage through chronic exposure the formulation is classified as hazardous according to the criteria of Worksafe Australia (5).

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Beckosol 13-030 during paint manufacture and use the following guidelines and precautions should be observed. The precautions for the use of the notified polymer should recognise the presence of the carrier solvents in the imported formulation and formulated paint:

- Local exhaust ventilation should be used during mixing.
- Application of paint should take place in booths with appropriate engineering controls to reduce exposure to employees.
- During paint manufacture and during application the following protective equipment should be worn:
 - impervious gloves conforming to Australian Standard (AS) AS 2161 (6),
 - protective eye goggles conforming to AS 1336 (6), and Australian/New Zealand Standard AS/NZS 1337 (8)
 - protective clothing conforming to AS 3765.2 (9), and
 - protective footwear conforming to AS/NZS 2210 (10).
- If engineering controls are not sufficient to control exposure, the following protective equipment should also be worn:
 - respiratory protection conforming to AS/NZS 1715 (11) and AS/NZS 1716 (12).
- Good personal hygiene practices should be observed.
- A copy of the MSDS should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the imported formulation containing the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (13).

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.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

1. National Occupational Health and Safety Commission, 1994. *List of Designated Hazardous Substances* [NOHSC:10005(1994)], AGPS, Canberra, 1994
2. Sax and Lewis 1989, *Dangerous Properties of Hazardous Materials*, Van Nostrand Reinhold, New York
3. Toxline Silver Platter (1995). *Toxline SilverPlatter CD-ROM database, 1994-September 1995*, Silver Platter International N.V.
4. National Occupational Health and Safety Commission 1995, *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:3008 (1995), 1003(1995)], Australian Government Publishing Service, Canberra.
5. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)], Australian Government Publishing Service, Canberra.
6. Standards Australia, 1978. *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, Australia.
7. Standards Australia, 1994. *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia
8. Standards Australia, Standards New Zealand 1992. *Australian/ New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.
9. Standards Australia, 1990 Australian Standard 3765 - 1990. *Clothing for Protection Against Chemical Hazards, Part 1, Protection against General or Specific Chemicals; Part 2, Limited Protection Against Specific Chemicals*, Standards Australia Publ., Sydney, Australia.
10. Standards Australia, Standards New Zealand 1994. *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

11. Standards Australia, Standards New Zealand, 1994. *Australian/New Zealand Standard 1715 - 1994 Selection, Use and Maintenance of Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ., Wellington, New Zealand.
12. Standards Australia, Standards New Zealand, 1991. *Australian/ New Zealand Standard 1716 - 1991 Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ., Wellington, New Zealand.
13. National Occupational Health and Safety Commission, 1994. *National Code of Practice for the Preparation of Material Safety Data Sheets*, [NOHSC:2011(1994)], AGPS, Canberra.