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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME  
(NICNAS)**

**FULL PUBLIC REPORT**

**Stock 3336**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Water Resources.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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## **TABLE OF CONTENTS**

FULL PUBLIC REPORT .....	3
1. APPLICANT AND NOTIFICATION DETAILS .....	3
2. IDENTITY OF CHEMICAL .....	3
3. COMPOSITION.....	4
4. INTRODUCTION AND USE INFORMATION.....	4
5. PROCESS AND RELEASE INFORMATION.....	4
5.1. Distribution, transport and storage.....	4
5.2. Operation description.....	5
5.3. Occupational Exposure .....	5
5.4. Release.....	6
5.5. Disposal .....	6
5.6. Public exposure.....	6
6. PHYSICAL AND CHEMICAL PROPERTIES.....	6
7. TOXICOLOGICAL INVESTIGATIONS .....	10
7.1. Acute toxicity – oral .....	10
8. ENVIRONMENT.....	11
8.1. Environmental fate.....	11
8.1.1. Ready biodegradability .....	11
8.1.2. Bioaccumulation .....	12
8.2. Ecotoxicological investigations .....	13
8.2.1. Acute toxicity to fish.....	13
8.2.2. Acute toxicity to aquatic invertebrates.....	14
9. RISK ASSESSMENT .....	15
9.1. Environment .....	15
9.1.1. Environment – exposure assessment.....	15
9.1.2. Environment – effects assessment .....	15
9.1.3. Environment – risk characterisation.....	15
9.2. Human health.....	15
9.2.1. Occupational health and safety – exposure assessment .....	15
9.2.2. Public health – exposure assessment.....	15
9.2.3. Human health – effects assessment.....	15
9.2.4. Occupational health and safety – risk characterisation .....	16
9.2.5. Public health – risk characterisation.....	16
10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS.....	16
10.1. Hazard classification.....	16
10.2. Environmental risk assessment.....	16
10.3. Human health risk assessment .....	16
10.3.1. Occupational health and safety.....	16
10.3.2. Public health.....	16
11. MATERIAL SAFETY DATA SHEET .....	17
11.1. Material Safety Data Sheet .....	17
11.2. Label .....	17
12. RECOMMENDATIONS.....	17
12.1. Secondary notification .....	17
13. BIBLIOGRAPHY .....	18

## **FULL PUBLIC REPORT**

<b>Stock 3336</b>
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### **1. APPLICANT AND NOTIFICATION DETAILS**

#### APPLICANT(S)

Mobil Oil Australia Pty Ltd (ABN 88 004 052 984)  
12 Riverside Quay  
Southbank Vic 3006

#### NOTIFICATION CATEGORY

Limited-small volume: Polymer with NAMW < 1000 (1 tonne or less per year).

#### EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name

Other Name

CAS Number

Structural Formula

Molecular Formula

Molecular Weight

Polymer Constituents

Spectral Data

Import Volume

Use

Hazardous Impurities/Residual Monomers

#### VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Adsorption/Desorption

Hydrolysis at a Function of pH

Particle size

Flammability Limits

Autoignition Temperature

Explosive properties

#### PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

#### NOTIFICATION IN OTHER COUNTRIES

None

### **2. IDENTITY OF CHEMICAL**

#### MARKETING NAME(S)

Stock 3336

#### Reformulated & Imported Finished Lubricants marketing names:

Mobilgear SHC 220, 320, 460, 680, 1000, 1500, 3200 & 6800

Mobil SHC 624, 626, 629, 630, 632, 634 & 636

% of Low MW Species < 1000

> 90

#### METHODS OF DETECTION AND DETERMINATION

Remarks UV, MS, IR and GPC data were provided.

### 3. COMPOSITION

DEGREE OF PURITY  
> 99%

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (> 1% by weight)  
None

ADDITIVES/ADJUVANTS  
None

DEGRADATION PRODUCTS  
Product is thermally stable at recommended temperatures and pressures.

Thermal Decomposition:  
Decomposition products depend upon temperature, air supply and the presence of other materials and can include but are not limited to: aldehydes, alcohols, ethers, hydrocarbons, ketones, organic acids and polymer fragments.

During a fire, smoke may contain the original material in addition to combustion products of varying composition. Combustion products may include and are not limited to: carbon monoxide, carbon dioxide and water.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES  
Loss by volatility: Polymer is of low volatility.

