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April 2013

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

Chemical in Reagent S–10338 Promoter

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 Sustainability, Environment, Water, Population and Communities.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This 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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Director
NICNAS

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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette:*

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
STD/1452	Cytec Australia Holdings Pty Ltd	Chemical in Reagent S–10338 Promoter	Yes	≤ 200 tonnes per annum	Extractant for metal refining.

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the available information, the notified chemical (at ≤ 73% concentration in aqueous solution) is recommended for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the table below.

Hazard classification	*Hazard statement*
Acute Toxicity (Category 3)*	H301 – Toxic if swallowed H311 – Toxic in contact with skin
Skin Corrosion (Category 1)	H314 – Causes severe burns and eye damage
Skin Sensitisation (Category 1)	H317 – May cause an allergic skin reaction

*Classification in a lower category may be relevant for the notified chemical itself (100% concentration)

In Australia, additional non-GHS hazard statements apply (see *Guidance on the Classification of Hazardous Chemicals Under the WHS Regulations* for further information; SWA, 2012a). Based on the available information, the following additional (non-GHS) hazard statement is also recommended (if applicable):

AUH071 – Corrosive to the respiratory tract

Based on the available information, the notified chemical (at ≤ 73% concentration in aqueous solution) is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004) with the following risk phrases:

R22: Harmful if swallowed
R24: Toxic in contact with skin
R35: Causes severe burns
R43 May cause sensitisation by skin contact

The environmental hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals* (GHS) is presented below. Environmental classification under the GHS is not mandated in Australia and carries no legal status but is presented for information purposes.

Hazard classification	*Hazard statement*
Acute Aquatic Toxicity (Category 1)	H400 - Very toxic to aquatic life
Chronic Aquatic Toxicity (Category 1)	H410 - Very toxic to aquatic life with long lasting effects

Human health risk assessment

Provided that control measures are in place to minimise exposure, including the use of enclosed/automated processes and PPE, the notified chemical is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified chemical is not considered to pose an unreasonable risk to public health.

Environmental risk assessment
On the basis of the assessed use pattern, the notified chemical is not considered to pose an unreasonable risk to the environment.

Recommendations

REGULATORY CONTROLS
Hazard Classification and Labelling

- The notified chemical (at ≤ 73% concentration in aqueous solution) should be classified as follows:
  - Acute Toxicity (Category 3): H301 – Toxic if swallowed; H311 – Toxic in contact with skin*
  - Skin Corrosion (Category 1): H314 – Causes severe burns and eye damage
  - Skin Sensitisation (Category 1): H317 – May cause an allergic skin reaction
  - AUH071 – Corrosive to the respiratory tract (if applicable)

  *Classification in a lower category may be relevant for the notified chemical itself (100% concentration)

  The above should be used for products/mixtures containing the notified chemical, if applicable, based on the concentration of the notified chemical present and the intended use/exposure scenario.

- The Delegate (and/or the Advisory Committee on Chemicals Scheduling) should consider the notified chemical for listing on the SUSMP.

- Due to the corrosive properties of the notified chemical, the notifier should consider their obligations under the Australian Dangerous Goods Code.

Health Surveillance

- As the notified chemical is a skin sensitiser, employers should carry out health surveillance for any worker who has been identified in the workplace risk assessment as having a significant risk of skin sensitisation.

(Material) Safety Data Sheet

- The (M)SDS for products containing the notified chemical should reflect the hazards associated with the notified chemical, as noted above.

CONTROL MEASURES
Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified chemical:
  - Enclosed, automated processes, where possible

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified chemical:
  - Avoid contact with skin and eyes
  - Avoid spills and splashing during use
  - Prevent leaks and spills
  - A shower and eyewash station should be available

- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical:
  - Coveralls
  - Impervious gloves
  - Full face mask

  Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Only workers with sufficient training in handling hazardous substances should handle products containing the notified chemical.

- A copy of the (M)SDS should be easily accessible to employees.

- If products and mixtures containing the notified chemical are classified as hazardous to health in accordance with the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- The notified chemical should be disposed of to landfill.

Storage

- The handling and storage of the notified chemical should be in accordance with the Safe Work Australia Code of Practice for *Managing Risks of Hazardous Chemicals in the Workplace* (SWA, 2012b) or relevant State or Territory Code of Practice.

Emergency procedures

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

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:

(1) Under Section 64(1) of the Act; if
  - The notified chemical is intended for use in products available to the public.

or

(2) Under Section 64(2) of the Act; if
  - the function or use of the chemical has changed from an extractant for metal refining or is likely to change significantly;
  - the amount of chemical/ being introduced has increased from 200 tonnes per annum, or is likely to increase, significantly;
  - 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.

