File No: STD/1269

12 November 2007

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Chemical in Petro Products

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:

Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888
Website:	www.nicnas.gov.au

Director
NICNAS

TABLE OF CONTENTS

FULL PUBLIC REPORT

Chemical in Petro Products

1. APPLICANT AND NOTIFICATION DETAILS

The notified chemical was originally notified by Akzo Nobel Chemicals Pty Ltd as STD/1088. Akzo Nobel Chemicals Pty Ltd has allowed BASF Australia Pty Ltd to use the data submitted for STD/1088 for the current notification. As a result details of claims for exempt information and variation to schedule requirements are as submitted by the original notifier.

APPLICANT(S)
BASF Australia Pty Ltd (ABN 62 008 437 867)
500 Princes Highway
Nobel Park VICTORIA 3174

NOTIFICATION CATEGORY
Standard: Chemical other than polymer (more than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:

Chemical Name, Other Names, Structural Formula, Molecular Formula, Spectral data, Purity, Identity of toxic and hazardous impurities and % weight, Identity of non-hazardous impurities and % weight, Identity of additives/adjuvants and % weight, Import volume, Customer names and identity of sites, Concentration of the notified chemical in products.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows:

Melting point, density, vapour pressure, water solubility, dissociation constant, particle size, flash point, flammability, auto ignition temperature, explosive properties, reactivity.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None.

NOTIFICATION IN OTHER COUNTRIES
None.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

The notified chemical is imported as a component of sodium nitrate or sodium nitrite products and is not identified specifically in products:
Sodium nitrate techn. RW (non-food grade)
Sodium Nitrite standard RW

OTHER NAME(S)
Sodium alkylnaphthalenesulfonate

3. COMPOSITION

DEGREE OF PURITY
Not applicable. The notified chemical is a complex mixture.

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
No hazardous impurities are expected to be present above the levels that would result in classification of the notified chemical as a hazardous substance.

4. PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical properties are not available for the notified chemical. However, these properties are available for a Petro product, Petro 11, containing > 60% notified chemical.

APPEARANCE AT 20°C AND 101.3 kPa: Tan powder (amber liquid when in aqueous solution)

Property	Value	Data Source/Justification
Melting Point	>124°C	Measured
Boiling Point	Not determined	
Density	1200 kg/m^3	Measured
Vapour Pressure	< 10^{-9} kPa	Estimated for analogous substances.
Water Solubility	>100 g/L at 20°C	Estimated. Ecotoxicity tests report that the notified chemical was readily soluble at 1 g/L.
Hydrolysis as a Function of pH	Not Applicable	The notified chemical does not contain hydrolysable functionality.
Partition Coefficient (n-octanol/water)	Not determined.	This cannot be readily tested given the surfactant nature of the notified chemical.
Adsorption/Desorption	Not determined.	While soluble, it is expected that the notified chemical may potentially adsorb to soil, based upon its surfactant nature.
Dissociation Constant	Not determined	The pKa for benzene sulfonic acid is calculated to be –2.8
Particle Size	Not determined	Estimated to be in the inspirable range of 10 – 100 μm
Flash Point	>94°C	MSDS
Flammability	Not expected to be flammable.	Estimated based on flashpoint
Autoignition Temperature	Not determined	
Explosive Properties	Not determined	

DISCUSSION OF PROPERTIES
For full details of tests on physical and chemical properties, please refer to Appendix A.

Reactivity
The notified chemical is characterised by surface active properties.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
As a minor component of sodium nitrate or sodium nitrite in 25 kg polyethylene lined bags.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	< 5	< 5	< 5	< 5	< 5

PORT OF ENTRY: Perth, Melbourne and Sydney.

IDENTITY OF MANUFACTURER/RECIPIENTS
Two recipients have been identified in Melbourne and Sydney.

TRANSPORTATION AND PACKAGING
Pallets of 25 kg bags are to be transported from the wharf by road to the customer's site. It is then later redistributed to their customers by road.

USE
As an anti caking agent in cement additive, auto coolant, insulation, fibreglass.

OPERATION DESCRIPTION
The notified chemical is introduced as an anti-caking agent in sodium nitrate or sodium nitrite at < 1%. The sodium nitrate or sodium nitrite may be components of other products whose primary purpose is reliant on the properties of these inorganic salts rather than the notified chemical itself. The products into which the sodium nitrate and sodium nitrite are formulated include diverse products such as cement additives, auto-coolants, insulation and fibreglass.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Unloading from ship at wharf	4	2 hrs/day	4 day/year
Transport from wharf to customer site	1	2 hrs/day	4 day /year
Warehousing at customer site	4	5 hrs/day	4 day /year

Exposure to the notified chemical is low for all workers involved in transport, storage, product manufacture and product disposal primarily on the basis that the notified chemical is present at less than 1%. Exposure of transport and storage workers should only occur in the event of an accident where there is spillage of the crystalline powder of which the notified chemical is a minor component.

The sodium nitrate and sodium nitrite are formulated into a range of products for diverse uses. Therefore, exposure to the notified chemical is controlled in the same fashion as the salts of which it is a component.

The material safety data sheet (MSDS) for sodium nitrate and sodium nitrite recommend the use of local exhaust ventilation on processing machines, therefore, inhalation exposure to the notified chemical on weighing out and manual addition of products to blending vessels, should be low. The same would be true of the blending operation (which should be enclosed) and packing off into the final products. For both sodium nitrate and sodium nitrite specific respiratory, dermal and ocular protection is specified in the MSDS. These measures would serve also to further limit exposure to the notified chemical of process workers.

For end use, the exposure of workers to cement, auto-coolants, insulation and fibreglass would dictate exposure to the notified chemical. Cement, insulation and fibreglass present well known inhalation hazards so that respiratory protection as normally used would also serve to protect workers against the low levels of notified chemical. Auto-coolants would not normally present an inhalation hazard requiring respiratory protection and consequent exposure to the notified chemical should be negligible.

Dermal exposure to cement can be considerable as gloves may not normally be used. However, the notified chemical would be at very low levels in the cement. As a result, dermal exposure would be low for this reason. Dermal exposure to the other products should be intermittent even if gloves are used and the products would contain the notified chemical at very low levels so that exposure can be considered negligible.

6.1.2. Public exposure
The public can potentially come into contact with the notified chemical if the packaging is breached during transport of sodium nitrate and sodium nitrite or to a lesser extent during transport of products which contain these salts as a component. However, the intermittent nature of transport accidents and the low level of notified chemical in products mean that public exposure will be low.

The public may come in contact with the notified chemical via use of cement, auto-coolants, insulation or fibreglass containing sodium nitrate or sodium nitrite. However, the low level of notified chemical in these products should limit public exposure to low levels even in the absence of personal protective equipment.

6.2. Human health effects assessment

Toxicology data were obtained on products containing the notified chemical and on analogue chemicals.