Loss by exudation: Not applicable

Loss by leaching: Not relevant under expected use or disposal conditions

### 4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS  
The notified polymer is to be imported in finished lubricants (<0.3% (w/w)).

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	< 1	< 1	< 1	< 1	< 1

USE  
The notified polymer will be used as an additive for industrial gear oils (<0.3% (w/w)).

### 5. PROCESS AND RELEASE INFORMATION

#### 5.1. Distribution, transport and storage

PORT OF ENTRY  
Melbourne

IDENTITY OF MANUFACTURER/RECIPIENTS  
Mobil Oil Australia Pty Ltd.  
Quality Packaging Services Pty Ltd of 535 Somerville Road, Sunshine Victoria

#### TRANSPORTATION AND PACKAGING

The finished lubricants will be stored in imported shipping containers and, after repackaging, in smaller 1-5 litre plastic containers, which will be stored in a covered bunded area in accordance with State legislation.

Finished lubricant containing the notified polymer will be classified as a C2 substance (a combustible liquid that has a flash point of greater than 150°C) according to AS1940 (Australian standard for "The storage and handling of flammable and combustible liquids").

### 5.2. Operation description

The notified polymer will not be manufactured in Australia, but will be imported in final formulated lubricant(s).

#### *Repackaging of final lubricants from shipped drums*

The imported finished lubricants containing notified polymer will on rare occasions be repacked from 180 kg & 170 kg drums to 1-4 litre plastic containers via a semi-automated dispensing process or to Intermediate Bulk Containers. The bung on the drum is opened and a pump line inserted into the drum and then it is auto-pumped to smaller containers and capped automatically at the completion of the run for smaller packs and manually capped for the IBCs. Packaging workers will place these smaller packages manually into cardboard cartons, placed in turn on pallets. IBCs and pallets of smaller packs will be transferred to the general warehouse area for storage until they are transported for use. Prior to the initial run of repacking, a sample is taken from the nozzle header and sent to a laboratory for QC checking. At completion of checking all lines will be flushed with the next product to a slops tank. Slops will be sent for recycling. Minimal residue will be left in the steel drum after pumping. Drums will be bunged & sent to a drum recycler.

#### *Industrial use*

During industrial use, the lubricants will be applied in various gear equipment applications depending upon manufacturers' instructions and via internal procedures. Methods of delivery to gears can be via pump or by direct pouring of containers. The volume used in top-ups and the frequency of oil changes will vary significantly between operations & equipment. Used oil will be collected via reservoirs and are expected to be disposed of in accordance with State and Local government regulations.

### 5.3. Occupational Exposure

#### *Number and Category of Workers*

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Waterside, transport and warehouse workers	2-3	1 hour/day	Every 4 months
Re-packaging workers	1	6 hrs/repackage run	Every 4 months
Laboratory workers	1	0.5 hr/sample	Every 4 months
Industrial end user	high	variable	variable

#### *Exposure Details*

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached. Should a spill occur, it is expected to be contained and collected using suitable absorbents and placed into suitable containers for recovery or disposal in accordance with the MSDS and State and Local government regulations.

One worker will be exposed to the notified polymer (<0.3% (w/w)) during repackaging of polymer in finished lubricant from drums. The potential exposure to notified polymer would be via skin and eye contact due to the residues and spillages/splashes during connecting/disconnecting pump lines and QC sampling. Exposure during equipment maintenance and cleaning are anticipated to be less frequent and in smaller quantities. The workers will wear suitable protective clothing, impervious gloves, safety glasses with side shields or chemical goggles. All work will be done in a well ventilated area.

One worker will be exposed to analysis of finished blended lubricants as a Quality Control check. Dermal and ocular exposure to the notified polymer at concentrations <0.3% (w/w) is possible if there are splashes or spills during the analysis. Laboratory workers will wear laboratory coats, safety glasses and nitrile gloves when analysing samples.

A large number of industrial workers will be the end users of the gear lubricants. The lubricants will be used regularly by workers in large and small facilities to top up reservoirs or, less frequently, as a complete lubricant change in gear boxes. Exposure of hands & eyes to the notified polymer (<0.3% (w/w)) is likely, but would be minimised by the use of personnel protective equipment, good industrial hygiene and good work practices.

