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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

ECA 14713

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**ECA 14713****1. APPLICANT**

Exxon Chemical Company Australia Ltd. 636 St Kilda Road,
Melbourne, Victoria, 3004

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, ECA 14713 is not considered to be hazardous. Therefore, the chemical identity, structural formula, monomers, spectral data, and exact molecular weight have been exempted from publication in the Full Public Report and the Summary Report.

Trade name(s) : **ECA 14713**

Number-average molecular weight: >1000 (calculated)

Maximum percentage of low molecular weight species (molecular weight < 1000):	not determined, theoretically very small or nonexistent
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3. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance at 20°C
and 101.3 kPa:** clear amber-brown liquid

Melting Point: < ambient temperature

Boiling Point: > 100 °C

Specific Gravity	0.92 - 0.96 at 15°C
Density:	933.9 kg/m ³ at 15°C
Vapour Pressure:	negligible
Water Solubility:	0.00089g product/L at 15°C
Partition Co-efficient: (n-octanol/water)	No data were provided for partition coefficient on the grounds that this parameter is only applicable to water soluble chemicals which do not dissociate or associate, and which are not surface active.
Hydrolysis as a function of pH:	not applicable due to low solubility. Data are not available on the hydrolysis of ECA 14713 as a function of pH. However, imidazolines in the presence of moisture will readily hydrolyse back to amide/amine groups. This hydrolysis will occur more easily under alkaline rather than acidic conditions.
Adsorption/Desorption:	not available
Dissociation Constant:	not applicable, does not dissociate
Flash Point:	243°C
Pyrolysis products:	fumes, smoke, oxides of nitrogen, carbon monoxide
Autoignition Temperature:	not determined

Reactivity/Stability: incompatible with strong oxidising agents; imidazoline groups can react with water and revert to amides.
Contact with hot air may darken product.

4. PURITY OF THE CHEMICAL

Degree of purity: 98.1%

Maximum content of residual monomers: none

Toxic or hazardous impurities: none

Non-hazardous impurities: (> 1% by weight)

An impurity is present at a maximum concentration of 2%. As this chemical is not considered hazardous, its identity has been exempted from publication in the Full Public Report and the Summary Report.

Additives/Adjuvants: none

5. INDUSTRIAL USES

ECA 14713 will be imported a component comprising 30.7% (by volume) of an additive mixture in quantities of 10 - 15 tonnes/year of the notified chemical. The additive package will be blended with mineral oil, by lubricant blending companies, to form a two cycle engine oil. This oil is diluted approx 1:50 for use in outboard engines. The material is listed on the US Inventory under the Toxic Substances Control Act.

6. OCCUPATIONAL EXPOSURE

ECA 14713 will be imported in 200L steel drums. Workers involved in the storage and transport of the chemical will have low exposure under normal circumstances.

Workers in lubricant processing plants may be exposed during transfer of material to the system and during system maintenance. Exposure during the blending process itself is expected to be minimal. Workers usually wear chemical resistant gloves and safety glasses.

The blended product contains 8% (v/v) of the notified chemical. Outboard motor mechanics will be exposed to the blended product and to the engine oil diluted with gasoline for use as fuel.

7. PUBLIC EXPOSURE

The public is unlikely to be exposed to the chemical during its importation, blending and repackaging. The chemical is imported in 200L steel drums, blended with mineral oil by lubricant processors and repackaged (8% of the chemical by volume), using automated equipment. It was estimated that waste steel drums may contain up to 2.3 L of the chemical, which could be recycled or disposed by incineration.

The public may be exposed to the chemical in engine oil (8% by volume), or in outboard exhaust fumes (10% unburnt). The most likely forms of exposure are accidental contact with the skin or eye, or inhalation of exhaust fumes, respectively.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

The chemical will be bought into Australia as an additive package which will be imported in 200 L steel drums. The drums will be stored in drum warehouses in Melbourne, Sydney, Brisbane and Perth. Subsequently, they will be sold and delivered to lubricant blending companies for blending into motor oils.

ECA 14713 is to be used as a dispersant in engine oils. It is to be imported as a component in a lubricant additive package and will comprise 30.7% (by volume) of the additive mixture. This additive package is sold to customers for blending with mineral oil to form a two-cycle engine oil, used in outboard engines. The engine oil will contain 8% (volume) of the chemical. These two stroke outboard lubricants are usually mixed at a 1:50 ratio with gasoline for final use as outboard motor fuel.

The company states that the release of ECA 14713 to the environment will be minimal, unless environmental exposure occurs from accidental spillage. Any minimal leakage from product transfer operations is collected and recycled and not released to the environment. During the blending process there is minimal leakage of the chemical and any such leakage is collected and recycled and not released to the environment.

