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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

OLOA 2509H

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**OLOA 2509H****1. APPLICANT**

Chevron Chemical Company of 385 Bourke Street MELBOURNE VICTORIA 3000. has submitted a standard notification statement in support of their application for an assessment certificate for OLOA 2509H.

2. IDENTITY OF THE CHEMICAL

OLOA 2509H is a polymer containing aliphatic hydrocarbon and polypropylene moieties, together with a small content of aromatic hydrocarbon.

OLOA 2509H is considered not to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, 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.

Trade Name: OLOA 2509H

Method of Detection and Determination: Gel Permeation Chromatography (GPC) and infrared (IR) spectra were provided by the notifier

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: colourless to clear yellow viscous liquid

Boiling Point: decomposes before boiling

Density: 986.3 kg.m⁻³

Vapour Pressure: 1.33 x 10⁻³ kPa at 25°C

Water Solubility: 3 to 5 mg.L⁻¹ at 25°C (estimated)

Partition Co-efficient (n-octanol/water):	$\log P_{ow} > 7.0$
Hydrolysis as a Function of pH:	not expected to hydrolyse (see comments below)
Adsorption/Desorption:	no data provided (see comments below)
Dissociation Constant:	will not dissociate (see comments below)
Flash Point:	$> 189^{\circ}\text{C}$
Flammability Limits:	not determined
Autoignition Temperature:	$> 200^{\circ}\text{C}$
Explosive Properties:	not explosive
Reactivity/Stability:	will react in the presence of strong oxidising agents; stable with acid and bases

Comments on Physico-Chemical Properties

The water solubility of between 3 and 5 mg.L^{-1} provided by the notifier was estimated from comparisons with the known solubilities of similar alkyl polypropylene oxide polyethers, but the basis of the comparison methods used were not specified in the notification. However, water solubilities may be estimated using accepted approaches based on the measured value of the n-octanol/water partition coefficient, and Lyman *et al* (1) document a number of such predictive equations for a variety of chemical classes. Unfortunately there is no equation in this compilation specific for polyethers such as the new polymer, and the relevant equation for simple ethers (equation 2-8 of 2) which is written as -

$$\log (1/S) = 1.182 \log K_{ow} - 0.935,$$

where S is the water solubility in mol.L^{-1} has to be used here. Taking $\log P_{ow} > 7$, and using a NAMW of around 1 000 g.mol^{-1} for the polymer gives a water solubility estimate of 0.05 mg.L^{-1} (at 25 $^{\circ}\text{C}$). A more general equation which is applicable to a large range of organic chemicals containing both polar and non-polar functionalities (equation 2-14 of reference 1) provides a water solubility estimate of 0.02 mg.L^{-1} . These results are significantly lower than the estimate furnished by the notifier.

The new polymer contains no functionalities which will be susceptible to hydrolysis in the usual environmental pH region where $4 < \text{pH} < 9$.

The n-octanol/water partition coefficient was determined using a reverse phase

HPLC method. Essentially the retention time of the new polymer on a standard C₁₈ column was compared with those for a series of polycyclic aromatic hydrocarbons of known P_{ow}. The high value of Log P_{ow} reflects the high hydrocarbon content of the molecules.

Although no data on adsorption/desorption were provided, the high hydrocarbon content, high n-octanol/water partition coefficient and relatively low water solubility indicate the polymer would adsorb strongly onto the organic component of soils and sediments.

The polymer does not contain any acidic or basic functionalities, and would not dissociate or become protonated under usual environmental conditions.

4. PURITY OF THE CHEMICAL

Degree of Purity: approximately 88%

Toxic or Hazardous Impurities:

<i>Chemical name:</i>	propylene oxide
<i>Weight percentage:</i>	0.005%
<i>CAS No.:</i>	75-56-9

propylene oxide can cause skin, eye and respiratory irritation; it can also cause cancer (2).

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

<i>Chemical name:</i>	polypropylene glycol
<i>Weight percentage:</i>	6%
<i>CAS No.:</i>	25322-69-4

<i>Chemical name:</i>	polypropylene glycol monoallyl ether
<i>Weight percentage:</i>	6%
<i>CAS No.:</i>	9042-19-7

Additives/Adjuvants: none

5. USE, VOLUME AND FORMULATION

The notified polymer initially will be imported at concentrations ranging from 10 to 50% in fuel additive packages. It will be used as a carrier fluid for detergent/dispersant additives in unleaded gasolines. The range of final concentrations of the notified polymer in finished gasoline is 5 to 900 ppm. Carrier fluids of this type in combination with polybutene amines, polybutene succinimides or polyether amines, form deposit control additives which are currently used in the USA to control the formation of port fuel injector deposits and intake valve deposits.