Endpoint and Result	*Assessment Conclusion*
Rat, acute oral LD50 1646 mg/kg bw[a]; 5620 mg/kg bw[b]	harmful
Rat, acute dermal LD50 > 2000 mg/kg bw[c]	low toxicity
Rabbit, skin irritation[a]	moderately irritating
Rabbit, eye irritation[a]	severely irritating
Guinea pig, skin sensitisation – non-adjuvant test[a]	evidence of sensitisation
Dog, repeat dose oral (gavage) toxicity – 90 days[d].	NOAEL = 104.1 mg/kg bw/day
Genotoxicity – bacterial reverse mutation[e]	non mutagenic

[a]Morwet 3008 (>60% notified chemical); [b]Petro 11 (>60% notified chemical); [c]Petro BAF (>60% notified chemical); [d]Petro AG (96 – 98% notified chemical); [e]Petro ULF liquid (30 – 50% notified chemical).

Robust summaries were provided for certain analogues of the notified chemical:

Endpoint and Result	*Test Substance*	*Assessment Conclusion*
Rat, acute oral LD50 1100 mg/kg bw	Analogue #1	low toxicity
Rat, acute oral LD50 1410 mg/kg bw	Analogue #2	low toxicity
Genotoxicity – in vitro Ames test	Analogue #1	negative
Genotoxicity – in vitro Ames test	Analogue #2	negative
Genotoxicity – in vitro chromosomal aberration	Analogue #2	negative
Genotoxicity – in vitro chromosomal aberration	Analogue #3	negative
Genotoxicity – in vitro chromosomal aberration	Analogue #4	weak positive
Genotoxicity – in vivo micronucleus test	Analogue #3	negative

The notified chemical was harmful via the oral route in rats (LD50 = 1646 mg/kg) but was of low acute toxicity via the dermal route. It was a moderate skin irritant but a severe eye irritant in rabbits and was a skin sensitiser in guinea pigs. A 90-day repeat dose oral toxicity study in dogs did not reveal any specific organ toxicity (NOAEL = 104.1 mg/kg bw/day). The notified chemical was not mutagenic in bacteria and close analogues were not convincingly genotoxic in in vitro chromosomal aberration studies in CHO cells and also one of these analogues was not genotoxic in an in vivo mouse micronucleus assay.

Based on an acute oral toxicity study in rats, an eye irritation study in rabbits and a skin sensitisation test in guinea pigs the notified chemical is classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004). The classification and labelling details are:

R22: Harmful if swallowed
R41: Risk of serious eye damage
R43: May cause sensitisation by skin contact

6.3. Human health risk characterisation

6.3.1. Occupational health and safety

At the concentration of notified chemical in the imported products, the products would not be classified as harmful if swallowed, having a risk of serious eye damage or causing sensitisation by skin contact solely on the basis of the notified chemical content being at well under 1%. The end use products also would contain the sodium nitrate or nitrite as minor components and so the concentration of the notified chemical and the consequent risk of adverse health outcomes from ingestion (including after breathing in dust), eye contact or skin contact is further reduced.

The low risk of adverse health outcomes solely from the low level of notified chemical in imported products is further reduced by the use of the controls listed on the MSDS for the imported products sodium nitrate and sodium nitrite as being necessary for handling and storage. Both chemicals are crystalline powders or granules and the MSDS state that local exhaust ventilation should be used in any processes involving their use. The MSDS also suggest the use of eye, skin and respiratory protection. Thus the engineering controls and personal protective equipment expected to be employed when blending sodium nitrate and sodium nitrite into end use products will reduce exposure to the notified chemical below the already low level predicted from its low concentration in the imported products.

The end use products, cement, insulation and fibreglass either necessitate the use of adequate PPE or can be expected to contain the notified chemical in a form which is not bioavailable. Auto-coolants contain nitrite as a minor component to inhibit pitting of the cylinder liner. Thus the notified chemical concentration in auto-coolants can be estimated to be below 0.1%. Therefore, the risk of adverse health effects from the notified chemical content of end use products can be assessed as negligible.

6.3.2. Public health

The low likelihood of public exposure to sodium nitrate or nitrite as a result of a transport accident coupled with the low notified chemical content of imported products suggests a low risk of adverse health outcomes resulting from transport of these products.

The public may come into contact with the notified chemicals in formulated products containing sodium nitrate or nitrite but the notified chemical is either at a low concentration or is not likely to be bioavailable. Thus the risk of adverse health outcomes from end use products is assessed as low.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

Once imported, the notified chemical is transported to reformulation sites. Release of the notified chemical in not expected during normal handling use. Exposure to the notified chemical may come about in the event of packaging breach. The notified chemical is in formulation at a maximum concentration of < 1%, hence should a 25 kg bag containing the notified chemical break and release product, it is expected that a maximum of 50 grams may be release to the environment.

RELEASE OF CHEMICAL FROM USE

As the reformulators act as distributors of the notified chemical it is unknown what the end use will be. It is expected that the notified chemical will be further diluted in other formulations, hence making the maximum concentration of the notified chemical < 1%.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified chemical forms part of packaged material entering the country in 25 kg bags. Any disposal by customers may be a result of packaging breach. Therefore any material spilt form the packaging should be recycled or reused. The actual packaging should be disposed of via an approved landfill site.

7.1.2 Environmental fate

Three biodegradation studies were submitted testing various formulations of the notified chemical, and indicate that the notified chemical is inherently biodegradable. For the details of the environmental fate studies please refer to Appendix C.

7.1.3 Predicted Environmental Concentration (PEC)

As the end-uses of the notified chemical are unknown, it has been assumed that 100% of the annual imported quantity of notified chemical will be disposed of to domestic sewer after use. As such, the following Predicted Environmental Concentration has been calculated.

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Total Annual Import/Manufactured Volume	5,000	kg/year
Proportion expected to be released to sewer	100%	
Annual quantity of chemical released to sewer	5,000	kg/year
Days per year where release occurs	365	days/year
Daily chemical release:	13.70	kg/day
Water use	200.0	L/person/day
Population of Australia (Millions)	20.496	million
Removal within STP	0%	
Daily effluent production:	4,099	ML
Dilution Factor - River	1.0	
Dilution Factor - Ocean	10.0	
PEC - River:	3.34	µg/L
PEC - Ocean:	0.33	µg/L

7.2. Environmental effects assessment

The results from ecotoxicological investigations conducted on the notified chemical are summarised in the table below. Details of these studies can be found in Appendix C.

