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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

TLA-1609

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

TLA—1609

1. APPLICANT

HTX Corporation Pty Ltd of 17th Floor, 360 Elizabeth St, Melbourne, Vic, 3000.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, TLA-1609 is not considered to be hazardous. Therefore, the chemical name, other names, Chemical Abstracts Registry Number (CAS No.), molecular formula, structural formula, and spectral data have been exempted from publication in the Full Public Report and the Summary Report.

Trade names: TLA—1609
Alkenylsuccinimide dispersant in diluent oil

Lowest number-average molecular weight: 5000

Maximum percentage of low molecular weight species (molecular weight < 1000): No polymeric species with molecular weight below 1000 are expected to be present.

Method of detection and determination: At present no analytical methods exist which are specific for this polymer.

3. PHYSICAL AND CHEMICAL PROPERTIES

All physico-chemical data listed below relate to TLA-1609 which is the notified polymer in diluent oil.

Appearance at 20^{0}C and 101.3 kPa:	TLA-1609 is a brown viscous liquid
Viscosity:	300 cSt at 100 ^{0}C
Odour:	slight "petroleum" odour
Melting Point/Boiling Point:	not determined, however estimated to be very high based on the molecular weight
Specific Gravity/Density:	915 kg/in^3
Vapour Pressure:	not provided, however estimated at < 0.13 kPa based on the molecular weight of the polymer
Water Solubility:	not provided, however estimated at < 0.1% w/w based on the molecular weight and structure of the polymer
Partition Co-efficient	not required as this chemical is likely to be highly insoluble in water
Hydrolysis as a function of pH: polymer	not provided as this is not expected to readily hydrolyse at ambient temperature based on the structure of the polymer functionality
Adsorption/Desorption:	not required as this chemical is likely to be highly insoluble in water

Dissociation Constant	expected to be low due to water insolubility
Flash Point:	214^{0}C (Cleveland open cup)
Flammability Limits:	not determined as this chemical has a relatively high flash point
Combustion Products:	carbon monoxide, carbon dioxide, aldehydes and ketones
Decomposition Products:	there are no known degradation products produced under normal use conditions
Autoignition Temperature:	not required as this chemical has negligible vapour pressure
	estimated at greater than 445 C based on molecular weight of both the polymer and diluent oil
Explosive Properties:	does not exhibit explosive properties
Reactivity/Stability:	reacts with strong oxidisers, but not with air, water or under normal heating conditions

4. PURITY OF THE CHEMICAL

Degree of purity: 89.45%

Toxic or hazardous impurities: All hazardous impurities are present at levels below their cut—off values for classification as a hazardous substance (1), and have therefore been granted exemption from this publication.

5. INDUSTRIAL USE

The notified chemical is an alkenylsuccinimide polymer. The alkenylsuccinimide polymer will be imported into Australia as a solution in diluent oil and as a component in lube oil additive packages. It will be used as a dispersant additive in the manufacture of crankcase lubricants by the petroleum and related industries. The dispersants are used to solubilise sludge and inhibit the formation of sludge precursors in lubricants. The crankcase lubricants containing the notified polymer will be used in petrol engines (predominantly passenger car motor vehicles and light commercial vehicles) and diesel engines. Approximately 45% of total diesel oil sales will be to off-highway equipment, comprising 80% mobile trucking equipment and 20% stationary equipment.

Import volumes of this alkenylsuccinimide polymer into Australia are estimated at 50-500 metric tonnes in the first year and 50—1500 metric tonnes per annum in years two to five.

Lubricant additive formulations containing this alkenylsuccinimide dispersant will also be marketed in the United States.