#### **5.4. Release**

##### **RELEASE OF CHEMICAL AT SITE**

It is expected that none of the notified polymer in finished lubricant products will be released during transport except from unanticipated release.

During repackaging, the product is repacked into smaller containers. Significant release of product containing the notified polymer is not expected as the process is semi-automated and will be done at a very low frequency. Any spills will be contained within appropriate catchments (i.e. catch pans, bunds) and the spilt material will be soaked up with absorbent material then incinerated at approved facilities or transferred to a slop tank for recycling.

Residual amounts of lubricant will be left in import drums containing <1% of product (<6.0 g of notified polymer), but it is expected that the empty drums will be properly bunged and sent to a drum reconditioner.

##### **RELEASE OF CHEMICAL FROM USE**

During use of notified polymer in finished lubricants, the product will be contained within the enclosed gear cases and release is expected to be low. It is expected that there will be residue left in containers, IBCs & pails/drums. It is expected that drums will be sent to a drum reconditioner and that any pails and small packs will be disposed of in accordance with State regulations. It is expected an empty IBC will be collected by the manufacturer from the place of use for recycling.

It is expected that all disposal will occur in accordance with MSDS instructions & State regulations, but based on a worst case scenario it could be expected that a maximum of 3 kg annually of notified polymer could end up in landfill via disposal of containers.

#### **5.5. Disposal**

Empty drums are expected to be completely drained, properly bunged and returned to a drum reconditioner. All IBCs are expected to be picked up by the manufacturer and recycled. All containers are expected to be disposed of in an environmentally safe manner in accordance with State regulations.

Gear oils are changed infrequently and it is assumed that skilled tradesmen will be undertaking all maintenance of equipment. Any used oil generated from engine repair or changeover is likely to be disposed of in accordance with State regulations by incineration or to sealed landfill.

#### **5.6. Public exposure**

The imported polymer is intended for industrial use only and that usage outside the industry (DIY (do-it-yourself) enthusiasts) will be rare or under conditions similar to those of industrial users.

Public exposure to the notified polymer in products as a result of transportation within Australia is unlikely unless there is an accident. The Material Safety Data Sheets supplied for the products containing the notified polymer have instructions for clean-up and disposal of any accidental spills and therefore public exposure as a result of a transport accident is likely to be negligible.

## **6. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C and 101.3 kPa**

Viscous liquid

<b>Melting Point/Freezing Point</b>		< -50°C
METHOD	OECD TG 102 Melting Point/Melting Range. EC Directive 92/69/EEC A.1 Melting/Freezing Temperature.	
Remarks	Method: Differential Scanning Calorimetry. The test substance did not undergo freezing at temperatures down to -50°C	
TEST FACILITY	Covance Laboratories Ltd. (2006a)	
<b>Boiling Point</b>		> 300°C
METHOD	OECD TG 103 Boiling Point. EC Directive 92/69/EEC A.2 Boiling Temperature.	
Remarks	Method: Differential Scanning Calorimetry. The test substance did not boil at temperatures up to 400°C, but decomposition commenced from ca. 300°C.	
TEST FACILITY	Covance Laboratories Ltd. (2006a)	
<b>Density</b>		979 kg/m <sup>3</sup> at 20°C
METHOD	OECD TG 109 Density of Liquids and Solids. EC Directive 92/69/EEC A.3 Relative Density.	
Remarks	Determined with a density meter	
TEST FACILITY	Covance Laboratories Ltd. (2006a)	
<b>Vapour Pressure</b>		ca. 1.245 x 10 <sup>-8</sup> kPa at 20°C. ca. 1.898 x 10 <sup>-8</sup> kPa at 25°C.
METHOD	OECD TG 104 Vapour Pressure. EC Directive 92/69/EEC A.4 Vapour Pressure.	
Remarks	Evaluated in duplicate by the Knudsen Effusion technique with test temperatures between 60°C and 80°C.	
TEST FACILITY	Covance Laboratories Ltd. (2006a)	
<b>Water Solubility</b>		ca. 3.6 g/L at 20°C
METHOD	OECD TG 105 Water Solubility. EC Directive 92/69/EEC A.6 Water Solubility.	
Remarks	Using the shake flask method with 11 days equilibration at 20°C and GC-MS detection, 1 g of the notified polymer was added to 100 mL double distilled water. The resultant pH was typically 5.6 (not dissimilar to a water blank). The solubility value covers all quantifiable polymeric isomers of the test substance.	
TEST FACILITY	Covance Laboratories Ltd. (2006a)	
<b>Hydrolysis as a Function of pH</b>		Not determined.
Remarks	Hydrolysis is not expected due to a lack of hydrolysable functional groups.	
<b>Partition Coefficient (n-octanol/water)</b>		log P <sub>ow</sub> = 1.48-3.17 at 20°C
METHOD	OECD TG 107 Partition Coefficient (n-octanol/water) – Shake Flask Method EC Directive 92/69/EEC A.8 Partition Coefficient.	
Remarks	The range of log P <sub>ow</sub> values were observed for the most significant components (different polymeric species) of the test substance.	
TEST FACILITY	Covance Laboratories Ltd. (2006a)	
<b>Adsorption/Desorption</b>		log K <sub>oc</sub> = 1.27 (estimated)
Remarks	Test not conducted. Soil-water partition coefficient was calculated using the PCKOWIN software provided in EPISUITE.	

