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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polymer in Infineum C9567**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act* 1989 (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 National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

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Director  
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## **TABLE OF CONTENTS**

FULL PUBLIC REPORT .....	3
1. APPLICANT .....	3
2. IDENTITY OF THE CHEMICAL .....	3
3. POLYMER COMPOSITION AND PURITY .....	3
4. PLC JUSTIFICATION .....	4
5. PHYSICAL AND CHEMICAL PROPERTIES .....	4
5.1 Comments on physical and chemical properties .....	4
6. USE, VOLUME AND FORMULATION .....	5
7. OCCUPATIONAL EXPOSURE .....	5
8. PUBLIC EXPOSURE .....	6
9. ENVIRONMENTAL EXPOSURE .....	7
9.1. Release .....	7
9.2. Fate .....	7
10. EVALUATION OF HEALTH EFFECTS DATA .....	8
11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA .....	8
12. ENVIRONMENTAL RISK ASSESSMENT. ....	8
13. HEALTH AND SAFETY RISK ASSESSMENT .....	9
13.1. Hazard assessment .....	9
13.2. Occupational health and safety .....	9
13.3. Public health .....	10
14. MSDS AND LABEL ASSESSMENT .....	10
14.1. MSDS .....	10
14.2. Label .....	10
15. RECOMMENDATIONS .....	10
15.1 Secondary notification .....	11
16. REFERENCES .....	11

**FULL PUBLIC REPORT****Polymer in Infineum C9567****1. APPLICANT**

Infineum Australia Pty Ltd of 2/6 Riverside Quay SOUTHBANK VIC 3006 (ABN 24084581 863) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in Infineum C9567.

**2. IDENTITY OF THE CHEMICAL**

The chemical name, CAS number, molecular and structural formulae, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

**Marketing names:** Infineum C9567

**Reactive functional groups:** None.

**Molecular weight (MW):**

Number-average MW	Weight-average MW	% MW < 1000	% MW < 500	Method
8187	9790	< 1%	< 1%	GPC

**Structural identification method:** Infrared and nuclear magnetic resonance spectroscopy.

**3. POLYMER COMPOSITION AND PURITY**

Details of the polymer composition have been exempted from publication in the Full Public Report.

**Purity (%):** > 96%

**Hazardous impurities (other than residual monomers and reactants):** < 0.5% of a hazardous impurity.

**Non-hazardous impurities at 1% by weight or more:** < 3% of a non-hazardous impurity.

**Additives/adjuvants:** None.

#### 4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

#### 5. PHYSICAL AND CHEMICAL PROPERTIES

Property	Result	Comments
Appearance	Semi-solid gel.	
Pour point	85°C	
Density	890 kg/m <sup>3</sup>	
Water solubility		Not provided – see comments
Particle size		Not applicable
Flash point	> 130°C	
Explosive properties	No explosive properties.	
Stability/reactivity	Reacts with strong oxidising agents.	
Hydrolysis as function of pH		Not provided – see comments
Partition coefficient		Not provided – see comments
Adsorption/desorption		Not provided – see comments
Dissociation constant		Not provided – see comments

##### 5.1 Comments on physical and chemical properties

The water solubility of the notified polymer was not measured directly, however, the notifier states that on the basis of the chemical structure (ie. saturated hydrocarbon) and high molecular weight, the polymer is expected to be poorly soluble in water. Computer model calculations, using a theoretical chemical structure only 25% the size of the average molecular weight of the notified polymer, indicated the water solubility of the new chemical would be less than 0.001mg/L.

The polymer is expected to have a high solubility in aliphatic/alicyclic hydrocarbon solvents.

The substance is a saturated hydrocarbon and does not contain any functional groups that are subject to either hydrolysis or dissociation in aquatic systems.

## 6. USE, VOLUME AND FORMULATION

**Use:** Wax crystal nucleator additive in winterised diesel fuel.

**Manufacture/Import volume:** 4 tonnes per annum for the first five years.

**Formulation details:** The notified polymer will be imported in a fuel additive package at a concentration of approximately 2%. The concentration in the finished fuel will be 0.002%.

## 7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Transport and storage</i>		
dermal/ ocular	Transport and storage of the fuel additive package contained in 205 L steel drums or bulk liquid containers involving up to 4 workers and 12 truck deliveries per year. Exposure unlikely except in the event of accidental spillage.	Personal protective equipment (PPE) complying with Australian or Australian/New Zealand (AS or AS/NZS) standards including industrial clothing and footwear, gloves (PVC or nitrile) and eye protective as required.
<i>Formulation</i>		
dermal/ ocular	Blending of the additive package into fuel occurs at a refinery or customer storage facility. One to 4 workers per facility pump the additive package through a flexible hose to a transfer system attached to the blending tank and similarly pump the finished diesel fuel to road tankers for transport to distributors, retail outlets, vehicle fleet operators and industrial users. The final concentration of the notified polymer in the finished fuel is 0.002% and it is estimated that 1 kg of material is lost during connection and disconnection of transfer hoses. The additive package in the transfer system is flushed with diesel fuel.	PPE as above. Adequate general and local exhaust ventilation is provided.