Endpoint	*Result*	*Assessment Conclusion*
Fish Toxicity	LC50 211.3 mg/L	Very slightly toxic
Daphnia Toxicity	EC50 45.2 mg/L	Harmful
Algal Toxicity	IC50 >100 mg/L	Very slightly toxic
Inhibition of Bacterial Respiration	EC50 133 mg/L	Very slightly toxic

7.2.1 Predicted No-Effect Concentration

Using the EC50 result for the most sensitive trophic level tested (aquatic invertebrates) the following Predicted No Effect Concentration has been calculated.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
EC50 (Invertebrates).	45.20	mg/L
Assessment Factor	100.00	
Mitigation Factor	1.00	
PNEC:	452.00	µg/L

7.3. Environmental risk assessment

Using the PEC and PNEC values calculated above, the Risk Quotient (Q) has been derived as follows:

Risk Assessment	***PEC µg/L***	***PNEC µg/L***	***Q***
Q - River:	3.34	452	0.007
Q - Ocean:	0.33	452	0.001

As the Q value is below 1, for releases to both river and ocean, potential uses which release to domestic sewer are unlikely to pose an unacceptable risk to the aquatic environment.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
Based on the available data the notified chemical is classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)]. The classification and labelling details are:

R22: Harmful if swallowed
R41: Risk of serious eye damage
R43: May cause sensitisation by skin contact

and

As a comparison only, the classification of the notified chemical 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.

	Hazard category	*Hazard statement*
Health		
Acute toxicity	4	Harmful if swallowed
Eye irritation	1	Irreversible effects on the eye
Skin sensitisation	1	May cause allergic skin reaction
Environment		
Toxicity	3	Chronic toxicity

Human health risk assessment
Under the conditions of the occupational settings described and based on the available data, the notified chemical is not expected to pose an unreasonable risk to workers.

When used in the proposed manner and based on the available data, the notified chemical is not expected to pose an unreasonable risk to the public.

Environmental risk assessment
On the basis of the PEC/PNEC ratio, the notified chemical is not considered to pose a risk to the environment, under the potential use pattern described above.

Recommendations

REGULATORY CONTROLS
Hazard Classification and Labelling

- The Office of the ASCC, Department of Employment and Workplace Relations (DEWR), should consider the following health hazard classification for the notified chemical:

  – R22: Harmful if swallowed
  – R41: Risk of serious eye damage
  – R43: May cause sensitisation by skin contact

- Use the following risk phrases for products/mixtures containing the notified chemical:
  – ≥ 25%: R22: Harmful if swallowed
  – ≥ 10%: R41: Risk of serious eye damage
  – 5% ≤ conc ≤ 10%: R36: Irritating to eyes
  – ≥ 1%: R43: May cause sensitisation by skin contact

- Products containing more than the percentage specified of notified chemical and available to the public must carry the following warning statements and safety directions on the label:
  - 5%: Irritant, Avoid contact with eyes
  - 1%: (Repeated) exposure may cause sensitisation, Avoid contact with skin; Wear protective gloves when mixing or using.

CONTROL MEASURES
Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified chemical as introduced:
  - Local exhaust ventilation should be employed at sites of potential dust cloud generation.

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical as introduced:
  - Respiratory protection in the absence of local exhaust ventilation;
  - Impervious gloves;
  - Safety goggles or face shields

  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 chemical are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances*[NOHSC:1008(2004)], workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

Disposal

- The notified chemical should be disposed of to landfill.

Emergency procedures

- Spills/release of the notified chemical should be physically contained, collected and disposed of in an appropriate manner.

Regulatory Obligations

Secondary Notification
This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(2) Under Section 64(2) of the Act; if
  - the function or use of the chemical has changed from anti-caking agent, or is likely to change significantly;
  - the amount of chemical being introduced has increased from < 5 tonnes, or is likely to increase, significantly;
  - if the chemical has begun to be manufactured in Australia;

- additional information has become available to the person as to an adverse effect of the chemical on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

No additional secondary notification conditions are stipulated.

Material Safety Data Sheet
The MSDS of products containing the notified chemical provided by the notifier were reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical properties are not available for the notified chemical as it is not isolated. Values given here are for Petro 11 powder.

Appearance at 20ºC and 101.3 kPa Tan powder (amber liquid when in aqueous solution)

Melting Point/Freezing Point >124ºC

Remarks The melting point of analogous chemicals of lower MW is >124°C.

Density 1200 kg/m^3

Remarks No test report provided.

Vapour Pressure Not determined.

Remarks Expected to be low based on structure. Calculated by EPIWIN 3.12 from representative structure to be less than 10^{-9} kPa.

Water Solubility Soluble in water.

Remarks >100 g/L. No test report provided. Ecotoxicity tests report that the notified chemical was readily soluble at 1 g/L.

Hydrolysis as a Function of pH Not determined

Remarks There are no hydrolysable functionalities in the notified chemical.

Partition Coefficient (n-octanol/water) Not determined

Remarks This cannot be readily tested given the surfactant nature of the notified chemical.

Adsorption/Desorption Not Determined

Remarks While soluble, it is expected that the notified chemical may potentialy adsorb to soil, based upon its surfactant nature.

Dissociation Constant Not determined.

Remarks The pKa for benzene sulfonic acid is calculated to be –2.8.

Particle Size Not determined. Expected to be in the inspirable range (10 – 100 μm).

Flash Point >94ºC

Remarks From MSDS.

Flammability Limits Not expected to be flammable.

Remarks Based on flashpoint.

Autoignition Temperature Not determined.

Explosive Properties Not determined.

Reactivity Not determined.

APPENDIX B: TOXICOLOGICAL INVESTIGATIONS

Toxicology data were obtained on products containing the notified chemical and on analogue chemicals.

B.1. Acute toxicity – oral

TEST SUBSTANCE: Morwet 3008 (>60% notified chemical)

METHOD
- Species/Strain: Rat/HSD:SD
- Vehicle: Water
- Remarks - Method: No significant protocol deviations.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
1	5/sex	750	m:0/5 f:0/5
2	5/sex	1500	m:2/5 f:3/5
3	5/sex	2500	m:5/5 f:3/5
4	5/sex	5050	m:5/5 f:5/5

- LD50: 1646 mg/kg bw (95% confidence level: 1100-2732 mg/kg bw)
- Signs of Toxicity: Clinical signs of toxicity included piloerection, nasal discharge, salivation, diarrhoea, activity decrease, respiratory chirp and gurgle, and ataxia. Other signs included crust around the nose and eyes, and staining of the muzzles. Ptosis, polyuria and gasping were also exhibited in animals that died. Surviving animals were asymptomatic by day 8.

  Animals that died had slightly decreased body weights. Body weight gain in surviving animals was unaffected by the test substance.
- Effects in Organs: Animals that died on test revealed discolouration of the contents of the gastrointestinal tract and gas in the gastrointestinal tract, and matting and staining of the muzzle and genital hair.

  Animals surviving to termination of the study revealed no observable abnormalities.
- Remarks - Results: None.

CONCLUSION: The notified chemical is harmful via the oral route.

TEST FACILITY: Stillmeadow Incorporated (1995a).