**Dissociation Constant** No characteristics of dissociation were observed using acid-base titration, which is consistent with the molecular structure and other technical properties

METHOD OECD TG 112 Dissociation Constants in Water.  
Remarks Using acid-base titration and consideration of other parameters.  
TEST FACILITY Covance Laboratories Ltd. (2006a)

**Particle Size** Test is not relevant because the substance is a liquid.

**Flash Point** >110°C at ambient pressure

METHOD EC Directive 92/69/EEC A.9 Flash Point.  
Remarks No flash was observed at temperatures at up to 110°C using the closed cup equilibrium method.  
TEST FACILITY Covance Laboratories Ltd. (2006a)

**Flammability Limits** Test not conducted based high flash point result

**Autoignition Temperature** Self-ignition is not expected.

METHOD ASTM E-659-78  
Remarks Methods referenced for autoignition testing indicate that the test is not applicable to compounds which decompose (ASTM E-659-78). The notified polymer is expected to decompose at approximately 300°C with no further changes up to 400°C.

**Explosive Properties**

METHOD EC Directive 92/69/EEC A.14 Explosive Properties.  
Remarks This notified polymer is expected to decompose at approximately 300°C, with no further changes up to 400°C, based on study test data. The notified polymer is not expected to have explosive properties, since there are no chemical groups that would infer explosive properties, based on a review of the structural formula and information cited in "Bretherick's Handbook of Reactive Chemical Hazards" (Bretherick, 1990).

**Reactivity**

Remarks Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: aldehydes, alcohols, ethers, hydrocarbons, ketones, organic acids and polymer fragments.

During a fire, smoke may contain the original material in addition to combustion products of varying composition. Combustion products may include and are not limited to: carbon monoxide, carbon dioxide and water.

**Viscosity** 39.4 cSt at 40°C and 5 cSt at 100°C

METHOD ASTM D 445  
Remarks No report was provided.  
TEST FACILITY Dow Chemical

**Oxidising Properties** Not oxidising

METHOD EC Directive 92/69/EEC A.21 Oxidising Properties (Liquids)  
Remarks The test substance was found not to possess oxidising properties.  
TEST FACILITY Covance Laboratories Ltd. (2006a)



<b>Colour</b>	150 max.
METHOD	AS1209-05 "Standard test method for Color of Clear Liquids (Platinum-Cobalt scale)"
REMARKS	Scale rating used for the visual measurement of the colour of light coloured liquids
<b>Hydroxyl Number</b>	200-236 mg/g
METHOD	ASTM D 4274

## 7. TOXICOLOGICAL INVESTIGATIONS

<i>Endpoint and Result</i>	<i>Assessment Conclusion</i>
Rat, acute oral LD50 > 2000 mg/kg bw	low toxicity

### 7.1. Acute toxicity – oral

TEST SUBSTANCE	Notified polymer
METHOD	OECD TG 425 Acute Oral Toxicity: Up-and-Down Procedure.
Species/Strain	Rat/ HsdRccHan:WIST
Vehicle	Undiluted
Remarks - Method	No significant protocol deviation.

