File No.: NA/660

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

CA2

Under subsection 38(5) of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), the Director of Chemicals Notification and Assessment publishes this assessment report by giving a copy of it to :

- the Chief Executive Officer of the National Occupational Health and Safety Commission;
- the Secretary of the Department of the Environment;
- the Secretary of the Department of Health and Aged Care; and
- WorkSafe Western Australia.

This assessment report will be available for inspection by the public.

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

CA2

1. APPLICANT

Plastral Fidene Pty Ltd of 11B Lachlan Street, Waterloo NSW 2017 and Uniroyal Chemical Pty Ltd of Unit 2, 13 Stanton Road, Seven Hills NSW 2147 have submitted a limited notification statement in support of their joint application for an assessment certificate for CA2.

2. IDENTITY OF THE CHEMICAL

For the notified chemical, specific details of its chemical name, CAS number, molecular and structural formulae, molecular weight, methods of detection and determination, exact import volume and customers have been exempted from publication in the Full Public Report and the Summary Report.

Trade Name:	CA2 in Ethacure 300

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	white powder
Melting Point:	124°C
Specific Gravity:	not determined; see comments below
Vapour Pressure:	expected to be <0.0001kPa at 20°C; see comments below
Water Solubility:	slightly soluble in water; see comments below
Partition Co-efficient (n-octanol/water):	not determined; see comments below
Hydrolysis as a Function of pH:	not determined; see comments below

Adsorption/Desorption:	not determined; see comments below
Dissociation Constant:	not determined; see comments below
Flash Point:	>100°C
Flammability Limits:	not determined; see comments below
Autoignition Temperature:	not determined; see comments below
Explosive Properties:	CA2 has not been reported to detonate following shock, friction or heat treatment
Reactivity/Stability:	CA2 has antioxidant properties; it is not known to be a reactive substance

Comment on Physico-Chemical Properties

The majority of the above parameters have not been determined for the notified chemical. The notifier has requested a variation on these schedule requirements on the basis that CA2 will be imported into Australia as a minor component of the curative agent and, hence, these properties are not relevant to its proposed use in Australia.

The notifier has estimated the water solubility of the notified chemical to be less than 0.01 mg/L. Using the United States Environmental Protection Agency's ASTER program, the solubility was estimated to be 420 mg/L (USEPA, 1998).

The notifier has estimated the octanol-water partition coefficient (log K_{OW}) of the notified chemical to be between 4 and 6. Using the United States Environmental Protection Agency's ASTER program, the log K_{OW} was estimated to be 2.19 (USEPA, 1998).

Hydrolysis of the notified chemical is not expected in the environmental pH range of 4-9 (USEPA, 1998).

Based on the estimated slight water solubility and partition coefficient, the notified chemical is unlikely to adsorb strongly to soils and sediments. The hydroxylamine functionality is expected to have basicity typical of this class of chemicals.

4. PURITY OF THE CHEMICAL

Degree of Purity: 100%;

Impurities: no impurities, hazardous or non-hazardous, have been detected in preparations of the notified chemical

Additives/Adjuvants: no additives or adjuvants are added to CA2

5. USE, VOLUME AND FORMULATION

The notified chemical is used as an antioxidant and stabiliser. It will be imported as a minor component (0.1-0.5% by weight) of the curative agent (Ethacure 300) for elastomers/polymers, which will typically be cast into articles for industrial use, wheels and machinery parts. The curative agent is a clear, amber liquid.

The notified chemical will be imported at less than one tonne per year. It will not be manufactured in Australia, nor will the curative agent containing the notified chemical.

6. OCCUPATIONAL EXPOSURE

Transport and storage

Around 50-100 personnel (including wharf handlers) will be involved in the receipt and transport of 210 litre drums of the liquid curative agent to the receiving stores (three sites in Australia). Stores personnel at these three sites (about 10 staff in all) will repack the curative agent by decanting into 20 litre pails. Shipping and repack containers will be stored under a nitrogen blanket and not exposed to prolonged elevated temperatures. Further transportation of pails and drums will occur from receiving stores to the production process operators (about 200 in all), who perform the casting.