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**End use**

dermal/ ocular	Typically the fuel plus additive will be transferred via hoses and couplings from tanker trucks to underground tanks. Exposure of transport drivers and service personnel to 0.002% notified polymer in the final fuel may occur due to spillage. Exposure is expected to be confined to dermal contamination with drips and spills during the connection and disconnection of transfer lines and dipping of tanks. Numbers of workers were not provided.	Typically gloves may be used by tanker drivers to protect against exposure to the diesel fuel but will not necessarily be used by other workers.
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**Disposal**

dermal/ ocular	Less than 1 kg of product will be lost per transfer during formulation. This is expected to be soaked up with absorbent material and placed in a sealable container for disposal in accordance with Local, State or Commonwealth government regulations.  Very little of the diesel fuel containing the notified polymer is expected to require disposal as it will be contained in underground and vehicle fuel tanks.	PPE as described above.
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**8. PUBLIC EXPOSURE**

The fuel additive package containing the notified polymer will not be sold to the public. The public may come into contact with the notified polymer after it is incorporated into diesel fuel. During transfer of the diesel fuel from storage tanks to fuel tanks in vehicles at retail outlets, there is potential for small spillage and skin contact by consumers.

## **9. ENVIRONMENTAL EXPOSURE**

### **9.1. Release**

At the refinery, the notifier indicates that very little C9567 would be lost during transfer operations because transfer is carried out in automated and closed systems. Up to 1 kg of material may be lost during the connection and disconnection of transfer hoses during blending at each transfer. Any incidental losses occurring will be contained and soaked up with inert absorbent material and placed in sealable containers for appropriate disposal in accordance with local, state or national EPA regulations.

Up to 1% fuel additive may be left as residue in empty drums and iso-containers following formulation. Typically this material will be washed out of containers and the containers reused. Assuming an import volume of 4 tonnes per year, an estimated 40 kg of the notified polymer may be present for disposal as residue. The Material Safety Data Sheet (MSDS) indicates that the notified polymer is not suitable for disposal by either landfill or via municipal sewers, and recommends disposal of empty drums through a suitable qualified or licensed contractor. Any residues not recycled will be incinerated.

At retail outlets, diesel fuel stocks are generally stored in closed underground tanks from where the fuel is pumped directly into vehicle fuel tanks. The percentage of fuel accidentally spilt at service stations during transfer will be negligible because it is not economic to sustain such losses through spills. It is anticipated that < 1% of fuel could be accidentally spilt at service stations. Assuming an import volume of 4 tonnes and a polymer concentration of 0.002%, the amount of notified polymer lost due to spills would be < 4 kg per year.

Most of the notified polymer will enter the environment as combustion products during combustion of fuel. In the engine, the polymer contained in the fuel would burn to give carbon dioxide and water. The products of combustion would be released to the environment through vehicle exhaust pipes. These products are expected to comprise only a small fraction of the total amount of combustion products released by fuel burning itself.

The relative amounts of products produced by burning fuel compared to combustion of the fuel additive were provided in the notification dossier as follows: If additive containing 500 tonnes of polymer (0.005%) is used to treat 10 million tonnes of fuel the expected amount of carbon dioxide released upon combustion of the notified polymer is about 1550 tonnes (based on alkane of MW 8000 with 85% carbon content) and the amount of water produced by combustion would be 340 tonnes (based on 15% hydrogen content of polymer). This compares to 30 million tonnes of carbon dioxide produced by combustion of the fuel (based on average diesel fuel paraffin C<sub>19</sub>H<sub>40</sub>) and 7 million tonnes of water produced by combustion of the fuel molecules.

### **9.2. Fate**

Most of the notified polymer in the fuel additive will be destroyed during end use via combustion of the fuel. While no measured data are provided, the notifier expects that the notified polymer will be completely destroyed during combustion because the polymer has a relatively high ratio of H to C (> 97% saturated) and contains only carbon and hydrogen (eg. no aromatics). The polymer is not expected to add significantly to greenhouse gas emissions

given that the combustion products comprise only a small fraction of those produced during combustion of the host fuel.

A small amount of polymer may be released into the environment via landfill. No reports on biodegradation of the notified polymer are provided in the notification dossier. In general the main constituent monomer is not expected to readily biodegrade. The polymer is a branched, saturated hydrocarbon and does not contain any chemical functional groups that are subject to hydrolysis or to dissociation in the presence of water to facilitate breakdown.