#### RESULTS

<i>Group</i>	<i>Number and Sex of Animals</i>	<i>Dose mg/kg bw</i>	<i>Mortality</i>
1	5 F	2000	1

LD50 > 2000 mg/kg bw

Signs of Toxicity There was one death following a single oral dose among rats dosed at 2000 mg/kg bw. This animal was humanely killed 15 minutes after dosing due to severity of clinical signs. Clinical signs noted in the animal that was humanely killed were tonic convulsions and increased salivation.

Clinical signs noted in surviving animals on the day of dosing were confined to tremors and pale extremities in one animal and piloerection in one other animal.

Effects in Organs Recovery of surviving rats, as judged by external appearance and behaviour, was completed by Day 2.

Remarks - Results No macroscopic changes were observed at necropsy of the animal that was humanely killed during the study or for animals killed on day 15.

All surviving rats gained weight during the first and second weeks of the observation period.

CONCLUSION The notified polymer is of low toxicity via the oral route.

TEST FACILITY Covance Laboratories Ltd (2006b)

## 8. ENVIRONMENT

### 8.1. Environmental fate

#### 8.1.1. Ready biodegradability

TEST SUBSTANCE	Stock 3336
METHOD	OECD TG 301F Ready Biodegradability: Manometric Respirometry Test.
Inoculum	Fresh activated sludge was used as the inoculum. The activated sludge was obtained from the Clinton Sanitary Wastewater Treatment Plant, Annandale, New Jersey on April 25, 2006. This treatment facility was selected because it deals predominantly with domestic sewage.
Exposure Period	31 days
Auxiliary Solvent	Nil
Analytical Monitoring	HPLC
Remarks – Method	The test substance was administered by direct addition on glass fibre filters. No aqueous stock solutions were prepared for the test substance because of its expected low water solubility. The test substance was evaluated at a mean concentration of 50.1 mg/L. The positive control substance, sodium benzoate, was evaluated at a concentration of 54.1 mg/L.

#### RESULTS

<i>Test substance</i>		<i>Sodium benzoate</i>	
<i>Day</i>	<i>% degradation</i>	<i>Day</i>	<i>% degradation</i>
7	1.5	7	80.69
14	11.13	14	90.78
21	41.33	21	88.98
28	55.98	28	89.25
31	59.70	31	89.25

Remarks – Results	The average percent biodegradation for the test substance was determined to be 56.0% over a 28-day testing period. Since the test substance biodegradation rate had not plateaued at 28 days, the study was extended to 31 days, at which time 59.7% degradation was achieved. Sodium benzoate degraded to 90% at day 14, satisfying the test validity criteria of degrading to >60% at day 14.
CONCLUSION	The notified polymer cannot be classed as readily biodegradable.
TEST FACILITY	ExxonMobil (2006a)

### 8.1.2. Bioaccumulation

#### CONCLUSION

The notified polymer has the potential to be slightly bioconcentrating, based on a calculated log  $P_{ow}$  value of 4.4 estimated with the EPISuite® QSAR program. QSAR analysis was revised using a representative molecular structure of the test substance. The range of measured log  $P_{ow}$  values observed for the different polymeric species representing greater than 90% of the composition of the product (based on % abundance by mass spectroscopy) were between 1.48 and 3.16. The measured log  $P_{ow}$  values and a water solubility value of 3.6 g/L were determined according to the OECD 107 and 105 test methods, respectively, for the product (Covance Laboratories Ltd. (2006a)).

An assessment of the potential of the notified polymer to bioaccumulate based on both octanol water-partition coefficient data and water solubility indicates a low probability for bioaccumulation to occur. For many substances, significant relationships exist between octanol/water partition coefficients and their bioaccumulation in aquatic organisms. log  $P_{ow}$  has also been demonstrated to be correlated with fish toxicity as well as to sorption of chemicals to solids such as soils and sediments. The most likely substances to bioaccumulate are those which are poorly soluble in water, but which are highly soluble in the fatty (lipid) tissues of fish and other organisms. These materials have a strong tendency to partition from water to an organic solvent such as octanol, which serves as a model for fish lipids. They are thus described as having a high octanol-water partition coefficient. As stated in the NICNAS Handbook for Notifiers, Appendix 12, Schedule of Data Requirements, if the chemical has a low octanol-water partition coefficient (ie, log  $P_{ow} < 3$ ), or is readily biodegradable, then no bioaccumulation testing is required. Therefore, given that the majority of the isomers were determined to have log  $P_{ow}$  values of approximately 3.2 or less, and that this material extensively biodegraded to approximately 60% in 31 days in an OECD ready biodegradability test, it is not likely that bioaccumulation of the identified isomers will occur.