Apart from where accidents occur, significant exposure of workers involved in the transportation and storage of the curative agent is not expected. Those workers performing decanting and repacking are more prone to exposure to constituents of the curative agent (e.g. inhalation and/or skin and eye contact). Standard personal protective equipment will include impermeable overalls and gloves, industrial footwear, and face shields/eye goggles.

End-use

Production processes include weighing, mixing and dispensing. For high volume production, procedures will generally be automated and contained in order to limit the exposure of workers to the curative agent. After receipt of the pails or drums, process operators will transfer the contents to holding tanks by direct pour, or pressure/vacuum line transfer. Controlled mixing with prepolymer will then occur mechanically, prior to dispensing into

moulds. In this step, prepolymer and curative are pumped from containers, or holding tanks, to a mixing head/dispenser and injected directly into moulds (single or multiple), in static or moveable carousels. Cured material is automatically ejected from the moulds, or removed manually. Upon completion of the batch, the production process operators may then clean the tanks and drums. In the case of low volume production, the basic procedures are the same, except that the process operators may hand mix curative and prepolymer, then pour the mixture manually into the moulds.

Once the curative agent is reacted with prepolymer mixture, all components (including CA2) become chemically bound in a solid form. Hence, none of the notified chemical remains in an available form, preventing any further exposure to it. Solid wastes can be disposed of to landfill without the possibility of release.

Low volume process operators are therefore the most likely to be exposed to the curative and CA2. However, according to the notifier, occupational hygiene monitoring at the manufacturer's premises and at customer plants has been unable to detect any of the curative in the air, down to 50 parts per billion, during processing under usual conditions. The personal and area monitoring referred to were performed above storage containers, during resin pouring, transferring of formulations, spraying of the curative agent at temperatures of 77°C and close to polymer curing ovens, spray booths and vacuum pump discharge points. Detailed monitoring results were not provided.

It is possible, but not stated, that the findings of low levels of airborne curative may have been related to the operation of local exhaust ventilation systems. Since CA2 is expected to have a lower vapour pressure than the curative agent (<0.0001kPa at 20°C) and is dissolved in this liquid, CA2 fumes are likely to be undetectable in the workplace air.

No free CA2 will occur in dust. Dust is not anticipated to occur unless castings are subject to cutting, sawing or machining. Local exhaust ventilation will be installed to minimise dust levels.

Exposure to free CA2 may occur during handling of the curative agent, for example, during weighing, mixing and where liquid spills and wastes are generated. Skin contamination may occur during these operations and during any clean-up or maintenance of equipment. Process workers will wear standard personal protective equipment (as above).

7. PUBLIC EXPOSURE

CA2 will only be sold to industrial users and will not be sold to the general public. Most of the final elastomer/polymer products will be for industrial use. When the curative agent is used, the CA2 is reacted into the curative and prepolymer mixture, to form a solid. All the notified chemical becomes chemically bound in the final polymeric solid; hence, none remains in an available form. For these reasons, no significant public exposure to CA2, as a component of the curative agent, is anticipated during transport, reformulation, use and disposal.

8. ENVIRONMENTAL EXPOSURE

Release

Under normal conditions it is not expected that CA2 would be released during storage and transportation. The material safety data sheet (MSDS) for the curative agent contains adequate instructions for handling a spill should one occur.

Once empty, the storage containers will be either washed for re-use, or punctured and scrapped for metal recovery. The notifier has estimated that there will be <1kg residual curative agent left in a 210 litre drum after emptying. Based on an importation rate of one tonne per year, this corresponds to a maximum of 4kg of the notified chemical per annum. Rinsate containing the notified chemical will be disposed of through liquid waste contractor.

The notifier recommends that unused, spilled or residual curative agent should be reacted with excess pre-polymer. Hence, any residual notified chemical will be incorporated in a cured polymer matrix prior to disposal.