B.2. Acute toxicity – oral

TEST SUBSTANCE: Petro 11 (>60% notified chemical)

METHOD: The notified chemical in water was administered to male rats by oral gavage. Food was withheld for 3-4 hours prior to dosage, and was available freely at other times. During the seven-day study period, the animals were closely observed at 0, 1, 4, and 24 hours on the day of administration, and daily thereafter, until day 7, when surviving animals were sacrificed. Autopsies were performed on all animals.
- Species/Strain: Rat/Sprague-Dawley

Vehicle	Water.
Remarks - Method	None.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
1	5/sex	31.6	m:0/5 f:0/5
2	5/sex	100	m:0/5 f:0/5
3	5/sex	316	m:0/5 f:0/5
4	5/sex	1000	m:0/5 f:0/5
3	5/sex	3160	m:0/5 f:0/5
4	5/sex	10000	m:5/5 f:5/5

LD50	5620 mg/kg bw
Signs of Toxicity	Clinical signs of toxicity included depression characterised by inactivity, laboured respiration, ataxia, sprawling of the limbs, ptosis, and depressed righting and placement reflexes. Body weight gain in surviving animals was unaffected by the test substance.
Effects in Organs	Necrosis of animals that died on test revealed congestion of the lungs, kidneys, and adrenals, and irritation of the gastrointestinal tract. Animals surviving to termination of the study revealed no observable abnormalities.
Remarks - Results	None.

CONCLUSION The test substance is of low toxicity via the oral route.

TEST FACILITY Petrochemicals Company Inc (1959).

B.2. Acute toxicity – dermal

TEST SUBSTANCE Petro BAF (>60% notified chemical)

METHOD Skin on the back (~30% of the total body surface) of rabbits was clipped 24 hours prior to application, and in one male and two females, abraded by making four shallow epidermal incisions immediately prior to application of the test article moistened with 3 mL of water. The exposure period was 24 hours, and the skin was then washed with warm tap water. Animals were observed directly after removal of the test substance, and daily for 14 days after exposure.

Species/Strain	Rabbit/New Zealand albino rabbits
Vehicle	None.
Type of dressing	Occlusive
Remarks - Method	None.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
1	1m/2f	2000 mg/kg bw	0

LD50	>2000 mg/kg bw
Signs of Toxicity - Local	Slight to moderate erythema, oedema and atonia was observed on days 1-

	9, subsiding on day 10 in most animals. Slight desquamation, increasing to marked desquamation was noted beginning day 4-5 and continuing through the study. On days 4 to 7 slight fissuring was observed. On day 4 of the study the test areas were leathery to touch and eschar formation was then noted on day 5, continuing throughout the study. Exfoliation began on day 6 to 13 and continued through the study.
Signs of Toxicity - Systemic	One rabbit was observed to have difficulty breathing, nasal discharge, nictating membranes reddened and swollen with marked lacrimation on days 1 through 14.
Effects in Organs	None reported.
Remarks - Results	Application of the notified chemical resulted in marked irritation and some signs of systemic toxicity.
CONCLUSION	The test substance is of low toxicity via the dermal route.
TEST FACILITY	WIL Research Laboratories, Inc (1980).

B.3. Acute toxicity – inhalation

No test reports provided. Exposure to powders is unlikely to be high and continuous during reformulation.

B.4. Irritation – skin

TEST SUBSTANCE	Morwet 3008 (>60% notified chemical)
METHOD	EPA 540/9-84-014 Pesticide Assessment Guidelines, Subdivision F, Hazard Evaluation: Human and Domestic Animals.
Species/Strain	Rabbit/New Zealand White
Number of Animals	6 (1m/5f)
Vehicle	Test material was moistened with water.
Observation Period	14 days
Type of Dressing	Semi-occlusive.
Remarks - Method	None.

RESULTS

Lesion	*Mean Score**	*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
Erythema/Eschar	1.78	3	14 days	1
Oedema	1.56	3	14 days	1

*Calculated on the basis of the scores at 24, 48, and 72 hours for ALL animals.

Remarks - Results	Skin irritation worsened after the initial 72-hour observation period. At 7 days, the average erythema score was 2.67, reducing to 1.67 on day 10. At 7 days, the average oedema score was 1.83, reducing to 1 on day 10. Atonia was observed in one animal at 24 hours, and in all animals at 24 and 72 hours. Eschar and/or desquamation were observed in 5/6 animals on days 7 and 10, and desquamation was observed in two animals at day 14.
CONCLUSION	The test substance is moderately irritating to the skin.
TEST FACILITY	Stillmeadow Incorporated (1995b).

B.4. Irritation – skin

TEST SUBSTANCE	Petro 22 liquid (30-50% notified chemical)
METHOD	Primary Irritation Study – FHSLA
Species/Strain	Rabbit/New Zealand White
Number of Animals	6
Vehicle	None.
Observation Period	72 hours.
Type of Dressing	Occlusive/Semi-occlusive.
Remarks - Method	Two areas on the back of 6 rabbits was clipped and one was abraded by making four shallow epidermal incisions immediately prior to application of 0.5 mL test article to both shaved areas. The exposure period was 24 hours. It is not clear if the skin was washed after 24 hours. Observations were only conducted at 24 and 72 hours.

RESULTS

Lesion	*Mean Score**	*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
Intact skin				
Erythema/Eschar	1	2	24 hours	0
Oedema	0	0	-	-
Abraded skin				
Erythema/Eschar	1.2	2	72 hours	1
Oedema	0.3	1	24 hours	0

*Calculated on the basis of the scores at 24 and 72 hours for ALL animals.

Remarks - Results	On abraded skin, very slight oedema was observed in 3/6 animals at 24 hours; and very slight erythema persisted until 72 hours.
CONCLUSION	The test substance is slightly irritating to the skin.
TEST FACILITY	BTL (1975a).

B.5. Irritation – eye

TEST SUBSTANCE	Petro 22 liquid (30-50% notified chemical)
METHOD	Draize Eye irritation Study – Wolcott Modification.
Species/Strain	Rabbit/New Zealand White
Number of Animals	6
Observation Period	7 days.
Remarks - Method	0.1 mL of undiluted test substance was instilled into the conjunctival sac. In 6 animals, the eyes were unwashed. In 3 animals the eyes were washed 2 seconds after exposure. In 3 animals the eyes were washed 4 secs of exposure. The OECD guideline does not recommend washing of the eye in this test. Thus, only the unwashed results are reported here.

RESULTS

Lesion	*Mean Score**	*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
Conjunctiva: redness	2.0	2	7 days	1
Conjunctiva: chemosis	0.7	2	3 days	-
Conjunctiva: discharge	1.4	3	5 days	-
Corneal opacity	1.1	2	4 days	-
Iridial inflammation	0	-	-	-

*Calculated on the basis of the scores at 24, 48, and 72 hours for ALL animals.

Remarks - Results	Hyperemia (redness) of the conjunctivae was noted in one animal at the end of the test period (7 days). Hyperemia cleared on day 5 or 6 in the other 5 animals.
CONCLUSION	The test substance is moderately irritating to the eye.
TEST FACILITY	BTL (1975b).