6. OCCUPATIONAL EXPOSURE

The alkenylsuccinimide polymer will be imported into Australia as a solution in diluent oil (containing 25—60 weight % polymer) as the additive package TLA-1609, and as a component in other lube oil additive packages. It will be imported in large 205 litre metal drums, or, in bulk liquid tank containers in approximately 20 metric tonne parcels, or in chemical parcel tankers in approximately 150-400 metric tonne lots. The containers will be transported to approximately 25 locations (storage tanks, warehouses or lube oil manufacturer’s blending plants) by tank cars or tank trucks. At the lube oil manufacturing plants, the additive package will be pumped to tanks for enclosed delivery in blending operations which will result in the production of crankcase motor oils (containing 3-7 weight % polymer).

Worker exposure may occur during the following activities:

- unloading the additive packages from the vessel at the port
- transportation of the containers from the port to the storage tanks, warehouses or lube oil manufacturer's blending plants
- blending operations at the lube oil manufacturer's blending plants
- sampling from ship's tanks and shore tanks at the port, and vessels associated with the lube blending operations such as additive or finished lubricant product storage tanks, isotanks or drums
- filling vessels associated with the lube blending operations
- maintenance of pumps and associated equipment at all locations

Approximately 2-5 workers will be involved with each operation. Worker exposure is estimated at 1 hour/day for the sampling operation, 4 hour/day for tanker loading/unloading and drum filling, and 4 hour/day for maintenance work on approximately 220 days/year.

The notifier states that exposure levels will be minimal during blending operations as they occur in enclosed metered systems.

Mechanics who work on vehicles containing the finished motor oil may also come into contact with the polymer. The number of mechanics involved will depend on the sales of the new polymer.

7. PUBLIC EXPOSURE

There is low potential for public exposure to the notified polymer during shipment and distribution. Blending operations are conducted in enclosed systems and so are also unlikely to result in public exposure. Any accidental liquid releases which arise during industrial processes are to be contained in pits, by solid absorbent, or by other physical means for treatment and disposal by licensed waste companies.

There is moderate potential for exposure to the new chemical in finished motor oil. Persons undertaking vehicle maintenance are likely to make dermal contact with oil containing the notified polymer. There is additional scope for exposure via waste oil stored or disposed of in domestic settings.

8. ENVIRONMENTAL EXPOSURE

Release

The imported drums and parcels of the additive packages are stored at warehouses and storage locations operated by transport companies and chemical storage companies largely in the major capital city environs.

Waste streams containing the notified polymer are confined to slops, washings and spills and contained within bunded areas for adequate treatment or disposal to prevent entry into sewers and waterways.

The notifier stated the spilled material is washed into a separator, a fully enclosed system comprising a series of baffle units and a skimmer to separate oil or immiscible material from the carrier water stream, followed by a unit consisting of adsorbent polypropylene (oleophilic) mats to remove the oil sheen. The water stream is further treated to ensure pH, biochemical oxygen demand, sulphides etc comply with the parameters contained within the EPA (State) license before discharge to the outfall.

The residues from the skimmer unit pass to tanks for settling and dewatering. The oil based layer is incinerated typically as bunker fuel oil. Sludge residues are mixed with activated clay and taken by licensed industrial waste groups for ultimate disposal by land fill or incineration. Oil or product spills containing the notified polymer may also be treated with solid adsorbent and disposed of in the same manner by licensed industrial waste groups.

In the lube oil blending process it is estimated that typically a 0.2% product loss may be experienced or 40 kg blended oil in a 20 t blend batch containing 3—7 wt % of the notified polymer. For example, 3 kg of polymer may be released as slops or washings during transfers to storage tanks and filling lines, unloading additive from drums or bulk road tankers and sampling for testing purposes. These liquid releases are contained and controlled in appropriate compounds or pits for treatment or disposal. Over one year the amount of polymer
released would be —3 t (worst case situation — assuming importation of 1500 tonnes of the notified polymer per year).

The polymer may also be released to the environment through exhaust emissions, leakage and disposal of used oil.

During engine use the chemical is oxidised to combustion products. The amount lost, which is not burned, is probably not measurable, and to the notifier's knowledge has never been determined. The notifier expects this quantity to be no different to that with other engine lubricants.
It should be noted that oil emissions with the exhaust are very low (2) and the level of unoxidised polymer is likely to be higher from oil leakage from crankcase lubricated engines and the disposal of used oil.