(Material) Safety Data Sheet
The (M)SDS of a product containing the notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Cytec Australia Holdings Pty Ltd (ABN: 45 081 148 629)
Suite 1, Level 1, 21 Solent Circuit
Baulkham Hills NSW 2153

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, CAS number, molecular and structural formulae, molecular weight, analytical data, degree of purity, impurities, additives/adjuvants, use details, import volume and identity of recipients.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows: dissociation constant, flash point, flammability, autoignition temperature, explosive properties, oxidising properties, acute dermal toxicity, acute inhalation toxicity, eye irritation and chromosome damage in vitro.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
Commercial Evaluation Chemical (CEC) permit

NOTIFICATION IN OTHER COUNTRIES
None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Reagent S-10338 Promoter (aqueous solution containing ≤ 73% notified chemical)

MOLECULAR WEIGHT
< 500 Da

ANALYTICAL DATA
Reference NMR, IR and LC/MS spectra were provided.

3. COMPOSITION

DEGREE OF PURITY > 95%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: amorphous (non-crystalline) solid (Reagent S-10338 Promoter is a clear colourless to pale yellow solution – aqueous solution containing ≤ 73% notified chemical)

Property	Value	Data Source/Justification
Glass Transition Point	-58 to -49 °C	Measured
Boiling Point	Decomposition from ~237 °C	Measured
Density	927.9 kg/m^3 at 20 °C	Measured
Vapour Pressure	1.7 x 10^{-6} kPa at 20 °C	Measured
Water Solubility	> 887 g/L at 20 °C	Measured
Hydrolysis as a Function of pH	pH 4, 7 and 9, > 1 year at 25 °C	Measured
Partition Coefficient (n-octanol/water)	log Pow = 0.778 ± 0.032 at 23 °C	Measured
Adsorption/Desorption	Not determined	Expected to strongly adsorb to soil due to cationic properties of the notified chemical.
Dissociation Constant	Not determined	The notified chemical is a salt and will

		be ionised under environmental conditions.
Flash Point	Not determined	Imported as an aqueous solution
Autoignition Temperature	Not determined	Imported as an aqueous solution
Explosive Properties	Not determined	Not expected to have explosive properties, based on the structure
Oxidising Properties	Not determined	Not expected to have oxidising properties, based on the structure

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

Reactivity
The notified chemical is expected to be stable under normal conditions of use.

Physical hazard classification
Based on the submitted physico-chemical data depicted in the above table, the notified chemical is not recommended for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified chemical (at ≤ 73% concentration) will be imported into Australia as an aqueous solution.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	50-200	50-200	50-200	50-200	50-200

PORT OF ENTRY
Sydney, Melbourne, Gladstone, Darwin and Perth

IDENTITY OF MANUFACTURER/RECIPIENTS
Cytec Australia Holdings Pty Ltd and metal refineries throughout Australia

TRANSPORTATION AND PACKAGING
The notified chemical (at ≤ 73% concentration) will be imported in 1000 L IBCs and transported from the wharf to the Cytec Australia Holdings Pty Ltd warehouse by truck, where it will be stored before being distributed to end-use sites.

USE
Extractant for the removal of impurities during metal refining.

OPERATION DESCRIPTION
At end-use sites, the solution containing the notified polymer (at ≤ 73% concentration) will be transferred to on-site holding tanks using pumping equipment. Thereafter, all transfer processes will be fully automated and, in-general, use closed line systems. The solution containing the notified chemical will be pumped into the process stream, where it will be used as an extractant in a series of tanks and regularly recycled back into the process stream. The notified chemical will be gradually lost into the process liquor and will be sent to an on-site tailings dam for disposal.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport and storage	2	24
Plant workers	8-12	200
Maintenance workers	2	200

EXPOSURE DETAILS

Transport and storage

Transport and storage workers are not expected to be exposed to the notified chemical except in the unlikely event of an accidental rupture of containers. In the unlikely event of a spill, appropriate personal protective equipment (PPE) is expected to be worn by clean up staff.

End users

Processes which involve the notified chemical are expected to be largely automated and utilise enclosed transfer lines and tanks. Some worker exposure to the notified chemical is possible during pump transfer of the chemical from import containers to mixing tanks, and during scheduled maintenance. The main routes of exposure would be dermal and ocular. Inhalation exposure to the notified chemical is not expected, given the chemical properties and introduction/use pattern. Appropriate PPE is expected to be worn by all workers, including coveralls, impervious gloves, eye protection and if ventilation is insufficient, suitable respiratory protection.

6.1.2. Public Exposure

The notified chemical is expected to be used in industrial settings only. Therefore, given the proposed use pattern, public exposure is not expected.

6.2. Human Health Effects Assessment

The results from toxicological investigations conducted on the notified chemical are summarised in the following table. For full details of the studies, refer to Appendix B.

Endpoint	*Result and Assessment Conclusion*
Rat, acute oral toxicity	LD50 = 50-300 mg/kg bw; toxic*
Rat, Skin irritation (in vitro)	Corrosive *
Mouse, skin sensitisation – Local lymph node assay	evidence of sensitisation *
Rat, repeat dose oral (by gavage) toxicity – 28 days.	NOEL = 5 mg/kg/day*
Mutagenicity – bacterial reverse mutation	non mutagenic *
Genotoxicity – in vivo micronucleus assay	non genotoxic *

*notified chemical at ≤ 73% concentration in aqueous solution

Toxicokinetics

The notified chemical has the potential to cross biological membranes, based on the relatively low molecular weight (< 500 g/mol) and partition coefficient (log Kow = 0.778 ± 0.032 at 23 °C; the chemical is totally miscible in both n-octanol and water). This is supported by the observations of mortalities and/or systemic toxicity effects that were noted in animal studies following oral and dermal exposure to the notified chemical.