In normal use, two-cycle lubricants are added to the fuel and are burned as part of the combustion process. Unlike crankcase motor oils there is no "used oil" for disposal. This further reduces the scope for release to the environment.

The notifier has estimated that a typical outboard engine emits up to 10% of its fuel/oil mixture unburnt in the exhaust. Therefore, up to 1.5 tonnes per annum of the notified chemical could be released to the environment in the exhaust.

The notifier has stated that empty steel drums that contain the polymer will be removed to a safe place to await appropriate recycling or disposal. An empty 200 litre steel drum would be expected to contain up to 2.3 litres of lubricant additive (or 1.1% of the total drum volume). Therefore, a maximum of 0.17 tonnes per annum of the notified chemical could be extracted as a result of drum cleaning. Incineration of the reconditioned drum washings has been proposed by the notifier. Material that will be disposed by land fill will be sealed in properly labelled drums and disposed of at approved land fill sites.

8.2 Fate

The notified polymer will enter the environment when unburnt fuel containing the polymer is emitted from the exhaust of outboard engines. When hydrocarbons reach the water surface they are likely to spread and drift from their site of deposition depending on the direction and velocity of wind and surface flow.

Evaporation of fuel components depending on their vapour pressure and the prevailing weather conditions may also occur (2). However, evaporation of the notified polymer is unlikely to occur due to its high molecular weight. The polymer is likely to become associated with the sediment because of its limited solubility.

Incineration of drum washings containing the polymer will produce oxides of carbon and nitrogen.

Hydrolysis

The notifier has stated that imidazolines present in the polymer can react with water and revert to amide/amine groups. Also, the notified polymer contains a number of amide linkages that may be susceptible to hydrolysis, although probably less so than the imidazoline.

Biodegradation

The presence of imidazoline and amide moieties in the polymer indicate it would be vulnerable to cleavage in vivo with subsequent elimination. However, the polymer is unlikely to be readily absorbed by living organisms.

Bioaccumulation

The relatively high molecular weight of the polymer indicates it is unlikely to bioaccumulate.

9. EVALUATION OF TOXICOLOGICAL DATA

9.1 Acute Toxicity

Test	Species	Compound	Outcome	Ref
Oral Toxicity	rat	(Related Substance)	LD ₅₀ >5000mg/kg	(3)
Eye Irritation	rabbit	(Related Substance)	Slightly-moderately irritating	(4)
Eye Irritation	rabbit	(Related Substance)	Slightly-irritating	(5)

9.1.1 Oral Toxicity (3)

Five thousand mg/kg body weight of MRD-83-295 (ECA 9586), a chemical related to ECA 14713 was administered by oral intubation to five male and five female Sprague Dawley rats. Animals were observed for a 14 day period.

Clinical signs observed during the study were rales in the five male rats and a discharge from the mouth in one of those rats. No rats showed any abnormal clinical signs after 24 hours. At necropsy, five rats had mottled lungs and one rat had mottled liver. Effects on the lungs were considered related to the method of sacrifice.

The oral LD₅₀ of ECA 9586 was found to be > 5000mg/kg in rats.

9.1.2 Eye Irritation

Two eye irritation studies of related chemicals in rabbits were submitted as part of the notification statement.

a) Study with MRD-83-295 . (4)

A single dose of 0.1ml MRD-83-295 (ECA 9586) was instilled into the right eye of six New Zealand White rabbits (4 female, 2 male). The left eye remained untreated and served as control. The material was allowed to remain in contact with the eye without washing.

Eyes were observed 1, 4, 28, 48 and 72 hours 4 and 7 days post-instillation and reactions graded. Fluorescein examination was used to assess the presence of corneal ulceration at 24 and 48 hours.

There were no reported effects on the cornea or iris of any animal either on observation or on fluorescein examination. Conjunctiva of all animals showed some degree of redness ranging from mild to 'beefy diffuse' red at the one and four hour examination. All redness had cleared from the eyes of all six animals at day 7 when the study was terminated. Slight swelling was reported in all treated eyes which resolved after 48 hours. Some discharge was noted.

MRD-83-295 was found to be slightly irritating to the eye.

b) Study with MRD-71-33. (5)

One hundred mg MRD-71-33 (ECA 4360) was instilled into the left eye of 6 albino rabbits. The right eye was untreated and served as a control. Eyes were observed one, four, 24, 48 and 72 hours and four and seven days after instillation. Fluorescein staining was carried out after 72 hours and seven days.