The notifier also estimates that a maximum of 5% of the notified chemical may be lost during the polymer production process (including production failures, residues, spills and unused materials). Based on an importation rate of one tonne per year, this corresponds to a maximum of 50kg of the polymer per annum. It is anticipated that the majority of this will be reacted with excess pre-polymer and converted into a solid form. A small amount of the unreacted chemical may be disposed of as liquid wastes through a licensed liquid waste contractor.

Fate

The notified substance is intended for use as an antioxidant and stabiliser in various plastics. As such, the majority of the chemical will share the same fate as the plastic articles into which it is incorporated. Disposal of such articles is likely to be to landfill at the end of their useful lifetimes. Some incineration might occur and would destroy the chemical, creating typical decomposition products of water and oxides of carbon and nitrogen.

A maximum of 54kg of waste chemical would be generated annually, as residues in containers or waste from polymer production. The majority of this is expected to be in solid form after reaction with excess pre-polymer and disposed of to landfill. Once bound within the polymer matrix, the chemical is not expected to be mobile. Leaching of the chemical from landfill sites is unlikely as the chemical will be bound within the cured polymer matrix. A small amount may be disposed of by licensed liquid waste contractors for incineration.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided for CA2. The submission indicates that CA2 may be a skin irritant and is an eye irritant in powder form. The notifiers state that on the basis of the available information, the notified chemical would not be a hazardous substance according to

the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1994a).

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided for CA2. This is acceptable for chemicals with import volumes of less than 1 tonne per year.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

CA2 will be used as an antioxidant and stabiliser for plastics. Once incorporated into these products the notified chemical is expected to remain within the product matrices. Hence, the majority of the notified chemical will share the fate of the articles into which it is incorporated. It is anticipated that these will be disposed of to landfill or incinerated at the end of their useful lifetime. In landfill it is expected that the notified chemical will remain immobile within the product matrices.

Waste from empty containers and plastic production (maximum 54kg per annum) will be converted into solid, immobile forms after reaction with excess pre-polymer. Most will then be disposed of to landfill, although some may be incinerated along with other liquid wastes that are collected by a licensed liquid waste contractor.

Given these considerations, the overall environmental hazard of the notified chemical can be rated as low, given the anticipated low environmental exposure. Hence, the notified chemical is not likely to present a hazard to the environment when it is stored, transported and used in the proposed manner.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

According to the notifier, CA2 is considered an irritant, although not injurious, to the eye in its powdered state. Frequent or prolonged contact to the skin can lead to irritation. No reports of adverse health effects due to its handling or use have been reported. The notifiers state that it would not be classified as hazardous, based on the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1994a).

The notified chemical will be imported as a component of a curative agent, at a low concentration (0.1-0.5% by weight). This curative agent has shown an acute oral LD_{50} of 1500 mg/kg and an acute dermal LD_{50} of >2000 mg/kg in rodents, was non-irritating to skin but an irritant to eyes in rabbits, and caused delayed contact hypersensitivity in guinea pigs. Liver enlargement and decreased body weight were noted at 4000 mg/kg/day in a 28-day rat study, although no gross pathological lesions were noted. In a subchronic 90-day oral toxicity study in rats, increased liver and kidney weights were recorded at doses above 40 mg/kg/day

of curative in the diet. This latter dose level was considered to be a marginal, or no-effect level, for the curative substance in rats. Therefore, the health hazards of CA2 are over-ridden by the hazards of other components in the curative. The curative agent is a hazardous substance, according to NOHSC (1994a).

Occupational Health and Safety

Personnel that will handle the curative agent include wharf handlers, transport workers, stores personnel, laboratory staff and production process operators. Of these, repackers and process operators are the most likely to be exposed to the curative and CA2, mainly through skin and eye contact. Inhalation exposure is not considered likely due to the low volatility of CA2 and the curative and local exhaust ventilation systems.