The estimated import volume for the first year is 100 metric tons, increasing up to 500 metric tons in five years.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in 20 000 L isotanks and transported from the docks by road directly to customer sites. Five gasoline marketers will blend the product containing the notified polymer at approximately 20 blending sites.

Four categories of workers may be exposed to the notified polymer in the course of their work. These include workers involved in the transport, blending, quality control and storage of products containing the notified polymer.

During normal working conditions transport and storage workers are unlikely to be exposed to the notified polymer except in the event of an accident.

During formulation of the end-use product, material handlers may be exposed to the notified polymer. Initially the isotank containing the notified polymer will be connected to a storage tank by a four inch 6 to 8 foot flexible hose using cam lock couplings. A worker will be involved in the above operation at each site. Minimal exposure is expected during blending, as the process is enclosed. However, workers may be dermally exposed to the notified polymer while connecting and disconnecting hoses. Eye contact may result from exposure to drips and splashes. Inhalational exposure to the notified polymer is expected to be minimal, as the polymer is not volatile, based on its physico-chemical properties. Normally the area around and under the isotank is cemented and any spills or leaks are drained to an on-site chemical waste water system. The notified polymer and other components such as deposit control additives and aromatic solvents are drawn from their respective storage tanks to a blending tank via a computer control inline process. After blending the liquid is fed into a product storage tank. No exposure is expected during blending, as the process is completely enclosed and fully automated.

Quality control and laboratory workers may be exposed to small amounts of the notified polymer in gasoline during sampling and analysis. Dermal contact is expected to be the main route of exposure for these workers.

Transport workers will handle gasoline containing the notified polymer (5 to 900 ppm) during distribution to service stations and storage facilities via tank trucks. There may be dermal exposure to the notified polymer for short periods during transfer of gasoline, via temporary piping from tank trucks to service station storage tanks. Eye exposure is less likely.

The exposure to consumers, is not likely to be of concern due to very low level of the notified polymer (5 to 900 ppm) in gasoline.

7. PUBLIC EXPOSURE

There is negligible potential for public exposure to OLOA 2509H arising from blending as the process is completely enclosed and full automated. The final blended gasoline will be distributed to service stations and convenience stores by tank truck.

Accidental spills during transportation of the fuel additive package or of the gasoline containing the notified polymer during transportation or spills of gasoline by the general public could result in contamination of soil or streams. In the event of a transport accident, the spill is to be contained.

The finished gasoline product containing the notified polymer will be sold to the public through service stations or convenience stores. A moderate amount of public contact will occur while pumping gasoline into car or motorcycle fuel tanks, or into small engines used for home or garden activity, etc. The most likely route of exposure to the notified polymer will be through the skin. However, the potential for exposure is low, because of brief and intermittent contact, and the concentration of the notified polymer in finished petrol being in the range of 0.05 to 0.0005%.

8. ENVIRONMENTAL EXPOSURE

Release

The notifier indicates that the blending operations are performed at specially constructed sites (around 20 in Australia, all owned and operated by petroleum companies). The additive packages containing the new polymer will be delivered to the blending facilities and then pumped to on site storage tanks. It is anticipated that very little of the additive package (containing between 10 and 50% of the new polymer) will be released during transfer to the storage containers, and a figure of 50 grams per unload was estimated by the notifier. With import and unloading quantities of 100 isotanks per annum, this equates to an annual release of 5 kg of additive, or (at 25% w/w in the additive package) 1.25 kg of the notified polymer. All transfer operations from the storage facility to the (closed) blending equipment (these are typically in line mixers) would be under automatic control, and any spills incurred in the blending operations would be contained within concrete bunds and would be reclaimed or sent to the onsite waste water treatment facilities. After transfer of the additive packages from the isotanks to the storage facilities, the

isotanks are not cleaned, but are sent back with any residual material, for refilling in the USA.