B.5. Irritation – eye

TEST SUBSTANCE	Morwet 3008 (>60% notified chemical)
METHOD	EPA 540/9-84-014 Pesticide Assessment Guidelines, Subdivision F, Hazard Evaluation: Human and Domestic Animals.
Species/Strain	Rabbit/New Zealand White
Number of Animals	6 (1m/5f)
Observation Period	21 days
Remarks - Method	0.1 mL by volume (3.64 mg) of test material was placed into the conjunctival sac of each animal. In some animals, the eyes were washed with water for one minute beginning 30 seconds after treatment. The OECD guideline does not recommend washing of the eye in this test. Thus, only the unwashed results are reported here. Eye observations were conducted at 1, 24, 48 and 72 hours, and at 4, 7, 10, 14, 17 and 21 days. Following the 24-hour observation, sodium fluorescein was used to examine the corneas.

RESULTS

Lesion	*Mean Score**	*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
Conjunctiva: redness	2.6	3	21 days	1
Conjunctiva: chemosis	1.3	3	14 days	0
Conjunctiva: discharge	1.8	3	10 days	0
Corneal opacity	1.3	2	21 days	1
Iridial inflammation	0	0	None.	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for ALL animals.

Remarks - Results	All animals had positive fluorescein staining at the 24-hour observation. In one animal, this persisted for 21 days, in the other animals, the positive staining resolved by 7 days. Stippling was apparent in all animals, resolving within 72 hours. Conjunctival redness persisted in two animals for 21 days. This resolved at days 4-14 in the other animals. Corneal opacity persisted in two animals for 21 days. Apparent invasion of the cornea by blood vessels was observed in these animals at days 17 and 21.
CONCLUSION	The test substance is severely irritating to the eye.
TEST FACILITY	Stillmeadow Incorporated (1995c).

B.6. Skin sensitisation

TEST SUBSTANCE	Morwet 3008 (>60% notified chemical)
METHOD	EPA 540/9-84-014 Pesticide Assessment Guidelines, Subdivision F, Hazard Evaluation: Human and Domestic Animals.
Species/Strain	Guinea pig/Hartley Albino
PRELIMINARY STUDY	Maximum Non-irritating Concentration: topical: 75%
MAIN STUDY	
Number of Animals	Test Group: 5m/5f Control Group: 5m/5f
INDUCTION PHASE	Induction Concentration: topical: 400 mg moistened with 0.01 mL water
Signs of Irritation	Very faint to faint erythema was observed at 24 and 48 hours following the first induction. 24 hours after the second and third inductions strong erythema was observed, with or without oedema.
CHALLENGE PHASE	
1st challenge	topical: 75%
Remarks - Method	The test guideline closely follows the OECD guidelines for a Buehler test.

RESULTS

Animal	*Challenge Concentration*	*Average Skin Reactions after challenge*	
		24 h	*48 h*
Test Group	75%	2.25	3
Control Group	75%	0.29	0.79

Remarks - Results	The test material elicited moderate to strong erythema in all induced test-group animals, while the naïve animals exhibited very faint to moderate erythema. At 24 hours 1 control animal had a Draize score of 1 and 5 animals had a score of 0.5 which would rated as negative. By contrast 3 test animals had scores of 2 and the remaining 7 animals had scores of 3. 1-chloro-2,4-dinitrobenzene was used as a positive control and gave the appropriate response.
CONCLUSION	There was evidence of reactions indicative of skin sensitisation to the notified chemical under the conditions of the test.
TEST FACILITY	Stillmeadow Incorporated (1995d).

B.7. Repeat dose toxicity

TEST SUBSTANCE	Petro AG Special (96 – 98% notified chemical)
METHOD	A 90-day feeding study was conducted in Beagle Dogs in 1966 in line with recommendations by the US FDA in 1965.
Species/Strain	Dog/Beagle
Route of Administration	Oral – diet
Exposure Information	Total exposure days: 90 days Dose regimen: 6 days per week
Vehicle	None.
Remarks - Method	Dogs were allowed access to food for 1 hour per day on the 6 days per week feeding times.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw/day*		*Mortality*
		M	F	
I (control)	3\sex	0	0	None
II (low dose)	"	8.7	9.2	"
III (mid dose)	"	29.0	35.8	"
IV (high dose)	"	90.8	104.1	"

Mortality and Time to Death
None.

Clinical Observations
Normal behaviour with no signs of excitation or depression in all dogs. Body weight gain was as expected, ie lower in all animals initially due to handling. One high dose male showed a net weight loss during the study. Food consumption was approximately equivalent in all groups.

Laboratory Findings – Clinical Chemistry, Haematology, Urinalysis
Sporadic non-dose related findings in some parameters were not considered to be due to treatment. Generally, no haematological, renal, hepatic or metabolic effects were found.

Effects in Organs
No effects on organ weights were observed. A range of histopathological findings were noted. However, these were not more prevalent in the treated animals and no specific dose-related effects were identified.

Remarks – Results
None.

CONCLUSION
The No Observed Effect Level (NOEL) was established as the highest dose tested: 104.1 mg/kg bw/day in this study, based on the lack of any treatment related effects at any dose level.

TEST FACILITY Petrochemicals Company (1966).

B.8. Genotoxicity – bacteria

TEST SUBSTANCE Petro ULF (liquid, 30 – 50% notified chemical)

METHOD Modification of method of Ames B N *et al.* (1975).
Plate incorporation procedure

Species/Strain	*S. typhimurium*: TA1538, TA1535, TA1537, TA98, TA100
Metabolic Activation System	Aroclor 1254 induced rat liver microsomal enzymes.
Concentration Range in Main Test	a) With metabolic activation: 0 - 5 µL/plate b) Without metabolic activation: 0 - 5 µL/plate
Vehicle	None.
Remarks - Method	None.

RESULTS

Metabolic Activation	*Test Substance Concentration (µL/plate) Resulting in:*			
	Cytotoxicity in Preliminary Test	*Cytotoxicity in Main Test*	*Precipitation*	*Genotoxic Effect*
Absent				
Test 1	0.31		Not stated	Negative
Present				

Test 1	“	Negative

Remarks - Results: The highest concentration of test compound used in the main test was said to result in approximately 35% survival and a detectable reduction in numbers of spontaneous revertants. Negative controls were within historical limits and positive controls demonstrated the sensitivity of the test.

CONCLUSION: The test substance was not mutagenic to bacteria under the conditions of the test.

TEST FACILITY: EG & G Mason Research Inst (1979).

B.9. Genotoxicity – in vitro – chromosomal aberrations

Two analogues of the notified chemical have been tested for induction of chromosomal aberrations.

TEST SUBSTANCE: Analogue #3

METHOD: OECD TG 473 In vitro Mammalian Chromosome Aberration Test.

Cell Type/Cell Line	Chinese Hamster Ovary (CHO) Cells
Metabolic Activation System	Aroclor 1254 induced rat liver microsomal enzyme fraction.
Vehicle	tetrahydrofuran
Remarks - Method	None.