Acute toxicity, irritation and sensitisation.

The notified chemical (at ≤ 73% concentration in aqueous solution) was found to be toxic in an acute oral toxicity study in rats. The only animal treated with 300 mg/kg bw was found dead on Day 1, although no clinical signs of toxicity were noted leading up to the death. Additionally, the study authors noted no clinical signs of toxicity in any other animals (surviving animals treated with 50 mg/kg bw) over the 14 day study period. Numerous abnormalities in the liver, kidneys and stomach were noted at necropsy in the animal treated with 300 mg/kg bw and epithelial sloughing of the gastric mucosa was noted in 3/5 animals treated with 50 mg/kg bw. Therefore, the LD50 of the test substance (aqueous solution containing ≤ 73% notified chemical) was considered to be between 50 and 300 mg/kg bw.

The established acute oral LD50 of the notified chemical (at ≤ 73% concentration) is further supported by the range-finding test that was conducted in mice to establish the maximum tolerable dose (MTD) for use in the *in vivo* micronucleus study on the aqueous solution containing the notified chemical (≤ 73%; 150-1000 mg/kg bw). In the range-finding study, the MTD was established as 160 mg/kg bw, but following the observation of 3/7 deaths in mice treated with 160 mg/kg bw in the main study, the maximum dose tested was reduced to 140

mg/kg bw. Signs of toxicity that were observed in mice treated with the notified chemical (at ≤ 73% concentration) in the *in vivo* micronucleus study included hunched posture, tiptoe gait, ataxia, splayed gait and ptosis (noted in animals treated with ≥ 70 mg/kg bw test substance).

In an *in vitro* transcutaneous electrical resistance (TER) study, the notified chemical was found to be corrosive to the skin of rats, as indicated by the established mean electrical resistance value of 1.3 kΩ, which is below the threshold of 5 kΩ.

An LLNA study on the notified chemical (at ≤ 73% concentration in aqueous solution) indicated the potential for skin sensitisation effects (stimulation indices of 5.92, 9.05 and 10.91 at 0.5, 1 and 2.5% concentration, respectively). The concentrations tested were based on the results of a range-finding study, in which animals treated at ≥ 5% test substance were humanely killed within 2 days of initial dosing, and no signs of systemic toxicity or irritation were noted in animals treated with ≤ 2.5% test substance.

Due to the corrosive nature of the notified chemical, acute dermal, acute inhalation, and eye irritancy studies have not been conducted. However, for corrosive substances, the risk of severe damage to the eyes is considered implicit. In addition, the notifier has classified the notified chemical (at ≤ 73% concentration in aqueous solution) as being toxic in contact with skin. Corrosive substances should be considered as being corrosive to the respiratory tract, if acute inhalation test data are not available and they may be inhaled (SWA, 2012a).

Repeated Dose Toxicity.
A 28-day repeat dose oral toxicity study in rats (treated with the notified chemical at ≤ 73% concentration in aqueous solution) established a NOEL of 5 mg/kg bw/day, based on the presence of toxicologically relevant effects at higher dose levels.

No mortalities were recorded at any dose level. Toxicologically significant effects that were recorded at the high and/or mid-dose (30 and 75 mg/kg bw/day) levels included increased salivation and noisy respiration in both sexes. One male receiving 75 mg/kg bw/day also exhibited hunched posture and increased respiratory rate. Reduced kidney, liver and thymus weights were also noted in males treated with 75 mg/kg bw/day. There were numerous histopathological abnormalities detected in bone marrow, liver, spleen, kidneys, stomach, lung and thymus in animals treated with 75 mg/kg bw/day. However, due to a high number of abnormalities detected in organs examined in control animals, there were no significant differences detectable between treatment and control groups. Due to the organ weights and histopathological values being within historical ranges, results were considered by the study authors to be of no clinical significance.

Statistically significant increases in haematocrit and haemoglobin were observed in all female treatment groups and there was a statistically significant increase in platelet levels in females treated with 75 mg/kg bw/day. The study authors noted that these results were within historical ranges and therefore considered them to be toxicologically insignificant. There were no noted effects for blood chemistry parameters.

Effects from repeated dose exposure can be further supported by results from the 7-day range-finding studies. In particular, in one study all animals treated at 250 mg/kg bw/day died or were killed *in extremis* by day 4 of the treatment period. Clinical signs including noisy respiration, pilo erection, hunched posture and lethargy were noted in one or more animals treated at ≥ 75 mg/kg bw/day, with increased salivation reportedly observed at all dose levels tested (25, 75 and 250 mg/kg bw/day).

Mutagenicity/Genotoxicity.
Bacterial reverse mutation and *in vivo* micronucleus studies on the notified chemical were negative.

Health hazard classification
Based on the available information, the notified chemical (at ≤ 73% concentration in aqueous solution) is recommended for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the following table.