Moderate redness of the conjunctiva was noted in two animals. The redness cleared at 72 hours and at 4 days. A third animal showed moderate conjunctival redness, clearing at 48 hours. The remaining three animals have slight reddening of the conjunctiva. In all three symptoms had cleared at 72 hours. No corneal damage was reported in any animal. All animals had a slight discharge at one hour.

MRD-71-33 may be concluded to be slightly irritating to the eye.

9.2 Overall Assessment of Toxicological Data

Toxicology data on ECA 14713 was not included in the submission. This is acceptable for polymers with an average number molecular weight > 1000. Some data on related chemicals was submitted. An oral toxicity study and two eye irritation studies found the related chemical(s) to be of low oral toxicity and slightly irritating to the eye.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The notifier has submitted the results of an aquatic toxicity study on the marine invertebrate *Acartia tonsa*. The test material used was ECA 4360, a related polymer, not the notified substance. The 96 hour LC50 was stated to be 68 mg.L⁻¹. However, this end-point is not particularly meaningful as it would appear that nominal concentrations are used and there is no indication of the solubility of the test substance.

The ecotoxicity data provided are adequate for a polymer of greater than 1000 molecular weight.

11. ASSESSMENT OF ENVIRONMENTAL HAZARDS

The loss of the polymer from the drum cleaning process is likely to present negligible hazard to the environment as only 170 kg is likely to be extracted each year and will be incinerated, producing oxides of carbon and nitrogen.

The hazard to the environment from the emission of the polymer from the exhausts of outboard engines is likely to be low because:

The release will be dispersed across Australia's rivers, lakes and coastal waters and the environmental concentration of the polymer should be low;

The expected concentration of the polymer in the receiving waters is likely to be orders of magnitude lower than the critical limits for acute toxicity of aquatic organisms; and

The bulk of this release is likely to become associated with the sediment.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

The public may be exposed to the diluted chemical or the final product, in engine oils or outboard exhaust fumes. However, the bioavailability of the chemical is likely to be low due to its high molecular weight.

Occupational exposure to the notified chemical in 30.7% pure form may take place during transfer of the chemical into the blending process or during maintenance. Exposure to the chemical in the blended product may occur during final repackaging although this is minimised by the use of automated equipment. Exposure during normal situations in transport and storage is unlikely. Some exposure by outboard engine mechanics to the 8% oil when diluting with gasoline or servicing engines will occur.

Empty containers, containing residual liquid or vapours, present a combustion/explosion hazard.

13. RECOMMENDATIONS FOR THE CONTROL OF PUBLIC AND WORKER EXPOSURE

To minimise public and worker exposure to ECA 14713 the following guidelines and precautions should be observed:

- . workers handling ECA 14713 should wear long sleeves, chemical resistant gloves conforming to AS 2161 - 1978 (6), chemical goggles with side shields conforming to Australian Standard 1337 - 1984 (7) and respirators conforming to AS 1715 - 1991 (8)
- . good housekeeping practices should be observed.
- . workers handling ECA 14713 and products containing it should have access to MSDS.
- . containers in which ECA 14713 and products containing it have been stored should not be subjected to sources of heat or ignition.
- . the public should take normal precautions to avoid skin contact with the chemical, and to avoid inhalation of exhaust fumes containing the chemical.
- . empty containers should not be exposed to heat or other sources of ignition.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for ECA 14713 (Attachment 1) was provided in Worksafe Australia format (9). This MSDS was provided by Exxon Chemical Company Australia Limited as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Exxon Chemical Company Australia Limited.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of ECA 14713 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) "Aliphatic Diamines and Higher Amines" in Kirk-Othmer Encyclopedia of Chemical Technology, 1984, 3rd edition.
- (2) Wachs B et al , 1992, "Two-stroke engine lubricant emissions in a body of water subjected to intensive outboard motor operation", The Science of the Total Environment, 116, p59-81.
- (3) Acute Oral Toxicity Study in the Rat. Test Material. MRD-83-295. Data on file Exxon Chemical Company, East Millstone, New Jersey, 09873, USA.
- (4) Ocular Irritation Study in the Rabbit. Test Material MRD-83-295. Data on File, Exxon Chemical Company, East Millstone, New Jersey, 09873 USA.
- (5) Acute Eye - Rabbits, MRD-71-33, Final Report. Data on File, Exxon Chemical Company, East Millstone, New Jersey, 09873, USA
- (6) Australian Standard 2161-1978 *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ, Sydney 1978.
- (7) Australian Standard 1337-1984 *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ, Sydney 1984.
- (8) Australian Standard 1715-1991 *Selection, use and maintenance of Respiratory Protective Devices*, Standards Association of Australia Publ, Sydney 1991.
- (9) Guidance Note for Completion of a Material Safety Data Sheet. [NOHSC : 3001 (1991)], 3rd Edition, October 1991.