Oil leaks have a tendency to accumulate in the environment, resulting in a significant environmental load (2). One-third of the lubricating oil sold is lost during use; some is lost on the pavement surface, in the streets, roads and in car parks. The oil remains on these surfaces until stormwater or the municipal services wash the oil off, when it is transported by stormwater drains to waterways or the ocean of urban zones, or to adjacent soils from roads in non—urban areas (3).

The notifier has stated that losses of the polymer during motor oil changes would not be expected to be any different than losses experienced with other motor oils. Used lubricant handling guidelines stress minimising personal contact and disposal in an environmentally acceptable manner. However, it should be noted a report on used lubricating oil in Australia (4) indicates that lubricating oil not collected for recycling or reuse on site as a fuel or lubricant, amounts to 22% of total sales. The unacceptable methods of disposal of used oil include dust and vegetation control, and dumping in sewers and landfill.

Fate

The notifier has stated that waste polymer from the blending process is prevented from entry into sewers and waterways.

The notified polymer will enter the environment when waste polymer from the blending process is disposed of by land fill or incineration. When the polymer is land filled it is likely to remain at the site of deposition. Leaching of the polymer is unlikely due to its large molecular weight, expected low water

solubility and likely adsorption to soil. Incineration of the polymer is unlikely to produce toxic compounds.
The amount of polymer released to the environment through the exhaust emissions is likely to be low as the chemical is oxidised during combustion and any emissions can be expected to become associated with the soil compartment (including sediment).

Any unoxidised polymer which enters the environment from engine oil leakage and is lost on the pavement surface, in the streets, roads and in the car parks is washed of f (by rain or the municipal services) and is transported by storm water drains in the case of urban zones to waterbodies and becomes associated with the sediment. When the polymer is washed off roads to adjacent soils, it is likely to accumulate at the site of deposition unless erosion transports it to water bodies where it is likely to become associated with the sediment.

The fate of the polymer in lubricating oils lost during use in motor vehicles, diesel trucks compared to of f— highway diesel engines is likely to be different. Where off-highway diesel engines are stationary, they will create a localised effect whereas the effect of motor vehicles will be dispersed over a wider area.

The amount of unoxidised polymer in oil is unclear. However, the potential exists for a significant portion of oil containing the polymer to be disposed of in an environmentally unacceptable manner (eg dust and vegetation control, and dumping in sewers and landfill). Any unoxidised polymer in used oil that is used for dust and vegetation control is likely to remain at the site of application until erosion transports the polymer to waterbodies, where the polymer is likely to become associated with the sediment. The polymer is unlikely to leach when it is dumped at landfills. The dumping of the polymer in sewers is likely to result in the polymer becoming associated with sludge during treatment.

Hydrolysis

The notifier has stated the polymer should not readily hydrolyse at ambient temperature based on the structure of the polymer funtionality. The polymer does contain a number of groups which may be susceptible to hydrolysis. However, it is unlikely that the polymer would be readily degraded by hydrolysis under environmental conditions because of limited solubility.

Biodegradation

No information has been provided by the company. The structure of the polymer indicate it would be vulnerable to cleavage *in vivo* with subsequent elimination. However, the polymer is unlikely to be readily biodegraded under environmental conditions due to insolubility.

Bioaccumulation

The high molecular weight of the polymer (>5000) indicates it is unlikely to bioaccumulate.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicity data were provided for the notified polymer which is acceptable for a synthetic polymer with number-average molecular weight greater than 1000 under the Industrial Chemicals (Notification and Assessment) Act 1989, (the Act). However, toxicity tests on TLA—1605, which contains a polymer related to the notified chemical in TLA-1609, revealed slight skin and eye irritation.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

Since the chemical being notified is a polymer of greater than 1000 molecular weight, environmental effects information is not required under the Act.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Although up to -3 t (worst-case situation) of polymer per annum may by lost from the blending process, the hazard presented to the environment is likely to be low, due to the release being spread over a number of sites across Australia, and the notifier states that waste is prevented from entering sewers and waterways. The disposal of the waste polymer from the blending process by land fill or incineration is unlikely to present a hazard to the environment.