At the petrochemical plant's wastewater treatment facility, the residual hydrocarbon based products are comprehensively separated from the aqueous stream using techniques which include oil/water separation, induced air flotation, sand filtration and possibly biological treatment, after which the treated water is discharged to either municipal sewage or receiving waters. The hydrocarbon based waste is then either incinerated or is removed by oil recycling contractors, while the aqueous stream, now containing very little hydrocarbon based material, is discharged to the sewer.

Finished petrol is transported to service stations etc by bulk rail or road tankers, and distributed to the general public from bowsters. It is estimated that total loss of petrol through transport and transfer operations would be a maximum of 1%. If it is assumed all this is spilt onto the concrete driveways of service stations, then following evaporation of the volatile hydrocarbons, up to 5 tonnes of the notified material could be left on the service station driveways per annum. It is likely that this would be washed into stormwater systems, or possibly sewers where it would be expected to rapidly become associated with sediments because of the anticipated high affinity of the polymer for organic material.

The vapour pressure of the material is very low, so any release to the atmosphere during all transfer operations, or from spilt materials would be low.

Fate

The majority of the material will be burnt with the petrol with evolution of water vapour and oxides of carbon. The notifier indicates that use of the new polymer as an additive for non-leaded fuels will not adversely effect the levels of hydrocarbon, CO, CO₂ or NO_x emissions in exhaust emissions, and claims that use of the new material will reduce these emissions through improved engine performance. However, no data supporting these claims were provided.

The material is not readily biodegradable under aerobic conditions, and a standard biodegradation test [OECD 301A] indicated only 46% degradation after 28 days. However, any material released to the soil or water compartments would rapidly become associated with the organic component of soils and sediments, and could be expected to undergo slow degradation through bacterial action with production of water, oxides of carbon and, under anaerobic conditions, methane.

Although the new material has a high content of low molecular weight oligomers (NAMW < 1 000 g.mol⁻¹), the high octanol/water partition coefficient is expected to preclude significant potential for bioaccumulation.

9. EVALUATION OF TOXICOLOGICAL DATA

9.1 Acute Toxicity

Summary of the acute toxicity of OLOA 2509H

<i>Test</i>	<i>Species</i>	<i>Outcome</i>	<i>Reference</i>
acute oral toxicity	rat	LD ₅₀ > 5 000 mg.kg ⁻¹	3
acute dermal toxicity	rabbit	LD ₅₀ > 5 000 mg.kg ⁻¹	4
skin irritation	rabbit	non-irritant	5
eye irritation	rabbit	slight irritant	6
skin sensitisation	guinea pig	non sensitiser	7

9.1.1 Oral Toxicity (3)

<i>Species/strain:</i>	rat/Fischer 344
<i>Number/sex of animals:</i>	5/sex
<i>Observation period:</i>	14 days
<i>Method of administration:</i>	gavage
<i>Clinical observations:</i>	one male had faecal soiling of the perineum on the day of dosing - recovery by day 2
<i>Mortality:</i>	none
<i>Morphological findings:</i>	none
<i>Test method:</i>	similar to OECD guidelines (8)
<i>LD₅₀:</i>	> 5 000 mg.kg ⁻¹
<i>Result:</i>	the notified polymer was of low acute oral toxicity in rats in a limit test (single dose of 5 000 mg.kg ⁻¹)

9.1.2 Dermal Toxicity (4)

<i>Species/strain:</i>	rabbit/New Zealand White
<i>Number/sex of animals:</i>	5/sex

<i>Observation period:</i>	14 days
<i>Method of administration:</i>	semioclusive gauze dressing; 24 hour treatment
<i>Clinical observations:</i>	erythema and edema were noted in 2 rabbits on day 2 and in one rabbit on day 3; faecal soiling was observed in one rabbit on day 1 and in another on day 2; scaling was observed on the backs of 4 rabbits up to day 9; all observations resolved by day 14
<i>Test method:</i>	similar to OECD guidelines (8)
<i>LD₅₀:</i>	> 5 000 mg.kg ⁻¹
<i>Result:</i>	the notified polymer was of low dermal toxicity in rabbits in a limit test (single dose of 5 000 mg.kg ⁻¹)

9.1.3 Inhalation Toxicity not determined

9.1.4 Skin Irritation (5)

<i>Species/strain:</i>	rabbit/New Zealand White
<i>Number/sex of animals:</i>	3/sex
<i>Observation period:</i>	72 hours
<i>Method of administration:</i>	0.5 ml of pure notified polymer applied to an intact site on the back of each rabbit for 4 hours
<i>Test method:</i>	similar to OECD guidelines (8)
<i>Result:</i>	not a skin irritant; no erythema or oedema observed up to 72 hours after decontamination