No vapour pressure data were provided in the dossier, however, the hydrocarbon solvent preparation containing the notified polymer is volatile and would be expected to evaporate from soil over the course of a few days. Any unevaporated material would be expected to very slowly degrade through abiotic and biotic processes to release gases such as carbon dioxide. Because the notified polymer is insoluble in water, it is unlikely to be mobile in the soil environment under landfill conditions.

Little of the polymer is expected to reach the aquatic compartment, except in the case of transport accidents. A small amount of polymer contained in the end product could be released in situations where transfer spills at service stations are cleaned up inappropriately, for example, by hosing into drainage systems. However, any release of the polymer into the aquatic environment in this way is likely to be small and diffuse. The relative density indicates that if the substance enters waterways it will float on the surface and eventually volatilise from water.

The polymer has a high fat solubility, but is not expected to cross biological membrane or to bioaccumulate given its low water solubility and high molecular weight (Connell, 1990).

## **10. EVALUATION OF HEALTH EFFECTS DATA**

No toxicological data were submitted.

The residual levels of constituents and hazardous impurities would not render the notified polymer hazardous according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

## **11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA**

No ecotoxicological data were provided.

## **12. ENVIRONMENTAL RISK ASSESSMENT**

The proposed usage pattern of the polymer as a fuel additive intended to improve the cold weather operability of diesel fuel is not expected to result in a significant release of the polymer to the environment. Almost all of the notified polymer will be combusted with fuel to release carbon dioxide and water.



Small quantities of the fuel containing the additive may be lost as a result of spills from petrol pumps and residues in containers. Any polymer entering the soil environment is expected to adsorb to soil and to slowly mineralise to water and oxides of carbon through biological processes. Leaching of the polymer from soils is not anticipated.

Release of the polymer to the aquatic environment will be negligible except in cases of major spills during transport. The notified polymer is practically insoluble in water. Any polymer entering the water compartment is expected to float on the surface and to eventually volatilise from water or to adsorb to soils or sediments in or near the water compartment. The polymer is not expected to cross biological membrane or bioaccumulate given its low water solubility and high molecular weight.

### **13. HEALTH AND SAFETY RISK ASSESSMENT**

#### **13.1. Hazard assessment**

The notified polymer fulfils the criteria for a synthetic polymer of low concern and can be considered not to be a health hazard. It will be present at a concentration of 2% in the imported additive package but the additive package formulation is yet to be finalised. However, the MSDS states that a representative formulation will contain 52% distillate (petroleum), hydrotreated, light which is classified as harmful (Xn) and assigned the risk phrases R65: May cause lung damage if swallowed and R66: Repeated exposure may cause skin dryness or cracking.

#### **13.2. Occupational health and safety**

During import and transport of the notified polymer, worker exposure is unlikely except in the event of a spill. Exposure after a spill would be controlled by use of the recommended practices for spillage clean up outlined in the MSDS supplied by the notifier.

During reformulation into fuel and transfer of fuel to road tankers, workers will not experience adverse health effects from their low exposure to the notified polymer as little of the fuel additive package will be spilt during transfer, the notified polymer is at a low concentration and it is not a health hazard.

Tanker drivers and customers of the finished fuel and their employees will receive negligible exposure to the notified polymer because of the low concentration present in the final fuel (0.002%). Therefore, the risk of adverse health effects for these workers arising from exposure to the notified polymer is negligible.

The risk of adverse health effects from exposure to the petroleum distillate in the imported formulation is assessed as low as exposure is likely to be intermittent and there is little chance of workers imbibing the formulation.

### **Conclusion**

The notified polymer is of low concern to human health and safety and no specific risk reduction measures are necessary.

### 13.3. Public health

The public may come into contact with the notified polymer after it is incorporated into diesel fuel. During transfer of the diesel fuel from storage tanks to fuel tanks in vehicles, there is potential for small spillage and skin contact by consumers. Giving that the notified polymer is present at a very low concentration in finished diesel fuel, and that the exposure is likely to be limited, this is unlikely to cause significant public health concerns.

## 14. MSDS AND LABEL ASSESSMENT

### 14.1. MSDS

The MSDS for Infineum C9567 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, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

### 14.2. Label

The labels for the products containing the polymer were not finalised at the time of submission as the product range was still being developed.

## 15. RECOMMENDATIONS

### *Control Measures*

No specific precautions are required to control exposure to the notified polymer. However, in the interests of good occupational health and safety, the following guidelines and precautions should be observed:

#### Occupational Health and Safety

- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then 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.
- The labels for products containing Infineum C9567 should be in accordance with NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b)

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and

control procedures consistent with State and Territory hazardous substances regulations must be in operation.

### **15.1 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 notified polymer is introduced in a chemical form that does not meet the PLC criteria.

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.

## **16. REFERENCES**

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

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

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.