Metabolic Activation	*Test Substance Concentration (μg/mL)*	*Exposure Period*	*Harvest Time*
Absent			
Test 1	20, 40, 80	16 hours	16 hours
Test 2	20, 40, 80	16 hours	16 hours
Test 3	80, 120, 160	40 hours	40 hours
Present			
Test 1	20, 40, 80	16 hours	16 hours
Test 2	20, 40, 80	16 hours	16 hours
Test 3	80, 120, 160	40 hours	40 hours

All cultures selected for metaphase analysis.

RESULTS

Metabolic Activation	*Test Substance Concentration (μg/mL) Resulting in:*			
	Cytotoxicity in Preliminary Test	*Cytotoxicity in Main Test*	*Precipitation*	*Genotoxic Effect*
Absent				
Test 1	> 160		80	Negative
Test 2			“	“
Test 3		160	“	“
Present				
Test 1	> 160		“	“
Test 2			“	“
Test 3			“	“

Remarks - Results: In the initial experiment without activation and 16-hour harvest there was a statistically significant increase in chromosomal aberrations at one dose level but this was the sole observation and was assumed to have arisen by chance.

The positive and negative controls gave the expected responses.

CONCLUSION The test substance was not clastogenic to CHO cells treated in vitro under the conditions of the test.

TEST SUBSTANCE Analogue #4

METHOD OECD TG 473 In vitro Mammalian Chromosome Aberration Test.

Cell Type/Cell Line	Chinese Hamster Ovary (CHO) Cells
Metabolic Activation System	Aroclor 1254 induced rat liver microsomal enzyme fraction.
Vehicle	tetrahydrofuran
Remarks - Method	None.

Metabolic Activation	*Test Substance Concentration (µg/mL)*	*Exposure Period*	*Harvest Time*
Absent			
Test 1	10, 20, 40	16 hours	16 hours
Test 2	10, 20, 40	16 hours	16 hours
Test 3	10, 20, 40	40 hours	40 hours
Present			
Test 1	10, 20, 40	16 hours	16 hours
Test 2	10, 20, 40	16 hours	16 hours
Test 3	10, 20, 40	40 hours	40 hours

All cultures selected for metaphase analysis.

RESULTS

Metabolic Activation	*Test Substance Concentration (µg/mL) Resulting in:*			
	Cytotoxicity in Preliminary Test	*Cytotoxicity in Main Test*	*Precipitation*	*Genotoxic Effect*
Absent				
Test 1	160		40	Negative
Test 2			"	"
Test 3			"	"
Present				
Test 1			"	"
Test 2			"	"
Test 3			"	"

Remarks - Results In the initial experiment without and with activation at the 16-hour harvest there was a dose-related statistically significant increase in chromosomal aberration. This was not observed in the other assays.

The positive and negative controls gave the expected responses.

CONCLUSION The test substance was clastogenic to CHO cells treated in vitro under the conditions of the test but not reproducibly.

B.10. Genotoxicity – in vivo

Analogue #1 tested for induction of chromosomal aberrations in vitro was also tested in vivo in the Mammalian Erythrocyte Micronucleus Test.

TEST SUBSTANCE Analogue #3

METHOD OECD TG 474 Mammalian Erythrocyte Micronucleus Test.

Species/Strain Mouse/CD-1

Route of Administration	Oral – gavage
Vehicle	Peanut oil.
Remarks - Method	None.

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Sacrifice Time hours*
I (vehicle control)	5/sex	0	24 hours
II (low dose)	"	500	"
III (mid dose)	"	1000	"
IV (high dose)	"	2000	"
V (positive control, CP)		20	"

CP=cyclophosphamide.

RESULTS

Doses Producing Toxicity	None.
Genotoxic Effects	None.
Remarks - Results	Positive and negative controls gave the expected responses. There was no bone marrow toxicity.

CONCLUSION The notified chemical was not clastogenic under the conditions of this in vivo mammalian erythrocyte micronucleus test.

APPENDIX C: ENVIRONMENTAL FATE AND ECOTOXICOLOGICAL INVESTIGATIONS

C.1. Environmental Fate

C.1.1. Ready biodegradability

TEST SUBSTANCE: Petro 22 (46% notified chemical if liquid, 88% if powder)

METHOD: OECD TG 301 B Ready Biodegradability: CO_2 Evolution Test.
- Inoculum: Primary clarifier supernatant from a primarily domestic STP.
- Exposure Period: 28 d
- Auxiliary Solvent: Nil
- Analytical Monitoring:
- Remarks - Method: The test contained one control, one reference, and one treatment group, with two replicates per group. The reference group was dosed with sodium benzoate at a concentration of 20 mg C/L. The treatment group was dosed with test substance at a concentration of 20 mg C/L.

RESULTS

Test substance		*Sodium Benzoate*	
Day	*% Degradation*	*Day*	*% Degradation*
2	5.0	2	56.0
5	22.1	5	75.3
9	31.3	9	97.2
13	41.0	13	96.8
16	43.1	16	96.4
20	44.4	20	97.3
23	47.2	23	98.9
26	48.4	26	101.1
29	49.1	29	101.3

Remarks - Results: The test substance evolved an average of approximately 49% of the maximum theoretical CO_2 production. Although significant degradation of the test substance was observed, the test substance may not be considered readily biodegradable since 60% of theoretical CO_2 production was not achieved within 28 days.

The viability of the inoculum and validity of the test was supported by the reference substance, sodium benzoate, degrading an average of approximately 101%. The reference substance yielded approximately 75% of the theoretical maximum CO_2 by day 5 of the test, thereby fulfilling the criteria for a valid test.

CONCLUSION: While significant biodegradation of the test substance occurred, the criterion for ready biodegradable was not achieved. Therefore, the test substance is inherently biodegradable.

TEST FACILITY: Wildlife International (1995a)

C.1.2. Ready biodegradability

TEST SUBSTANCE: Petro BA Liquid (36% Notified Chemical)

METHOD: OECD TG 301 B Ready Biodegradability: CO_2 Evolution Test.
- Inoculum: Primary clarifier supernatant from a primarily domestic STP.
- Exposure Period: 28 d
- Auxiliary Solvent: Nil
- Analytical Monitoring:
- Remarks - Method: The test contained one control, one reference, and one treatment group,

with two replicates per group. The reference group was dosed with sodium benzoate at a concentration of 20 mg C/L. The treatment group was dosed with test substance at a concentration of 20 mg C/L.

RESULTS

Test substance		*Sodium benzoate*	
Day	*% Degradation*	*Day*	*% Degradation*
2	2.2	2	59.45
6	30.45	6	77.85
9	41.05	9	83.7
12	46.65	12	92.8
15	46.1	15	95.25
20	50.2	20	97.2
23	51.55	23	98.35
26	52.95	26	98.85
29	53.75	29	99.75

Remarks - Results

The test substance evolved an average of approximately 54% of the maximum theoretical CO_2 production. Although significant degradation of the test substance was observed, the test substance may not be considered readily biodegradable since 60% of theoretical CO_2 production was not achieved within 28 days.