9.1.5 Eye Irritation (6)

<i>Species/strain:</i>	rabbit/New Zealand White
<i>Number/sex of animals:</i>	3/sex
<i>Observation period:</i>	72 hours

<i>Method of administration:</i>	0.1 mL of the notified polymer into the conjunctival sac of the left eye
<i>Clinical observations:</i> (unirrigated eyes)	slight conjunctival redness were observed in 5 of the 6 rabbits one hour after dosing and in 4 of the 6 rabbits one day after dosing; all animals appeared normal 48 hours after dosing
<i>Test method:</i>	similar to OECD guidelines (8)
<i>Result:</i>	the notified chemical was a slight eye irritant in rabbits

9.1.6 Skin Sensitisation (7)

<i>Species/strain:</i>	guinea pig/Hartley albino
<i>Number of animals:</i>	20 males (test) 10 males (control)
<i>Induction procedure:</i>	0.4 ml of the notified polymer applied dermally for six hours (right side of thorax) at weekly intervals for three weeks
<i>Challenge procedure:</i>	2 weeks after induction a single application of 0.4 ml of the notified polymer to the left side thorax of the test group and the control group
<i>Challenge outcome:</i>	

Challenge concentration	Test animals		Control animals	
	24 hours*	48 hours*	24 hours	48 hours
100%	**0/20	0/20	0/10	0/10

* time after patch removal

** number of animals exhibiting positive response

<i>Test method:</i>	similar to OECD guidelines (8)
<i>Result:</i>	the notified chemical was not a skin sensitiser to the skin of guinea pigs

9.2 Combined Repeat Dose Oral, Reproductive and Neurotoxicity Study (9)

<i>Species/strain:</i>	rat/Crl:CD BR
<i>Number/sex of animals:</i>	108 males and 84 females
<i>Subchronic toxicity</i>	6/sex/group; in the control and high dose groups 12/sex/group
<i>Neurotoxicity</i>	6 males/group
<i>Reproductive toxicity</i>	12/sex/group
<i>Method of administration:</i>	gavage; the vehicle was peanut oil
<i>Dose/Study duration:</i>	
<i>subchronic toxicity</i>	the test substance was administered daily for a period of 28 days: control: 0 mg/kg/day low dose: 100 mg/kg/day mid dose 300 mg/kg/day high dose 1 000 mg/kg/day
<i>neurotoxicity</i>	the test substance was administered daily for a period of 28 days control 0 mg/kg/day high dose 1 000 mg/kg/day
<i>reproductive toxicity</i>	the test substance was administered to both sexes daily for 28 days prior to mating; dosing was continued for a total of 71 or 72 days in the parental (FO) males; FO females continued to receive the test article until day 4 of lactation control 0 mg/kg/day low dose: 100 mg/kg/day mid dose 300 mg/kg/day high dose 1 000 mg/kg/day
<i>Clinical observations:</i>	no adverse clinical effects were noted in the subchronic toxicity, neurotoxicity (functional observational battery data) or reproductive toxicity (FO reproductive performance, gestation length and parturition were normal) studies; no obvious treatment-related effects were seen in body weight gain or food

	consumption; no adverse effects were noted on F1 live litter size, mortality, viability and sex ratios
<i>Clinical chemistry/Haematology</i>	no effects on haematological profile or clinical chemistry parameters
<i>Histopathology:</i>	no treatment-related macroscopic, microscopic or neuropathological lesions or dose related effects on organ weights were noted at any dose level
<i>Test method:</i>	similar to OECD guidelines (8)
<i>Result:</i>	no organ toxicity observed; no signs of neuro toxicity or reproductive toxicity was observed at any dose;

9.3 Genotoxicity

9.3.1 *Salmonella typhimurium* Reverse Mutation Assay (10)

<i>Strains:</i>	TA 1537, TA 1535, TA 100, TA 98 and <i>Escherichia coli</i> strain <i>uvra</i>
<i>Concentration range:</i>	250 - 10 000 µg/plate
<i>Test method:</i>	similar to OECD guidelines (8)
<i>Result:</i>	not mutagenic in the bacterial strains tested in the presence or absence of metabolic activation provided by rat liver S9 fraction

