

26 September 2000

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Edaplan 482

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**Polymer in Edaplan 482****1. APPLICANT**

Swift and Company Ltd of 64 Trenerry Crescent ABBOTSFORD VIC 3067 (ACN 000 005 578) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC), 'Polymer in Edaplan 482'.

2. IDENTITY OF THE CHEMICAL

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

Marketing name: Polymer in Edaplan 482

3. POLYMER COMPOSITION AND PURITY

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

4. PLC JUSTIFICATION

The notified polymer meets the revised PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

Unless otherwise stated, the properties below are those of the 85% aqueous solution of the polymer.

Property	Result	Comments
Appearance	Red brown liquid	
Boiling point	Approximately 100°C.	At 100 kPa.
Density	1.12 g/mL.	

Water solubility	Soluble	Dissociates completely in water.
Particle size	Not applicable.	Produced as an aqueous solution.
Flammability	Not applicable.	In aqueous solution.
Autoignition temperature	Not applicable.	
Explosive properties	Does not have explosive properties.	
Stability/reactivity	Not reactive. Stable at up to 200°C.	Like other organic materials, will react with oxidising agents.

5.1 Comments on physical and chemical properties

The polymer is expected to remain stable under ambient conditions and decompose when temperatures exceed 200°C. The polymer is expected have low vapour pressure and not to be volatile under the conditions of use. The polymer solution is expected to boil at the temperature of water.

The water solubility was reportedly determined by a modified OECD TG 105 method, which consisted of using water at 65°C to gain faster solubility before allowing the solution to equilibrate to 20°C. The notifier claims that the polymer is highly water-soluble and completely dissociates but no test results were provided. The polymer structure indicates that while it contains over 20% of a carboxylic salt functionality, it is more likely to be dispersible than truly water-soluble. Consequently the polymer is likely to form micelle-like dispersions in water. Such polymer characteristics are responsible for the dispersant action, where it is assumed that the polyester moieties become attached to the pigment particles and the hydrophilic head groups with high water affinity stabilise the dispersed particles in water.

The polymer contains organic ester groups that could undergo hydrolysis under extreme pH. Hydrolysis in the environmental pH range between 4 and 9 is unlikely.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be used as a pigment dispersant in pigment concentrates and in the formulation of a wide range of coatings; from architectural paints used by general public to automotive and industrial paints. It will be imported from Europe as an 85% solution in water (Edaplan 482) in 25 kg and 155 kg plastic pails and drums. The notifier estimates that approximately one to ten tonnes of the notified polymer will be imported per annum for the next five years.

Approximately 80% of the notified polymer is projected for use in architectural paints, and 20% in industrial, including automotive, uses.

Formulation details:

In Australia, the notified polymer will be added to paints and pigment concentrates. The notifier estimates that 0.5 to 5% of the notified polymer will be present in the final end-use products. Industrial paints manufactured using the notified polymer will be stored and transported in 20L pails or 200L plastic lined steel drums. Paints for architectural use, including domestic uses, will be stored and transported in 500 mL, 1 L, 4 L and 10 L epoxy lined tin plate cans.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Formulation</i>		
<i>High Speed dispersion (100 factory workers, 4 hours/day; 30 days/year)</i>		
Dermal	Reformulation will involve transfer of the solution, containing 85 % notified polymer, into mixing vessels, where it will be blended with water, polymer emulsions and other additives to produce paints. Transfer may be by decanting or drum pumps. Possible skin contamination while pouring Edaplan 482 in mixers and while high speed blending.	Mixers fitted with local exhaust ventilation to capture volatiles; coveralls, impervious gloves and goggles worn by workers.
<i>Batch adjusting (100 factory workers, 2 hours/day; 30 days/year)</i>		
Dermal	Possible skin contamination while adjusting batch and blending.	Mixers fitted with exhaust ventilation to capture volatiles; coveralls, impervious gloves and goggles worn by workers.
<i>Container filling (100 factory workers; 8 hours/day; 30 days/year)</i>		
Dermal	Dermal exposure due to drips and spills of the product while filling containers.	Coveralls, impervious gloves and goggles worn by workers.
<i>Quality control testing (10 workers; 8 hours/day; 30 days/year)</i>		
Dermal	Dermal exposure to paint during sampling and testing.	Quality control testing is performed in approved booths. Workers wear coveralls, impervious gloves and goggles.