Hazard classification	***Hazard statement***
Acute Toxicity (Category 3)*	H301 – Toxic if swallowed H311 – Toxic in contact with skin
Skin Corrosion (Category 1)	H314 – Causes severe skin burns and eye damage

Skin Sensitisation (Category 1)	H317 – May cause an allergic skin reaction

*Classification in a lower category may be relevant for the notified chemical itself (100% concentration)

In Australia, additional non-GHS hazard statements apply (see *Guidance on the Classification of Hazardous Chemicals Under the WHS Regulations* for further information; SWA, 2012a). Based on the available information, the following additional (non-GHS) hazard statement is also recommended (if applicable):

AUH071 – Corrosive to the respiratory tract

Based on the available information, the notified chemical (at ≤ 73% concentration in aqueous solution) is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004), with the following risk phrase(s):

R22: Harmful if swallowed
R24: Toxic in contact with skin
R35: Causes severe burns
R43: May cause sensitisation by skin contact

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

End Use

Workers may be exposed to the notified chemical (at ≤ 73% concentration) during transfer of the solution containing the notified chemical from transport tanks to mixing vessels and during general maintenance operations, although processes are expected to be are largely automated and utilise enclosed transfer lines and tanks.

The primary risks associated with worker exposure will be due the corrosive and sensitising nature of the chemical (and the toxicity of the chemical via the dermal route). However, dermal and ocular exposure is expected to be minimised by the wearing of PPE, including gloves, full face mask, and coveralls. While the notified chemical is considered to be toxic via the oral route, ingestion is unlikely under the proposed use scenario. Exposure to the notified chemical via inhalation is not expected under the proposed use scenario.

Provided that control measures are in place to minimise worker exposure, including the use of automated processes and PPE, the risk to the health of workers from use of the notified chemical is not considered to be unreasonable.

6.3.2. Public Health

The notified chemical is intended for use in industrial settings by trained workers. The public may only be exposed to the notified chemical in the unlikely event of an accident during transport. Therefore, when used in the proposed manner, the risk to public health from the notified chemical is not considered to be unreasonable.

0.7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified chemical will be imported into Australia and used as an extractant in mineral processing for metal refining. No release of the notified polymer to the environment is expected from manufacturing, reformulation and repackaging, as these activities will not take place locally. The storage tanks and mixer-settler units will be situated within bunded areas. Spilt notified chemical is expected to be contained, collected using adsorbent material and be disposed of to the onsite tailings dams.

RELEASE OF CHEMICAL FROM USE

Minimum release of the notified chemical is anticipated once it is delivered into the mineral processing, as this process will be a closed system and fully automated. All of the import volume of the notified chemical will be recycled within the process stream and will gradually end up in the tailings dams. The majority of the notified chemical is expected to associate with the insoluble particles and settle to the bottom of the dams. Direct release of the notified chemical to the sewer system or the environment is not expected at any stage in the notified chemical's proposed lifecycle. Spills and leaks, accounting for 1% of the total import volume of the

notified chemical, are expected to be collected with inert material and be disposed of to the tailings dams.

At the refinery sites, two large on-site tailing dams are typically constructed with a multi-layered base of compacted clay and PVC membrane with a further inner layer of yellow sand housing the underdrain system, which collects the water. This multi-layered base will prevent leaching of the dilute caustic liquor containing the notified chemical into groundwater.

The caustic sand and mud waste will be sent to the first disposal dam for treatment to separate the solids and recycle the water for further use. After thickening, the mud slurry will be pumped to drying beds, distributed over the surface to a depth of less than one metre and sun dried to at least 65 to 70% solids before distribution of the next mud layer. The remaining supernatant in the settling dam will be sent to a secondary dam, where it will be returned to the refinery to be used as wash water to the mud washers, as hose water and as cooling water. The remaining water in the secondary dam is expected to be evaporated.

RELEASE OF CHEMICAL FROM DISPOSAL
The notified chemical is expected to strongly associate with the caustic red mud and will share its fate to be recycled for use in constructing new internal dam walls within the existing outer walls. Residues remaining in the imported containers will account for 1% of the total import volume of the notified chemical. The containers will be rinsed and the rinsate will be disposed of to the tailings dams.

7.1.2. Environmental Fate
Most of the notified chemical is expected to end up in tailings dams along with the caustic red mud. The notified chemical will associate with soil and sediment strongly due to its cationic properties. The notified chemical is not readily biodegradable (0% degradability over 28 days). However, the potential for the notified chemical to bioaccumulate in organisms is not expected to be significant based on its ionic properties and low partition coefficient (n-octanol/water) (Log Pow = 0.778). Moreover, as the notified chemical is not expected to be directly released to sewer or the environment, it is not expected to be exposed to aquatic organisms. The notified chemical is expected to degrade through biotic and abiotic processes overtime to form water, oxides of carbon, phosphorus compounds and inorganic salts. For the details of the environmental fate studies please refer to Appendix C.

7.1.3. Predicted Environmental Concentration (PEC)
The predicted environmental concentration (PEC) was not calculated as direct release of the notified chemical to the aquatic environment is not expected based on its use pattern.