## 8.2. Ecotoxicological investigations

### 8.2.1. Acute toxicity to fish

TEST SUBSTANCE	Stock 3336
METHOD	OECD TG 203 Fish, Acute Toxicity Test – Semi Static
Species	Rainbow trout, <i>Oncorhynchus mykiss</i>
Exposure Period	96 h
Auxiliary Solvent	None
Water Hardness	88 mg CaCO <sub>3</sub> /L
Analytical Monitoring	Total Organic Carbon1 (TOC) content
Remarks – Method	This study was performed to evaluate the acute toxicity of the water-accommodated fractions (WAFs) of the test substance to rainbow trout in a 96-hour static test with 24-hour renewals.

The test substance actual loading rates for this study were: 3.3, 6.1, 13, 25 and 50 mg/L. A control treatment consisting of vehicle/dilution water with no test substance was also prepared. Individual treatments were prepared by adding the appropriate amount of test substance to vehicle/dilution water in glass aspirator bottles and stirring on magnetic stirplates with stirbars for 24 hours ( $\pm 1$  hour) during which test material was observed floating on the surface. The mixing vessels were closed with foil-covered stoppers. The solutions were allowed to settle and cool to test temperature in a waterbath for approximately one hour before removing the aqueous portion (WAFs) from the outlet at the bottom of the vessel into two replicate test chambers. Two replicates per treatment were tested. Each replicate contained five fish. Replicate chambers were 8.5 L size glass aquaria containing 5.5 L of solution. Chambers were covered with lids to minimise the potential of contamination, evaporation and/or volatilisation. Observations for mortality and abnormal behaviour or appearance were performed at 3, 24, 48, 72 and 96 hours  $\pm 1$  hour after the beginning of the test. Acute toxicity results are expressed as the Lethal Loading 50 (LL50); that is, the loading rate of test substance in dilution medium which is calculated to result in 50% mortality when compared to the control for the specified time of exposure.

#### RESULTS

Concentration mg/L		Number of Fish	Mortality%				
Nominal	Actual		3 h	24 h	48 h	72 h	96 h
3.3		10	0	0	0	0	0
6.1		10	0	0	0	0	0
13		10	0	0	0	0	0
25		10	0	0	20	20	30
50		10	0	100	100	100	100

LL50 33 mg/L at 24 hours.  
29 mg/L at 48 hours.  
27 mg/L at 96 hours.

NOEC 13 mg/L at 96 hours.

Remarks – Results The 96-hour LL50 was calculated to be 27 mg/L with confidence intervals of 23-33 mg/L. The maximum actual loading rate causing no mortality after 96 hours was 13 mg/L. The minimum actual loading rate causing 100% mortality after 96 hours was 50 mg/L.

CONCLUSION The notified polymer is harmful to fish.

TEST FACILITY ExxonMobil (2006b)

### 8.2.2. Acute toxicity to aquatic invertebrates

TEST SUBSTANCE Stock 3336

METHOD OECD TG 202 *Daphnia* sp. Acute Immobilisation Test

Species *Daphnia magna*

Exposure Period 48 hours

Auxiliary Solvent none

Water Hardness 146 mg CaCO<sub>3</sub>/L

Analytical Monitoring

Remarks – Method

This study was performed to evaluate the acute toxicity of the water-accommodated fractions (WAFs) of the test substance to the daphnid, *Daphnia magna* in a 48-hour static test, conducted according to OECD Guideline 202. The test substance actual loading rates for this study were 44, 93, 199, 450 and 1046 mg/L. A control treatment consisting of vehicle/dilution water with no test substance was also prepared. Individual treatments were prepared by adding the appropriate amount of test substance, via tuberculin and glass syringes, to 2.0 L of vehicle/dilution water in glass aspirator bottles (capacity 2 L) and stirring on magnetic stir plates for 23 hours and 10 minutes. The solutions with some floating test material were allowed to settle before removing the aqueous portions (WAFs) through the outlet at the bottom of the mixing vessels for testing. Four replicates per treatment, each containing five daphnids were tested in 125-mL glass Erlenmeyer flasks filled with approximately 140 mL of solution (no headspace) closed with ground glass stoppers. Observations for immobilisation and abnormal behaviour or appearance were performed at 24 and 48 hours  $\pm$  1 hour after the beginning of the test.