9.3.2 Micronucleus Assay in the Bone Marrow Cells of the Mouse (11)

<i>Species/strain:</i>	Mice/CD-1
<i>Number and sex of animals:</i>	5/sex
<i>Doses:</i>	0, 1 045, 2 070 and 4 180 mg.kg ⁻¹
<i>Method of administration:</i>	once intraperitoneally; terminated 24, 48 and 72 hours later
<i>Test method:</i>	similar to OECD guidelines (8)
<i>Result:</i>	not clastogenic in mouse bone marrow cells <i>in vivo</i>

9.3.3 Cytogenetic Test on Chinese Hamster Ovary Cells *in Vitro* (12):

Type of cell:	Chinese Hamster ovary cells
Concentration range:	5-1 500 $\mu\text{g}.\text{ml}^{-1}$
Metabolic activation:	Aroclor-induced rat liver S9-mix
Test method:	similar to OECD guidelines (8)
Result:	no biologically relevant increases in cells with structural chromosomal aberrations were observed, with or without metabolic activation; positive controls with reference mutagens gave a statistically significant increase in cells with structural chromosomal aberrations.

9.4 Overall Assessment of Toxicological Data

The notified polymer exhibited low acute oral ($\text{LD}_{50} > 5\,000\text{ mg}.\text{kg}^{-1}$) and dermal ($\text{LD}_{50} > 5\,000\text{ mg}.\text{kg}^{-1}$) toxicity in rats and rabbits, respectively. It was not a skin irritant in rabbits, but caused slight eye irritation in the same species. The notified chemical was not a skin sensitiser when tested in guinea pigs. No signs of toxicity or organ toxicity were observed in combined oral repeat dose, reproductive and neurotoxicity studies. No mutagenicity was observed in bacteria, no clastogenicity were observed in Chinese Hamster Ovary cells *in vitro* and no induction of micronuclei was observed in bone marrow cells of the mouse.

The notified chemical would not be classified as hazardous according to NOHSC's *Approved Criteria for Classifying Hazardous Substances* (13) in relation to acute lethal effects (oral, dermal), irritant effects (skin, eye), sensitising effects (skin) or severe effects after repeat exposure (oral route).

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The following ecotoxicity studies have been supplied by the notifier. The tests were carried out using OECD Test Methods.

The notifier provided a report on the toxicity testing of the new substance OLOA 2509H against Rainbow trout. This test series was performed over a 96 hour period using a static methodology with 80% renewal at 24, 48 and 72 hours. The test was performed in duplicate with controls using ten specimen fish per replicate at a temperature of $12 \pm 1^\circ\text{C}$. The tests were conducted using water accommodation fractions of the test substance made up at a nominal concentrations of 26, 43, 72, 120 and $200\text{ mg}.\text{L}^{-1}$. The individual WAF's were prepared by stirring weighed amounts of the test material (OLOA 2509H) with 35 L

of the water - previously aerated, filtered through carbon filters, and sterilised through exposure to UV light - for approximately 24 hours, followed by a 4 hour settling period. Throughout the tests, a film of the test material was apparent on the surface of each test medium, and the vessels containing the four highest concentration WAFs were cloudy over the initial 24 hour period. Dissolved oxygen levels were always above 7.4 mg.L⁻¹, and forced aeration of the test vessels was not required for maintenance of these levels. Over the 96 hour test period the solution pH dropped from initial values around 8.1 to around 7.5.

The results of these test indicate the material shows some toxicity to the Rainbow trout, and that at exposures to sub-lethal WAFs, the fish displayed signs of loss of equilibrium, lethargy and darkening of colour.

A number of ecotoxicity tests were conducted with a material designated as Experimental Polyglycol XU-13481.01, which according to the information supplied by the notifier is identical, or a very close analogue of the notified polymer OLOA 2509H.

Test	Species	Results (WAF - Nominal)
Acute Toxicity of OLOA 2509H (8)	Rainbow trout <i>Oncorhynchus mykiss</i>	LC ₅₀ (96 h) = 50 mg.L ⁻¹ . NOEC = 26 mg.L ⁻¹ .
Acute Toxicity of XU-13481.01 (8)	Rainbow trout <i>Oncorhynchus mykiss</i>	LC ₅₀ (96 h) = 8.3 mg.L ⁻¹ .
Acute Toxicity of XU-13481.01 (8)	Fathead minnow <i>Pimephales promelas</i>	LC ₅₀ (96 h) >1,000 mg.L ⁻¹ .
Acute Immobilisation of XU-13481.01 (8)	Water flea <i>Daphnia magna</i>	LL50 (48 h) > 1,000 mg.L ⁻¹ .
Growth Inhibition of XU-13481.01 (8)	Algae <i>Scenedesmus subspicatus</i>	34% inhibition at 500 mg.L ⁻¹ . See notes below.