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 (96 h) > 100 mg/L	Not harmful to fish
Daphnia Toxicity	EC50 (48 h) = 0.43 mg/L	Very toxic to aquatic invertebrates
Algal Toxicity	E_rC50 (72 h) = 0.0089 mg/L NOE_rC = 0.0023 mg/L	Very toxic to algae
Inhibition of Bacterial Respiration	EC50 (3 h) = 10-100 mg/L	Significantly inhibitory to microbal respiration at concentrations greater than 1 mg/L

The notified chemical is not harmful to fish but is very toxic to daphnia and algae. Based on its acute toxicity to aquatic biota, the notified chemical is formally classified as 'Acute Category 1; very toxic to aquatic life' under the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS).

On the basis of its chronic toxicity to algae and its lack of ready degradability, the notified chemical is formally classified under the GHS as 'Chronic Category 1; very toxic to aquatic life with long-lasting effects'.

7.2.1. Predicted No-Effect Concentration
Predicted no-effect concentration (PNEC) is not applicable as no PEC was calculated.

7.3. Environmental Risk Assessment
Despite the relatively large quantities of the notified chemical involved and the toxicity to aquatic organisms,

the proposed use pattern precludes significant direct release to the aquatic environment at any stage in its proposed life-cycle within Australia. Physical engineered barriers exist to contain any spilt or released notified chemical at the site of end-use in the form of bunded areas and lined dams. Therefore, given the lack of aquatic exposure, when used in the proposed manner, the notified chemical is not considered to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Glass Transition Point -58 to -49 °C

Method OECD TG 102 Melting Point/Melting Range.
Remarks Using differential scanning calorimetry (DSC; scanned at 10 ºC/minute from -140 to 20 ºC; prior heating of the test substance to 60 ºC to remove residual moisture; indium standard), the melting point of the test substance was not observed. The test substance underwent a glass transition from -58 to -49 °C, with a midpoint of -53.5 °C.
Test Facility CSCAL (2012)

Boiling Point Decomposition from ~237 °C

Method OECD TG 103 Boiling Point.
Remarks Differential scanning calorimetry (DSC) was used. The test substance was heated to 60 ºC to remove residual moisture. Test substance was scanned at 10 ºC/minute from 20 ºC to 350 ºC. An indium standard was used. The test substance did not boil. Decomposition was observed from ~237 ºC.

Thermogravimetric analysis (TGA; scanned at 20 ºC/minute) indicated that the test substance had a minor weight loss (~3%) at ~250 °C, with the major weight loss (~97%) occurring at ~400 ºC.
Test Facility CSCAL (2012)

Density 927.9 kg/m^3 at 20 °C

Method OECD TG 109 Density of Liquids and Solids.
Remarks Determined using an oscillating density meter.
Test Facility CSCAL (2012)

Vapour Pressure 1.7 x 10^{-6} kPa at 20 °C

Method OECD TG 104 Vapour Pressure.
Remarks Determined by thermogravimetric analysis (TGA). The test substance was applied to open aluminium pans (nitrogen purge at 25 mL/minute), rather than the surface of roughened glass plates, as called for in the test guideline.
Test Facility CSCAL (2012)

Water Solubility > 887 g/L at 20 °C

Method OECD TG 105 Water Solubility.
Remarks Flask Method. Saturated solution of the test substance could not be obtained as the test substance is completely miscible in water. Several concentrations of the test substance were prepared and the refractive index of each solution was measured. The linear fit equation of the refractive index indicated that all the solutions were homogeneous. The maximum concentration prepared was 88.67 wt%. The pH of each solution was measured to be 2.0-2.6 during the test.
Test Facility CSCAL (2012)

Hydrolysis as a Function of pH

Method OECD TG 111 Hydrolysis as a Function of pH.

pH	*T (°C)*	*$t_{½}$ (years)*
4	25	> 1
7	25	> 1
9	25	> 1

Remarks Less than 10% hydrolysis was observed after 5 days at pH 4, 7 and 9 at 50 °C in the preliminary test, equivalent to a half-life greater than 1 year at 25 °C. Therefore, no

further test was conducted as per protocol requirements.

Test Facility Harlan (2012a)

Partition Coefficient (n-octanol/water) log Pow = 0.778 ± 0.032 at 23 °C

Method OECD TG 107 Partition Coefficient (n-octanol/water).

Remarks Flask Method. The test substance is completely miscible in both n-octanol and water. The interface between the two phases was not well defined and in some cases the water phase was hazy. After centrifugation, both phases were clear and the interface in each system was well defined. Each phase was collected using phase separation paper and the concentration of the test substance in each phase was determined by quantitative x-ray fluorescence method.
According to the protocol, the shake flask method is not applicable for the test substance as the interface of the two phases may not be well defined. However, in this study, after serial treatments, both octanol and water phases were clear and the interface in each system was well defined. Therefore, in this case, the test result is considered to be acceptable.