The viability of the inoculum and validity of the test was supported by the reference substance, sodium benzoate, degrading an average of approximately 100%. The reference substance yielded approximately 78% of the theoretical maximum CO_2 by day 6 of the test, thereby fulfilling the criteria for a valid test.

CONCLUSION

While significant biodegradation of the test substance occurred, the criterion for ready biodegradable was not achieved. Therefore, the test substance is inherently biodegradable.

TEST FACILITY

Wildlife International (1995b)

C.1.3. Primary biodegradability

TEST SUBSTANCE

Petro BAF (36% notified chemical if liquid, 72% if powder)

METHOD

Presumptive Shake-Flask Bacterial Culture Method of the Soap and Detergent Association (SDA).

Inoculum: Laboratory shake-flask activated sludge culture
Exposure Period: 8 d
Auxiliary Solvent: Nil
Analytical Monitoring:

Remarks - Method

The bacterial culture was first adapted to the specific alkyl aryl sodium sulfonate detergent present in the Petro BAF sample, for which it was to be used later for evaluation of surfactant biodegradability during the 8-day shake-flask test. Test substance detergent was adapted to the activated sludge bacterial culture by subjecting it to a minimum of two 72-hour bacterial transfers in a shake-flask medium containing 30 mg/L (on a 100%-active basis) of the detergent in the sample under test. A sterilised microbial growth-promoting basal medium containing 30 mg/L of the test substance was then aseptically inoculated with 10 mL/L of the microorganisms which had already been preadapted. The mixture in the flask was then loosely capped and incubated at 25-30°C and aerated by continuous agitation of the flask for 8 days.

Biodegradation was determined by measuring the reduction in methylene

blue anionic-active substance (MBAS) from the shake-flask culture media, immediately after inoculation and again on the 7th and 8th days of the test period. Percent removal was calculated from the reduction in surfactant content. The result of the test was the average of the 7th and 8th day percent removals.

A blank flask control unit (containing all materials except the test substance was also run concurrently by the Shake-Flask procedure. Also, with each run, there was included one unit fed Dodecene-1 derived Linear Alkyl Sulfonate (LAS) as a control on sludge suitability and operating conditions.

RESULTS

Test substance	
Day	*% Degradation*
7	91.3
8	92.6

Remarks - Results

The test substance had an average percent MBAS removal of 91.9%. As the test substance was found to have a biodegradability value that exceeded 90% removal of MBAS, the test substance was considered to be adequately biodegradable and require no further testing according to SDA standards.

The result for dodecene-1 derived LAS was 98.8% removal thereby indicating the suitability of the activated sludge for use in this SDA procedure.

CONCLUSION

According to the SDA standards, the test substance is described as adequately biodegradable.

TEST FACILITY

United States Testing Company (1970)

C.1.2. Bioaccumulation

REMARKS

Test not performed. The notified chemical is unlikely to bioaccumulate as it is biodegradable and is unlikely to partition to fat, based upon the high water solubility.

C.2. Ecotoxicological Investigations

C.2.1. Acute toxicity to fish

TEST SUBSTANCE: Petro 11 (90% notified chemical)

METHOD
- Species: Murray River Rainbow Fish (*Melanotaenia fluviatilis*).
- Exposure Period: 96 h
- Auxiliary Solvent: Nil
- Water Hardness: Not Provided
- Analytical Monitoring: Temperature, pH, conductivity and dissolved oxygen.
- Remarks – Method: Treated Sydney tap water was used as the diluent water for the test. Treatment involved passing the water through sand and carbon filters before storage in epoxy lined concrete tanks. Prior to use in the bioassay, the stored waster was filtered through 5 µm carbon filter cartridges and finally UV sterilised. A stock solution of the chemical was prepared by dissolving the chemical in the treated water to give a concentration of 1 g/L. This solution was then appropriately diluted to produce concentrations of 10, 50, 100, 200, 400 and 800 mg/L for the conduct of the test. A diluent water control was also prepared. 4 replicates for each test concentration and control were prepared, containing 5 randomly selected fish each.

  This is an Imbalance Test (not defined) only and the NOEC and LOEC values were calculated, after appropriate transformation of data, using the ANOVA and Dunnetts test. The EC50 value was determined using the trimmed Spearmen-Karber Method.

RESULTS

Concentration mg/L		*Number of Fish*	*Percent Imbalanced*		
Nominal	*Actual*		*0 h*	*48 h*	*96 h*
0		20	0	5%	5%
10		20	0	5%	5%
50		20	0	5%	5%
100		20	0	15%	15%
200		20	0	35%	35%
400		20	0	100%	100%
800		20	0	100%	100%

- EC50: 211.3 mg/L at 96 hours.
- LOEC: 200.0 mg/L at 96 hours.
- NOEC: 100.0 mg/L at 96 hours.
- Remarks – Results: Temperature of the solutions ranged between 22.4 and 26.6°C. Conductivity of the sample solutions ranged between 191.2 and 450.5 µS/cm. Overall, the pH values for the sample solutions ranged between 7.40 and 8.08. The percentage saturation of dissolved oxygen was maintained well above 60% in all sample solutions, which meets the requirements of OECD TG 203 for fish toxicity tests.

CONCLUSION: The test substance, Petro 11, is very slightly toxic (Mensink *et al*, 1995) to fish and is not classified according to GHS (United Nations, 2003).

TEST FACILITY: University of Technology, Sydney (2004)

C.2.2. Acute/chronic toxicity to aquatic invertebrates

TEST SUBSTANCE: Petro 11 (90% notified chemical)

METHOD	ESA SOP 101, based on USEPA (1993) – Static, non-renewal.
Species	*Ceriodaphnia cf dubia*
Exposure Period	48 hours
Auxiliary Solvent	Nil
Water Hardness	Not provided
Analytical Monitoring	Temperature, pH, conductivity and dissolved oxygen.
Remarks - Method	Dilute Mineral Water (DMW) was used as the diluent for the toxicity tests and as the culture medium for the culturing of the test organisms. DMW was prepared 24-48 h prior to use by diluting Perrier mineral water to a concentration of 20% (vol/vol) with deionised water. A vitamin B12 and selenium supplement was added to the DMW to give final concentrations of 10 and 2 µg/L respectively. Six concentrations of Petro 11 powder were prepared in 250 mL beakers by diluting a 100 g/L working stock with DMW and subsequently homogenising the test solutions. A positive control, using was conducted in parallel, using potassium chloride as the toxicant. The EC50 estimates (with 95% confidence limits) were determined using the trimmed Spearman-Karber method. The NOEC and LOEC were determined by performing a Steels Many-one Rank Test for non-parametric data.