It is anticipated that observation of the hierarchy of control measures, including isolation procedures, engineering controls and safety procedures employed in working with the curative agent, will be adequate for minimising exposure to CA2. Workers potentially exposed to CA2 during the handling of the curative agent (e.g. stores, laboratory and production staff), will be trained in the handling of chemicals and all plant procedures (including safety procedures). If standard personal protective equipment is worn by repacking and process workers, an adequate level of protection from the notified chemical, as well as all other constituents of the curative agent, will be provided.

Providing that the curative agent is handled at ambient temperatures in areas with adequate ventilation, then no respirator should be necessary. Only in the event of an emergency or exposure to heated curative vapours should a supplied-air respirator be required.

Apart from the hazards likely to be encountered during the decanting, casting and moulding processes, there are no other relevant occupational hazards since only packaged materials will be handled.

Exposure to the notified chemical may be possible upon the occurrence of a liquid spill. The MSDS for the curative agent has adequate explanation of the emergency procedures required in such an instance. Small accidental spills should be soaked up with adsorbents (e.g. sawdust, sand or vermiculite) and collected into a container for disposal. Large spills should be contained within dykes or adsorbents and collected by pump or vacuum and the remainder treated as per small spills. Waste liquid curative agent can be reacted with excess prepolymer to form solid waste. During any of these operations, worker exposure should be minimal if standard personal protective equipment is worn.

Exposure to the notified chemical from solid polymers is not possible as CA2 is chemically bound in such forms. Solid wastes can therefore be safely disposed of to landfill without the possibility of exposure.

Based on the available information, there are no health conditions mitigating against use of CA2. Exposure to the curative substance, to which CA2 will be added, may cause delayed-type contact hypersensitivity and eye irritation; however, workers will avoid such exposure

if properly equipped with standard protective clothing.

It is therefore considered that occupational exposure to the notified chemical will be low. Health risks from inhalation and skin contact are therefore expected to be minimal due to the low toxicity and vapour pressure of the notified chemical, as well as the infrequency of exposure.

Public Health

Based on the use pattern of CA2, as a component of the curative agent to be imported, it is considered that the notified chemical will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to CA2, the following guidelines and precautions should be observed :

- Safety goggles should be selected and fitted in accordance with Australian Standard AS 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard AS/NZS 1337 (Standards Australia/Standards New Zealand, 1992);
- Industrial clothing should conform to the specifications detailed in AS 2919 (Standards Australia, 1987) and AS 3765.1 (Standards Australia, 1990);
- Impermeable gloves should conform to AS/NZS 2161.2 (Standards Australia/Standards New Zealand, 1998);
- All occupational footwear should conform to AS/NZS 2210 (Standards Australia/Standards New Zealand, 1994c);
- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the curative agent was provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994b).

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. In particular, secondary notification will be required if the annual volume of introduction exceeds one tonne.

16. REFERENCES

National Occupational Health and Safety Commission (NOHSC, 1994a) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

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

Standards Australia (1987) Australian Standard 2919-1987, Australian Standard Industrial Clothing. Standards Australia, Sydney.

Standards Australia (1990) Australian Standard 3765.1-1990, Australian Standard Clothing for Protection Against Hazardous Chemicals Part 1: Protection Against General or Specific Chemicals. Standards Australia, Sydney.

Standards Australia (1994) Australian Standard 1336-1994, Australian Standard Eye Protection in the Industrial Environment. Standards Australia, Sydney.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Australian/New Zealand Standard Eye Protectors for Industrial Applications. Standards Australia and Standards New Zealand, Sydney/Wellington.

Standards Australia/Standards New Zealand (1994) Australian/New Zealand Standard 2210-1994, Australian/New Zealand Standard Occupational Protective Footwear. Standards Australia and Standards New Zealand, Sydney/Wellington.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Australian/New Zealand Standard Occupational Protective Gloves Part 2: General Requirements. Standards Australia and Standards New Zealand, Sydney/Wellington.

United States Environmental Protection Agency (USEPA, 1998) ASTER Ecotoxicity profile: benzenemethanamine, N-hydroxy-N-(phenylmethyl)-. United States Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division, Duluth, Minnesota.