Test Facility CSCAL (2012)

APPENDIX B: TOXICOLOGICAL INVESTIGATIONS

B.1. Acute toxicity – oral

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 420 Acute Oral Toxicity – Fixed Dose Procedure. EC Council Regulation No 440/2008 B.1 bis Acute toxicity (oral) fixed dose method.
Species/Strain	Rat/Wister (RccHan™:WIST)
Vehicle	Water
Remarks - Method	No significant protocol deviations.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
I	1 F	300	1/1
II	1 F	50	0/1
III	4 F	50	0/4

LD50	50-300 mg/kg bw
Signs of Toxicity	The only animal treated with 300 mg/kg bw test substance was found dead no Day 1, although no clinical signs of toxicity were noted during the observation period after dosing (0-4 hours). Additionally, the study authors note no clinical signs of toxicity in any other animals (surviving animals treated with 50 mg/kg bw test substance) over the 14 day study period.
Effects in Organs	Abnormalities were observed at necropsy in the animal treated with 300 mg/kg bw. Dark discolouration of the liver and kidneys were noted. In addition, haemorrhagic and epithelial sloughing of the gastric mucosa and epithelial sloughing of the non-glandular epithelium of the stomach were also noted. In 3/5 animals treated with 50 mg/kg bw, epithelial sloughing of the gastric mucosa was noted.
Remarks - Results	All surviving animals showed expected gains in bodyweight over the observation period.
CONCLUSION	The test substance is toxic via the oral route.
TEST FACILITY	Harlan (2012b)

B.2. Irritation – skin (in vitro)

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 430 In vitro Skin Corrosion – Transcutaneous Electrical Resistance Test (TER)
Species/Strain	Rat/Wister (RccHan™:WIST)
Vehicle	None
Remarks - Method	No significant protocol deviations. The negative and positive controls were distilled water and hydrochloric acid (36%), respectively.

RESULTS

Test Item	*Mean Electrical Resistance (standard deviation)*
Negative control	20.8 kΩ (±5.0)
Test substance	1.3 kΩ (±0.1)

Positive control	0.7 kΩ (±0.061)

Remarks - Results	The test substance produced a mean TER value below the 5 kΩ threshold, which is indicative of corrosion. An indication of the appearance of the discs following treatment was not reported. Assessment of dye penetration was not conducted.
CONCLUSION	The notified chemical was considered to be corrosive to the skin under the conditions of the test.
TEST FACILITY	Harlan (2012c)

B.3. Skin sensitisation – mouse local lymph node assay (LLNA)

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 429 Skin Sensitisation: Local Lymph Node Assay EC Directive Regulation No 440/2008 B.42 Skin Sensitisation (Local Lymph Node Assay)
Species/Strain	Mouse/CBA/Ca
Vehicle	Dimethyl formamide
Remarks - Method	A preliminary range finding test was conducted at 1-10% concentration to determine the concentrations for the study (animals treated at ≥ 5% concentration were humanely killed within 2 days of initial dosing; no signs of systemic toxicity or irritation noted in animals treated at ≤ 2.5% concentration). Positive control (α-hexylcinnamaldehyde in dimethyl formamide; 25% concentration) and negative control (vehicle) studies were run in parallel with the test substance. No significant protocol deviations.

RESULTS

Concentration (% w/w)	*Proliferative response (DPM/animal)*	*Stimulation Index (Test/Control Ratio)*
Test Substance		
0 (vehicle control)	1306.55 (± 325.53)	-
0.5	7734.90 (± 2969.28)	5.92
1	11829.54 (± 10569.82)	9.05
2.5	14257.47 (± 4885.76)	10.91
Positive Control		
25	10200.86 (± 3021.79)	7.81

Remarks - Results	No mortalities and no clinical signs of toxicity were observed in the test or control subjects. The stimulation index (SI) for all three test groups dosed with the notified chemical was above 3 and hence the notified chemical was considered to be a skin sensitiser under the conditions of the test. The positive control confirmed the sensitivity of the test system.
CONCLUSION	There was evidence of induction of a lymphocyte proliferative response indicative of skin sensitisation to the notified chemical.
TEST FACILITY	Harlan (2012d)

B.4. Repeat dose toxicity

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 407 Repeated Dose 28-day Oral Toxicity Study in Rodents. EC Directive 96/54/EC B.7 Repeated Dose (28 Days) Toxicity (Oral).
Species/Strain	Rat/Wister (RccHan™:WIST)
Route of Administration	Oral – gavage
Exposure Information	Total exposure days: 28 days Dose regimen: 7 days per week Post-exposure observation period: None
Vehicle	Water
Remarks - Method	No significant protocol deviations. The doses selected for the study were based on the outcomes of 2 previous 7-day range-finding studies. In the first study, 3 animals/sex were treated with the test substance at 25, 75 and 250 mg/kg bw/day. All animals treated at 250 mg/kg bw/day died or were killed *in extremis* by day 4 of the treatment period. Clinical signs were noted in animals treated at ≥ 75 mg/kg bw/day, with treatment related changes reportedly observed at all dose levels. In the second study, 3 animals/sex were treated with the test substance at 25, 50 and 100 mg/kg bw/day. A single animal treated at 100 mg/kg bw/day was killed on day 5 of the treatment period (due to mal-dosing). While no clinical signs were reported in surviving animals, treatment related changes were considered to have occurred in both sexes treated at ≥ 100 mg/kg bw/day.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw/day*	*Mortality*
control	5M/5F	0	0/10
low dose	5M/5F	5	0/10
mid dose	5M/5F	30	0/10
high dose	5M/5F	75	0/10