#### RESULTS

Concentration mg/L		Number of <i>D. magna</i>	Number Immobilised	
Nominal	Actual		24 h	48 h
44		20	0	0
93		20	0	0
199		20	9	19
450		20	16	20
1046		20	20	20

EL50 252 mg/L at 24 hours 95% CI: 202-309 mg/L.  
119 mg/L at 48 hours

NOEC 93 mg/L at 48 hours

Remarks – Results Acute toxicity results are expressed as the Effect Loading 50 (EL50); that is, the actual loading amount of test substance in dilution medium which is calculated to result in 50% immobilisation compared to the control for the specified time of exposure. A reliable 48-hour 95% Confidence Interval could not be calculated.

The test substance was observed to be visible on the water surface of the 199, 450 and 1046 mg/L WAFs.

CONCLUSION The notified polymer is not harmful to *Daphnia magna*.

TEST FACILITY ExxonMobil (2006c)

## 9. RISK ASSESSMENT

### 9.1. Environment

#### 9.1.1. Environment – exposure assessment

Release to the aquatic environment is not expected apart from the unlikely event of an accidental spill. Used notified polymer is expected to be disposed of to landfill or more likely by incineration, whereby it will be thermally decomposed. While the notified polymer has potential to bioaccumulate, the lack of release to the aquatic environment, its low import volume mitigates this risk. It is not possible to calculate a Predicted Environmental Concentration.

#### 9.1.2. Environment – effects assessment

The results of two ecotoxicity tests indicates that the notified polymer is harmful to fish. A Predicted No-Effect Concentration (NOEC) has been calculated as follows:

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
LL50 (Fish).	27.00	mg/L
Assessment Factor	1,000.00	
PNEC:	27.00	µg/L

#### 9.1.3. Environment – risk characterisation

Without a PEC, it is not possible to derive a Risk Quotient (Q). However, given the very low potential for environmental exposure, the notified polymer is not expected to pose an unacceptable risk to the aquatic environment.

### 9.2. Human health

#### 9.2.1. Occupational health and safety – exposure assessment

The notified polymer is imported as a component of industrial gear oils (<0.3% (w/w)). In the event of a transport accident, workers can be exposed to the final industrial gear oil products but their physical nature (viscosity) means they would not be distributed widely and waste should be easily collected for disposal.

The limited opportunity for dermal and/or ocular exposure during repackaging is further reduced if workers wearing chemical resistant gloves, safety glasses and long sleeved overalls although the supplied MSDS indicates PPE is not normally required for the imported lubricants. Laboratory staff wearing chemically resistant disposable gloves, safety goggles and long sleeved laboratory coats test small volumes of the industrial gear oils and therefore exposure should be low.

Industrial end users may apply industrial gear oils containing the notified polymer via pump or by direct pouring of containers. Dermal exposure to the industrial gear oils is likely to be common and protective gloves may not necessarily be used. However, the concentration of notified polymer in the gear oils is very low (0.3% (w/w)) and therefore exposure will be low solely on this basis.

#### 9.2.2. Public health – exposure assessment

As for industrial end users, DIY enthusiasts may experience frequent and prolonged dermal exposure to industrial gear oils containing the notified polymer. Protective gloves may not necessarily be used during industrial gear oil applications.

#### 9.2.3. Human health – effects assessment

Acute toxicity

The notified polymer is of low acute toxicity in rats via the oral route based on the study provided.

No other toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

The notified polymer does not contain any functionality which may infer the potential for irritation effects. The notified polymer has a moderately high number average molecular weight (>500). The extent of absorption of compounds with molecular weight over 500 through normal human skin is low (Environmental Health Criteria 235, DERMAL ABSORPTION 2006), and as such the notified polymer is likely to be of low toxicity solely on this basis. Although the notified polymer contains moderate amount of low molecular weight species, it is likely to be of low toxicity based on an analogue chemical.