End use

1. Industrial paint application (including automotive and coil coatings); 10 workers, 8 hours/day, 200 days/year

Dermal, ocular and inhalation	Industrial paint application involves the use of spray, roller coating or dipping equipment (either manually or by robot). Coil coatings are applied by roller coater. Paint will be stirred, thinned and loaded into circulation tanks or spray guns. These workers will be exposed to the finished paint containing 0.5-3% notified polymer.	Filtered exhaust system. Coveralls, safety goggles and impervious gloves will be worn by industrial paint users, and cartridge type respirators may be used during spray application of the paints.
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2. Professional painters (apply paint by brush, roller or spray; thousands of workers working 8 hour/day, 100 days/year);

and,

3. Domestic users (apply paint by brush, roller or spray; thousands of workers working 8 hour/day, 1 day/year).

Dermal and ocular (inhalation exposure possible if spray guns used)	Paint application will generally be done by brush or roller, although spray painting may also occur.	Coveralls, impervious gloves and safety glasses are recommended for the end users, but use of protective equipment is difficult for the paint manufacturer to control.
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4. Retailers (mixing pigment concentrate into paint; occupational exposure for probably <100 retailers).

Dermal	Skin contact with pigment concentrate (up to 5% notified polymer) can occur during the tinting of paints at point of sale by the store staff.	Probably overalls/coat, gloves and perhaps safety glasses.
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Transport and storage

Dock/Transport workers (6-10 workers, 10 days/year)

Dermal	Workers may be exposed only if packaging is breached.	Not provided.
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Warehouse/ store persons (26-38 workers; 50 days/year)

Dermal Workers may be exposed only if packaging is breached. **Not provided.**

Disposal (*Number of workers and duration of exposure not provided*)

Dermal Exposure is possible when filling the containers with waste and transporting them to landfill. **Not provided.**

8. PUBLIC EXPOSURE

The notified polymer is incorporated in pigment concentrates and paint products for both industrial and domestic uses. Finished paint products will be available to the general public and may be applied by hand spray guns or automated electrostatic spray machines, by roller or by brush. During curing, the notified polymer reacts with other components of the paint formulation to form an integral part of the paint film.

The potential for public exposure to the notified polymer during transport or disposal is assessed as negligible. Members of the public, using liquid paint products containing the notified polymer, may make dermal and ocular contact as a result of spills and splashes. Dermal contact with industrial products and domestic surfaces coated with cured paint products would also occur.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

There is potential for release during the paint/coating formulation and the application of the paint or coating. The formulation process will take place at approximately 50 paint-manufacturing companies and spills would be contained by plant bunding.

During formulation the notifier estimates that up to 200 kg per annum of polymer waste will be generated. This will be derived from:

Equipment cleaning	100 kg/annum
Spills	50 kg/annum
Residues in the import containers	50 kg/annum

The solid waste from the paint/coatings production will be disposed to landfill by licensed waste disposal contractors.

Architectural Paints Application:

The architectural coatings will be applied at approximately 60% by brush and rollers and up to 40% by spraying. The notifier estimates the following maximum losses:

Overspray	1900 kg/annum
Equipment cleaning and spills	150 kg/annum
Residues in the empty containers	45 kg/annum.

Automotive Coatings Application:

The automotive coatings are applied by spray with approximately 60% loss from overspray. Estimated maximum losses are:

Overspray	600 kg/annum
Equipment cleaning and spills	20 kg/annum
Residues in the empty containers	20 kg/annum.

Coil Coatings:

These coatings are efficiently applied by roller coating with the following maximum losses expected:

Equipment cleaning and spills	20 kg/annum
Residues in the empty containers	20 kg/annum.

At maximum import volume the total release for the notified polymer will be approximately 3000 kg/annum Australia wide.

9.2. Fate

Once coated on the surfaces of houses, coils or automotive parts, the notified polymer will be incorporated in a hard, durable, inert film and would not present a significant environmental hazard. Any fragments, chips and flakes of the paint will be of little concern as they are expected to be inert.

Most of the solid waste generated in the formulation and application of the coating will be disposed of to landfill or by incineration. Overspray from exterior architectural coatings will fall directly to the ground. Containers and container residue will be disposed of to landfill. Waste produced during the cleaning of the architectural paint application equipment, such as brushes, rollers and possibly the spray equipment (approximately 150 kg/annum), will be washed to the sewer with copious amounts of water. The polymer is water soluble/dispersible, so could persist in solution. However, under normal environmental pH, the carboxylate functionalities would be partially neutralised, the polymer solubility reduced and the neutralised polymer may then become associated with aquatic sediments.