Mortality and Time to Death

There were no deaths observed in any dose group

Clinical Observations

Increased salivation and noisy respiration were noted in males and females treated with 30 and 75 mg/kg bw/day. Symptoms were still present upon study completion (day 28). One male receiving 75 mg/kg bw/day also exhibited hunched posture and increased respiratory rate on one occasion. Males treated with 75 mg/kg bw/day had significantly reduced bodyweight gain relative to control animals in week 4 of the study, however this effect was not observed in females.

Laboratory Findings – Clinical Chemistry, Haematology

Statistically significant increases in haematocrit and haemoglobin were observed in all female treatment groups and there was a statistically significant increase in platelet levels in females treated with 75 mg/kg bw/day. The study authors noted that these results were within historical ranges and therefore considered them to be toxicologically insignificant.

There were no toxicologically significant blood chemistry changes noted by the study authors.

Effects in Organs

Absolute and relative kidney, liver and thymus weights were decreased in males treated with 75 mg/kg bw/day (statistically significant for the kidneys and thymus). However, the authors noted that the values were within historical ranges (except for 1 thymus value) and in the absence of associated statistically significant histopathological changes, were not considered to be toxicologically significant.

There were numerous histopathological abnormalities detected in the bone marrow, liver, spleen, kidneys, stomach, lung and thymus in animals treated with 75 mg/kg bw/day. However, due to a high number of abnormalities detected in all organs examined in control animals, there were no significant differences detectable between treatment and control groups. As abnormalities were stated to be within historical ranges for the age and strain, they were considered by the study authors to be of no clinical significance.

There were no abnormalities observed at necropsy in any dose group

Remarks – Results
The lack of treatment related effects reported in this study is somewhat surprising given both the corrosive nature of the test substance, and the signs of systemic effects noted in the repeated-dose range finding studies and the *in vivo* mammalian erythrocyte micronucleus test (discussed below).

CONCLUSION
The No Observed Effect Level (NOEL) was established by the study authors as 5 mg/kg bw/day, based on the presence of effects at the higher dosage levels. The study authors also noted that due to lack of adverse effect from toxicological changes, the No Observed (Adverse) Effect Level (NO(A)EL) was established as 75 mg/kg bw/day.

TEST FACILITY Harlan (2012e)

B.5. Genotoxicity – bacteria

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 471 Bacterial Reverse Mutation Test. EC Directive Regulation No 440/2008 B.13/14 Mutagenicity – Reverse Mutation Test using Bacteria. Plate incorporation and Pre incubation procedures
Species/Strain	*S. typhimurium*: TA1535, TA1537, TA98, TA100 *E. coli*: WP2uvrA
Metabolic Activation System	S9 fraction from Phenobarbitone/β-naphthoflavone-induced rat liver
Concentration Range in Main Test	Test 1 a) With metabolic activation: 5,15,50,150,500,1500,5000 µg/plate b) Without metabolic activation: 5,15,50,150,500,1500,5000 µg/plate Test 2 a) With metabolic activation: 0.5,5,15,50,150,500,1500,5000 µg/plate b) Without metabolic activation: 0.5,5,15,50,150,500,1500,5000 µg/plate
Vehicle	Water
Remarks - Method	A preliminary toxicity test (0-5000 µg/plate) was performed to determine the toxicity of the test material (TA100 and WP2uvrA only). A range-finding study (Test 1) was then conducted using 7 concentrations of the test substance, assayed in triplicate against each tester strain with and without metabolic activation at 5-5000 µg/plate (plate incorporation method). The main study (Test 2) was conducted on a separate day to the range-finding study (Test 1) using fresh cultures of the bacterial strains and fresh test material formulations, with concentration ranges of 0.5 – 5000 µg/plate, with and without metabolic activation (pre-incubation method). Vehicle and positive controls were used in parallel with the test material. Positive controls: i) without S9: N-ethyl-N'-nitro-N-nitrosoguanidine (TA100, TA1535, WP2uvrA), 9-aminoacridine (TA1537) and 4-nitroquinoline-1-oxide (TA98); ii) with S9: 2-aminoanthracene (TA100, TA1535, TA1537, WP2uvrA) and benzo(a)pyrene (TA98).

RESULTS

Metabolic Activation	*Test Substance Concentration (µg/plate) Resulting in:*			
	Cytotoxicity in Preliminary Test	*Cytotoxicity in Main Test*	*Precipitation*	*Genotoxic Effect*
Absent				
Test 1	≥ 1500	≥ 500	none	Negative
Test 2		≥ 150	none	Negative
Present				
Test 1	≥ 1500	≥ 500	none	Negative
Test 2		≥ 500	none	Negative

Remarks - Results

In the preliminary toxicity study, the test material was toxic to both strains tested at and above 1500 µg/plate, with and without metabolic activation.