RESULTS

Concentration mg/L		*Number of D. magna*	*Number Immobilised*	
Nominal	*Actual*		*24 h*	*48 h*
0		20	0	0
6.25		20	0	0
12.5		20	0	2
25		20	0	6
50		20	7	11
75		20	6	13
100		20	10	15

EC50	95.2 mg/L at 24 hours (95% CI: 74.3-158.1 mg/L) 45.2 mg/L at 48 hours (95% CI: 31.7-64.5 mg/L)
LOEC	25.0 mg/L at 48 hours
NOEC	12.5 mg/L at 48 hours
Remarks - Results	The test substances was described as being readily soluble in DMW dilution water at 100 mg/L. Temperature of the solutions were held at 25±1°C. There were no reported deviations from the test protocol.
CONCLUSION	The test substance, Petro 11, was found to be harmful to *Ceriodaphnia cf dubia* (United Nations, 2003).
TEST FACILITY	Ecotox (2004)

C.2.3. Algal growth inhibition test

TEST SUBSTANCE	Petro 11 (90% notified chemical)
METHOD	OECD TG 201 Alga, Growth Inhibition Test. USEAP Protocol, 1994.
Species	*Selenastrum capricornutum*.
Exposure Period	72 hours
Concentration Range	Nominal: 0, 0.4, 1.1, 3.3, 10, 30, 100 mg/L
Auxiliary Solvent	EDTA

Analytical Monitoring

Remarks - Method

A primary stock solution of 10 g/L (w/v) Petro 11 was prepared in USEPA medium (+EDTA). This was diluted further to form a secondary stock of 1 g/L (w/v) Petro 11. The six test concentrations were subsequently prepared.

After mixing well, 6 mL of each test solution was dispensed into 20 mL silanised glass scintillation vials (each in triplicate). Each vial was inoculated with $1.3X10^4$ cells/mL of a *Selanastrum* suspension.

Five concentrations of the reference toxicant copper (14.3 – 114.3 µg Cu/L) and a control were prepared in 50 mL USEPA (+EDTA) medium. The bioassay was acceptable if copper toxicity (IC50) was within the cusum chart limits and if growth rate in the controls was within the normal range for *Selenastrum* (2.0 ± 0.5 doublings/day).

The 72 h IC50, LOEC and NOEC values were calculated using ToxCalc Ver. 5.0.23 (Tidepool Software).

RESULTS

Growth		
IC50	*LOEC*	*NOEC*
mg/L at 72 h	*mg/L at 72 h*	*mg/L at 72 h*
>100	>100	100

Remarks - Results

The control growth rate criteria were satisfied, validating the test.

CONCLUSION

The test substance, Petro 11, was not toxic to the alga with no significant inhibition of algal growth at any concentration tested.

TEST FACILITY

CSIRO (2004)

C.2.4. Inhibition of microbial activity

REMARKS

This test was not performed. For naphthalene sulfonic acids the literature presents a 17 h EC50=133 mg/L (Greim, 1994).

BIBLIOGRAPHY

BTL (1975a) Primary Irritation Study. Bio-Toxicology Laboratories Inc N.J. USA (unpublished report submitted by notifier).

BTL (1975b) Draize Eye irritation Study – Wolcott Modification. Bio-Toxicology Laboratories Inc N.J. USA (unpublished report submitted by notifier).

Ecotox (2004) The Acute Toxicity of Petro 11 Powder to *Ceriodaphnia dubia*, TR0152/1 7 October 2004, Ecotox Services Australasia Pty Ltd, Unit 27/2 Chaplin Drive, Lane Cove, NSW 2066.

EG & G Mason Research Inst (1979) Salmonella/Mammalian Microsome Plate Incorporation Mutagenesis Assay of Petrochemicals Company Inc Compound Petro ULF (MRI #168). Study #572-168-1-78, EG & G Mason Research Institute, Maryland, USA (unpublished report submitted by notifier).

FORS (Federal Office of Road Safety) (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 6th Edition, Canberra, Australian Government Publishing Service

Greim H *et al* (1994), Toxicity and Ecotoxicity of Sulfonic Acids: Structure-Activity Relationship, Chemosphere, Vol 28, No 12, pp 2203-2236, 1994.

Mensink BJWG, Montforts M, Wijkhuizen-Maslankiewicz L, Tibosch H and Linders JBHJ (1995) Manual for summarising and evaluating the environmental aspects of pesticides. National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands. Report No. 679101022.

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 edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

Petrochemicals Company Inc (1959) Acute Oral Toxicity Study Petro 11, Petrochemicals Company, Forth Worth, Texas (unpublished report submitted by notifier).

Petrochemicals Company Inc (1966) Subacute (90-Day) Feeding Studies with Petro A G Special in Dogs, Petrochemicals Company, Forth Worth, Texas (unpublished report submitted by notifier).

Stillmeadow Incorporated (1995a) Acute Oral Toxicity Study in Rats. Lab study number 2417-95. Stillmeadow Incorporated, Sugar Land, Texas (unpublished report submitted by notifier).

Stillmeadow Incorporated (1995b) Primary Dermal Irritation Study in Rabbits. Lab study number 2419-95. Stillmeadow Incorporated, Sugar Land, Texas (unpublished report submitted by notifier).

Stillmeadow Incorporated (1995c) Primary Eye Irritation Study in Rabbits. Lab study number 2418-95. Stillmeadow Incorporated, Sugar Land, Texas (unpublished report submitted by notifier).

Stillmeadow Incorporated (1995d) Dermal Sensitisation Study in Rabbits. Lab study number 2539-95. Stillmeadow Incorporated, Sugar Land, Texas (unpublished report submitted by notifier).

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.

United States Testing Company, Inc. (1970), Evaluation Of A Sample Of 'Petro BAF' Powder, Identified as an Alkyl Aryl Sodium Sulfonate Surfactant, For Biodegradability by the Presumptive Shake-Flask Culture Test Procedure of the Soap And Detergent Association, Report No. 38655, 13 January 1970, United States Testing Company, Inc., 1415 Park Avenue, Hoboken, New Jersey.

University of Technology, Sydney (2004) Toxicity of Petro 11 to Juveniles of the Murray River Rainbow Fish, *Melanotaenia fluviatilis*. 20 October 2004, Ecotoxicology Unit, Dept Environmental Sciences, University of Technology, Sydney, PO Box 123, Broadway, NSW 2007.

WIL Research Laboratories, Inc (1980) Acute Dermal Toxicity Study in Rabbits. Project number WIL-79289. WIL Research Laboratories, Inc, Cincinnati, Ohio (unpublished report submitted by notifier).

Wildlife International (1995a) Modified Sturm Screening Test, Petro 22, Project No. 344E-101, 9 January 1995, Wildlife International Ltd, 8598 Commerce Drive, Easton, Maryland 21601.

Wildlife International (1995b) Modified Sturm Screening Test, Petro BA, Project No. 344E-102, 9 January 1995, Wildlife International Ltd, 8598 Commerce Drive, Easton, Maryland 21601.