Emissions during engine use are unlikely to present a hazard to the environment as the amount of intact polymer being lost is likely to be very low due to the oxidation of the polymer during combustion.

The hazard to the environment from the leakage of oil from engines and the disposal of used oil containing the polymer in and environmentally unacceptable manner (eg dust and vegetation control, and dumping in sewers and landfills) is likely to be low because:

The release will be dispersed across Australia (predominantly in the urban regions) and the environmental concentration of the polymer should be very low;
The bulk of this release is likely to become associated with soil/sediment;

The toxicity of such polymers is low because of low bioavailability; and where the polymer is contained in urban and rural runoff and enters aquatic environments, the expected very low concentration of the polymer and its high molecular weight (>5000) indicates it is unlikely to present a hazard to organisms inhabiting these environments.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified chemical is a high molecular weight polymer (lowest number—average molecular weight >5000) in diluent oil. It is therefore unlikely to cross biological membranes and is expected to pose a low health hazard. The notified chemical is expected to contain no polymeric species with molecular weight below 1000. Hazardous impurities are present at levels below their cut—off values for classification as a hazardous substance (1) and therefore are unlikely to pose a concern to human safety.

There are no toxicological data available for the notified chemical. However, toxicity studies with a similar chemical product showed slight skin and eye irritancy effects. It is therefore recommended that direct contact with the chemical should be avoided.

TLA—1609 is stable at ambient conditions, has negligible vapour pressure, low water solubility, low flammability and is not explosive. It therefore should not present a significant safety hazard to workers. However, care should be exercised as toxic products are formed upon combustion and the chemical will react with strong oxidisers.

The potential for public exposure is moderate, given that persons undertaking vehicle maintenance are likely to make dermal contact with the notified polymer. However, the molecule is considered unlikely to be absorbed.

Based on the above information, it is considered that TLA-1609 will not pose a significant hazard to public or occupational health and safety when used in the proposed manner.

13 RECOMMENDATIONS

To minimise occupational exposure to the notified polymer in TLA-1609 the following guidelines and precautions should be observed:

Engineering control procedures such as local exhaust ventilation should be used to meet component occupational exposure limits (5) as described in MSDS for TLA—1609 during lube oil blending processes or filling and transfer operations.
Suitable personal protective equipment which complies with Australian Standards should be worn such as chemical—type goggles with face shield recommended to prevent eye contact (6), chemically resistant gloves (7) and protective clothing (8) to prevent skin contact.

Good work practices should be implemented to avoid splashing or spillages.

Good personal hygiene practices, such as washing of hands prior to eating food, should be observed.

A copy of the MSDS for products containing the notified polymer in diluent oil, such as TLA—1609 and other additive packages, should be easily accessible to employees working with products containing the chemical.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for TLA-1609 (Attachment 1) was provided in Worksafe Australia format (9). This MSDS was provided by HTX Corporation Pty Ltd 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 HTX Corporation Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of TLA—1609 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, *Guidance Note for Determining and Classifying a Hazardous Substance,* 2nd Edition, Australian Government Publishing Service Publ., Canberra, 1990.

2. Van Donkelaar P, *Environmental Effects of Crankcase and Mixed Lubrication,* The Science of the Total Enviroment, 92, p165—179, 1989.

3. Vazquez—Duhalt R, *Environmental Impact of Used Motor Oil,* The Science of the Total Enviroment, 79, p1—23, 1989.

4. Australian and New Zealand Environment Council, *Used Lubricating Oil Generation, Recovery and Reuse in Australia,* p11, 1991.