#### 9.2.4. Occupational health and safety – risk characterisation

The maximum concentration of notified polymer in industrial gear oils is < 0.3% (w/w) but industrial workers can be exposed frequently and for a prolonged period if gloves are not worn. The toxicological profile does not identify any significant hazard at this concentration level and repeated or prolonged exposure will be unlikely to result in any systemic toxicity. Therefore, the risk to workers involved in transport and storage, use or disposal of the notified polymer is considered to be low.

#### 9.2.5. Public health – risk characterisation

DIY enthusiasts may be exposed to industrial gear oils for a prolonged period (several hours) but infrequently (a few times and year). Due to the low concentration of notified polymer in industrial gear oil products and its expected low hazard at this concentration level together with low exposure, the risk of adverse health effects is considered to be low.

### 10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

#### 10.1. Hazard classification

Based on the available data the notified polymer cannot be classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

and

As a comparison only, the classification of notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

	<i>Hazard category</i>	<i>Hazard statement</i>
Chronic hazards to the aquatic environment	3	Harmful to aquatic life with long-lasting effects.

#### 10.2. Environmental risk assessment

The chemical is not considered to pose a risk to the environment based on its reported use pattern.

#### 10.3. Human health risk assessment

##### 10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

##### 10.3.2. Public health

There is No Significant Concern to public health when used in the proposed manner.



## 11. MATERIAL SAFETY DATA SHEET

### 11.1. Material Safety Data Sheet

The MSDS of the products containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

### 11.2. Label

The label for the notified polymer and products containing the notified polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

## 12. RECOMMENDATIONS

### REGULATORY CONTROLS

#### CONTROL MEASURES

##### Occupational Health and Safety

- Where prolonged contact with the skin is unavoidable, wearing of personal protective equipment is recommended in accordance with good industrial hygiene practices.
- Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.
- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

##### Environment

##### Disposal

- The notified polymer should be disposed of by incineration or to secure landfill.

##### Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

### 12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
  - the importation volume exceeds one tonne per annum notified polymer; or

or

- (2) Under Section 64(2) of the Act:
  - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

### 13. BIBLIOGRAPHY

- Bretherick (1990) Bretherick's Handbook of Reactive Chemical Hazards, Fourth Edition. Butterworths, London, UK
- Covance Laboratories Ltd (2006b) Stock 3336: Acute Oral Toxicity Study in the Female Rat (Up and Down Method), Final Report August 2006, Study 2717/001 for ExxonMobil Biomedical Sciences, Inc., Annandale, NJ, USA. Covance Laboratories Ltd, Harrogate, North Yorkshire, England (Unpublished report provided by notifier).
- Covance Laboratories Ltd. (2006a) Notified polymer: Evaluation of Physico-Chemical Properties, Final Report December 2006, Study 2717/002 for ExxonMobil Biomedical Sciences Inc, Annandale, NJ, USA. Covance Laboratories Ltd., Harrogate, North Yorkshire, England (unpublished report provided by notifier).
- Environmental Health Criteria 235, DERMAL ABSORPTION (2006), Published under the joint sponsorship of the United Nations Environment Programme, the International Labour Organization and the World Health Organization, and produced within the framework of the Inter-Organization Programme for the Sound Management of Chemicals (unpublished report provided by notifier).
- Exxon Mobil (2006a) Ready Biodegradability, Study No. 0656479, 15 August 2006, ExxonMobil Biomedical Sciences, Inc. Laboratory Operations, 1545 Route 22 East, P.O. Box 971, Annandale, New Jersey 08801-0971 (unpublished report provided by notifier).
- Exxon Mobil (2006b) Fish, Acute Toxicity Test, Study No. 0656458, 16 August 2006, ExxonMobil Biomedical Sciences, Inc. Laboratory Operations, 1545 Route 22 East, P.O. Box 971, Annandale, New Jersey 08801-0971 (unpublished report provided by notifier).
- Exxon Mobil (2006c) *Daphnia sp.* Acute Immobilisation Test, Study No. 0656442, 15 August 2006, ExxonMobil Biomedical Sciences, Inc. Laboratory Operations, 1545 Route 22 East, P.O. Box 971, Annandale, New Jersey 08801-0971 (unpublished report provided by notifier).
- NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2nd edn [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2004) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.
- United Nations (2003) Globally Harmonised System of Classification and Labelling of Chemicals (GHS). United Nations Economic Commission for Europe (UN/ECE), New York and Geneva.