The tests on Rainbow trout were performed over a 96 hour period using a static methodology with renewal at 48 hours. The test was performed in duplicate with controls using ten specimen fish per replicate at a temperature of 12±1 °C. The tests were conducted using WAFs of the test substance made up at a nominal concentrations of 4.7, 9.4, 18.8, 37.5, 75.0 and 150 mg.L⁻¹. The individual WAFs were prepared by stirring weighed amounts of the test material (XU-13481.01) with 35 L of the water - previously aerated, filtered through carbon filters, and sterilised through exposure to UV light - for approximately 21 hours, followed by a 3 hour settling period. Throughout the tests some undissolved test material was apparent in all the test vessels. Dissolved oxygen levels were always above 8.7 mg.L⁻¹ over the 96 hour test period, while the solution pH remained at 7.4±0.1 over the test duration.

After 96 hours 100% mortality was observed at all WAF loadings of 75 mg.L⁻¹ and greater, and that at exposures to sub-lethal WAFs, the fish displayed signs of loss of equilibrium, lethargy and darkening of colour.

As in the test discussed above, these results indicate the material shows some toxicity to Rainbow trout, although the LC₅₀ values are lower than those found in the tests with OLOA 2509H. It is not clear how to reconcile the differences in results obtained in the present test with those discussed above. However, small differences in the molecular weight distribution between the two test materials, or differences in the fish stocks employed (although the fish used in the two distinct test series originated from the same trout farm in California) may possibly account for the discrepancies. The complete mortality after 96 hours exposure to 75 mg.L⁻¹ and greater of the new polymer, together with the LC₅₀ of 8.3 mg.L⁻¹ indicate an unusual dose response curve, but this could possibly be an artefact caused by in-homogeneous dispersion of the test substance, as was apparently encountered with the tests discussed below on Fathead minnow, Daphnia and algal growth.

A similar series of toxicity tests were performed against Fathead minnow, but, as preliminary studies indicated that this species was far less susceptible to the new polymer than the trout, WAF were prepared at nominal loadings of 0 (control), 62.5, 125, 250, 500 and 1 000 mg.L⁻¹. The tests were again conducted in duplicate using ten fish per test vessel, and temperature was maintained at 22±1 °C. Again quantities of undissolved test material were evident in the test vessels. Throughout the test duration dissolved oxygen levels and pH were always within acceptable limits.

Some mortality among the fish was observed, but this was erratic and did not follow the nominal exposure concentrations (ie no dose response). Thus, after 96 hours exposure (nominal) at 62.5 mg.L⁻¹ of the test substance, the mortality rate was 15%, while there was 0% mortality at 125 mg.L⁻¹, 15% mortality at 250 mg.L⁻¹, 0% mortality at 500 mg.L⁻¹, and 5% mortality at 1,000 mg.L⁻¹. No marked sublethal effects were observed, and given the very erratic nature of the mortality pattern, it is probable that those fish which succumbed either ingested or were otherwise exposed to undissolved droplets of the test material. However, it may be concluded from the results that the test material is non-toxic to this species up to the limits of its solubility.

The immobilisation tests with Daphnia were also performed over a 48 hour period under static conditions using WAFs of 0 (control), 15.4, 31.6, 62.7, 125, 250, 500 and 1,001 mg.L⁻¹ at a temperature of 20±1 °C. The test at each WAF was conducted in triplicate with a control using ten Daphnia per test vessel. Low mortality (maximum of 6.7% at nominal exposure of 62.7 mg.L⁻¹) among the Daphnia were observed in some of the test vessels, but as with the tests on fathead minnow, no dose response was observed, and since no mortality occurred at the highest nominal loadings (500 and 1 001 mg.L⁻¹), the NOEC was determined as 1,001 mg.L⁻¹.