Leaching of the polymer from landfill sites is possible, given the high water solubility/dispersibility. However, leaching will be reduced for polymer disposed of in the inert cured state. Although the polymer is unlikely to be classed as readily biodegradable, it is expected to slowly degrade to water, carbonate and nitrate or ammonia if released to landfill or waterways.

The polymer is not expected to cross biological membranes, due to the high molecular weight, and should not bioaccumulate (Connell, 1989).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted. However, the material safety data sheet (MSDS) provided for the aqueous solution of the notified polymer, Edaplan 482, indicates that the solution is alkaline and is classified as a skin and eye irritant in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a).

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

12. ENVIRONMENTAL HAZARD ASSESSMENT

The majority of notified polymer associated with waste from formulation and application of the coating to house surfaces, coils and automotive components, would not enter the environment until the waste is disposed of to landfill or falls to ground as overspray. This waste will be derived from formulation (up to 200 kg/annum), application to houses (up to 2100 kg/annum), automotive parts (up to 650 kg/annum) and coil coatings (up to 40 kg/annum). Uncured polymer may leach from landfill sites, however the cured coating would be strongly cross-linked into an inert matrix and immobile in the environment.

Paint containing the notified polymer will be inert once applied to articles. In the event of accidental spillage of the polymer emulsion into waterways, the polymer is expected to disperse into the water, but will gradually degrade to its basic components of water, carbonate and nitrate or ammonia.

Given the above, environmental exposure and the overall environmental hazard are expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer. However, the notifier has classified aqueous solution of the polymer as a skin and eye irritant in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a).

The MSDS accordingly mentions that exposure to the product, Edaplan 482, may cause eye irritation and skin irritation. The residual monomer concentrations in the finished polymer are low and not responsible for its classification as a hazardous substance.

Due to the high molecular weight and low reactivity of the polymer, the notified polymer is not expected to be absorbed through the skin.

13.2. Occupational health and safety

There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the polymer solution or the paint component containing the polymer. There may be exposure during production of paints, and in the use and disposal of the paints.

During the paint manufacture process, the main exposure route for the notified polymer will be dermal. The paints will be viscous, and ready formation of aerosols is not expected. Skin and eye irritation may occur during the transfer of Edaplan 482 to the mixing vessel. The possibility of irritation is reduced when handling the final paint or pigment concentrate, as the concentration of notified polymer is reduced (maximum 5%). The engineering controls and personal protective equipment specified in the notification (impervious gloves, safety goggles and coveralls) are needed to provide a high level of protection against the notified polymer.

Industrial application of paint by roller coating or dipping (coil coating) may lead to dermal exposure to the 0.5-3% solution of the notified polymer. The risk of skin and eye irritation is low for paint application due to the reduced content of the notified polymer. The use of the specified personal protective equipment should provide a high level of protection against the notified polymer.

For spray application, the notified polymer is assessed for the contribution it makes to the hazards associated with use of the spray paints (automobile coating). The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves and a full face shield and respirator. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999b). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer.

Occupational exposure during the sale and professional use of architectural paints is likely to be widespread and often under poorly controlled conditions. Dermal contact during handling and application of the paints is likely. The occupational health and safety risk associated with dermal contact with the notified polymer in the form of uncured paints will be low, due to the low concentration in the finished paints.

Conclusion

The notified polymer solution is described as an eye and skin irritant; therefore appropriate control measures need to be taken to reduce risk from exposure to the polymer during formulation and use of paints.

13.3. Public health

Architectural paint products containing the notified polymer are available for sale to the general public, who may receive dermal or ocular exposure during use. The risk to public health from exposure to the notified polymer in liquid paints will be low because the notified polymer is present in low concentrations and once cured (dried), is unlikely to be bioavailable.

Based on the use pattern of the notified polymer, it is considered not to pose a significant hazard to public health.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The material safety data sheet (MSDS) for Edaplan 482 (containing 85% notified polymer in water) provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

The label for Edaplan 482 provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Edaplan 482, the following guidelines and precautions should be observed:

- Use of the paint containing the notified polymer by spray application should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999b);
- Protective eyewear and impermeable gloves, chemical resistant industrial clothing and footwear should be used when handling Edaplan 482; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;
- Spillage of the notified polymer should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of protective eyewear may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be

found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c); or other internationally acceptable standards.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

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

17. REFERENCES

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National Occupational Health and Safety Commission (1994a) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

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

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National Occupational Health and Safety Commission (1999b) National Guidance Material for Spray Painting. Australian Government Publishing Service, Canberra.

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

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

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

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