Tests on algal growth inhibition were also performed over a 96 hour period with WAFs made up at the nominal concentrations of 0 (control), 30, 70, 150, 260, 500 and 1 000 mg.L⁻¹, and at a temperature of 24.8±0.2 °C. The tests were conducted

in triplicate, and the effects of the test material on algal growth ranged from an increase of 8% in growth rate at a nominal loading of 30 mg.L⁻¹ to inhibition of 34.4% at a nominal loading of 500 mg.L⁻¹. These data indicate that exposure of green algae to between 5 and 10 times the test substance's water solubility will have no adverse effect on growth.

The ecotoxicity tests indicate that the new material is non toxic to most fresh water organisms up to the limits of its solubility. However, the material appears to display some toxicity to sensitive species such as Rainbow trout.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The environmental hazard from the notified polymer is low when it is blended into petrol and used in the manner indicated by the company. There is little potential for significant release of the material during the blending operations which will be performed at dedicated petrochemical facilities. Some release will inevitably occur as a result of petrol spills etc during distribution to motorists, and this may find its way into stormwater or sewer systems as a consequence of wash down from concrete service station aprons.

The new substance shows some toxicity to sensitive aquatic species such as Rainbow trout, although apparently it is non-toxic to water fleas and algae up to the limits of its solubility. However, the polymer has low water solubility and a high octanol/water partition coefficient ($\text{Log } P_{\text{ow}} > 7$), and consequently if released to the soil or water compartments is expected to bind strongly to, and become associated with the organic component of soils and sediments. This will mitigate any toxic potential of the material.

The material is not readily biodegradable, but nevertheless if released is expected to be slowly degraded through both aerobic and anaerobic biological action. Most of the material will be destroyed by combustion in the cylinders of automobile engines with production of water vapour and carbon oxides.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer has a molecular weight of less than 1 000 with a low percentage (0.4%) of low molecular species less than 500. The molecular weight is determined to be sufficiently high to limit transmission across biological membranes, despite the fact that the notified polymer has low water solubility and high log partition coefficient, indicating a high potential for bioaccumulation. The notified polymer has low vapour pressure and this will reduce the potential for inhalational exposure to vapours.

The notified polymer has a low oral and dermal toxicity when tested with rats and rabbits, respectively. A repeat dose study indicated no dose related and/or deleterious effects up to the high dose of 1 000 mg.kg⁻¹.day⁻¹. There was no evidence of skin irritation, but minimal irritation was detected in the rabbit eye

irritation study. These effects were reversible and were insufficient to require a hazard classification according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (13). A skin sensitisation study in guinea pigs showed no evidence of sensitisation potential. All genotoxicity studies including an *in vivo* mouse micronucleus assay were negative.

Occupational exposure will be greatest during connecting and disconnecting of hoses and during quality control checks by laboratory workers. Dermal contact is expected to be the main route of exposure; eye contact and inhalational exposure are less likely. The latter will be limited because of the low volatility of the notified polymer. The toxicological profile and mode of use of the notified polymer indicate that substantial risks through occupational exposure to the notified polymer are unlikely. However, potential for slight eye irritation is of concern where splashing may occur during handling of the notified polymer. The use of suitable eye protection during handling the product containing the notified polymer is needed.

Workers should be advised on the product Material Safety Data Sheets (MSDS) that the mineral oil in the product containing the notified polymer may cause skin, eye and respiratory irritation. In addition, inhalation exposure to the mineral oil mist or vapour will need to be controlled in accordance with NOHSC Exposure Standard for *Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*.

No significant public exposure to the notified polymer in OLOA 2509H is anticipated during transport and product formulation. Members of the public may, however, make dermal contact with the notified polymer when using gasoline which contains OLOA 2509H. Inhalation exposure is expected to be minimal, as the notified polymer is not expected to be volatile. Where exposure does occur, the notified polymer is unlikely to pose a significant hazard given its low toxicity and low concentration in gasoline for consumer use.

13. RECOMMENDATIONS

To minimise occupational exposure to OLOA 2509H the following guidelines and precautions should be observed:

- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (14) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (15);
- Industrial clothing should conform to the specifications detailed in AS 2919 (16);
- Impermeable gloves or mittens should conform to AS 2161 (17);
- All occupational footwear should conform to AS/NZS 2210 (18);

- 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.

In addition, The Worksafe Australia document *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards* (19) should be used as a guide in the control of mineral oil vapours or mists generated during the use of the notified polymer. Workplace monitoring for this component should be carried out on a regular basis to ensure that exposure standards are not exceeded.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (20).

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

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