In the mutation studies, the test substance caused a visible reduction in the growth of the bacterial background lawn to all strains in test 1, from 500 µg/plate, with and without metabolic activation. In test 2, the test substance caused a visible reduction in the growth of the bacterial background lawn from 150 µg/plate without metabolic activation and from 500 µg/plate with activation.

No toxicologically significant increases in the frequency of revertant colonies were recorded for any of the bacterial strains up to and including the maximum dose, either with or without metabolic activation.

The positive controls gave satisfactory responses, confirming the validity of the test system.

CONCLUSION

The notified chemical was not mutagenic to bacteria under the conditions of the test.

TEST FACILITY

Harlan (2012f)

B.6. Genotoxicity – in vivo

TEST SUBSTANCE

Notified chemical (≤ 73% in aqueous solution)

METHOD

OECD TG 474 Mammalian Erythrocyte Micronucleus Test.
EC Council Regulation No 440/2008 B.12 Mutagenicity - Mammalian Erythrocyte Micronucleus Test.

Species/Strain: Mouse/Hsd: ICR (CD-1)
Route of Administration: Oral – gavage
Vehicle: Arachis oil

Remarks - Method

A range finding test was performed (1-2 animals/sex/dose treated with 150-1000 mg/kg bw, via the oral route) to establish the Maximum Tolerated Dose (MTD), appropriate route of administration and choice of sex. Based on the results of the range-finding test, males only were chosen for the main test.

In the main test, 3 premature deaths were noted in the 7 animals treated with the established MTD (160 mg/kg bw), with a sacrifice time of the remaining 4 animals of 48 hours after exposure. Therefore, the highest dose tested was adjusted to 140 mg/kg bw, with a sacrifice time of 24 hours following exposure.

Positive (cyclophosphamide) and negative (vehicle) controls were run in parallel with the test substance.

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Sacrifice Time hours*

I (vehicle control)	7M	0	24
II (low dose)	7M	35	24
III (mid dose)	7M	70	24
IV (high dose) initial	7M	160	48
V (high dose) adjusted	7M	140	24
VI (positive control, CP)	7M	50	24

CP=cyclophosphamide.

RESULTS

Doses Producing Toxicity	Beyond the 3 premature deaths, which were observed in the established MTD group (160 mg/kg bw; 48 hour sampling time), no further deaths were recorded in any dose group during the study. Hunched posture, tiptoe gait, ataxia, splayed gait and ptosis were noted in animals treated with 70 mg/kg bw and above, providing evidence of systemic toxicity. While there were no statistically significant decreases in the PCE/NCE ratio at any dose level compared to the vehicle control, the study authors considered that the premature deaths and clinical signs of toxicity at doses of 70 mg/kg bw and above, indicated that exposure to the bone marrow had been achieved.
Genotoxic Effects	There was no statistically significant increase in the number of micronucleated polychromatic erythrocytes (PCE's) in animals treated at any dose level, relative to the vehicle control. The positive controls gave satisfactory responses, confirming the validity of the test system.
CONCLUSION	The notified chemical was not clastogenic under the conditions of this in vivo mammalian erythrocyte micronucleus test.
TEST FACILITY	Harlan (2012g)

APPENDIX C: ENVIRONMENTAL FATE AND ECOTOXICOLOGICAL INVESTIGATIONS

C.1. Environmental Fate

C.1.1. Ready biodegradability

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 301B Ready Biodegradability: CO_2 Evolution Test.
Inoculum	Activated sludge
Exposure Period	28 days
Auxiliary Solvent	None
Analytical Monitoring	TOC analyser
Remarks - Method	An initial experiment was conducted at a concentration of 10 mg/L of the test substance which indicated an inhibitory effect. Therefore, following the recommendations of the test guideline, the definitive test was conducted at a reduced concentration of 5 mg/L of the test substance.

RESULTS

Test substance		*Sodium benzoate*	
Day	*% Degradation*	*Day*	*% Degradation*
0	0	0	0
6	0	6	67
14	0	14	67
28	0	28	66

Remarks - Results	At a test concentration of 10 mg/L for the test substance in the initial test, the toxicity control attained less than 25% biodegradation after 14 days, indicating that the test item would be classed as exhibiting inhibitory effects under the strict terms and conditions of the test guidelines. Therefore, according to test guideline, the definitive test was conducted at a reduced concentration of 5 mg/L. The toxicity control attained 37% biodegradation after 14 days and 45% degradation after 28 days, indicating that the test substance was not toxic to microorganisms in the activated sludge. All validity criteria for the test were satisfied.
CONCLUSION	The notified chemical is not readily biodegradable
TEST FACILITY	Harlan (2012h)

C.2. Ecotoxicological Investigations

C.2.1. Acute toxicity to fish

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 203 Fish, Acute Toxicity Test – Semi-static.
Species	Rainbow trout (*Oncorhynchus mykiss*)
Exposure Period	96 hours
Auxiliary Solvent	None
Water Hardness	140 mg $CaCO_3$/L
Analytical Monitoring	HPLC-MS-MS
Remarks – Method	Based on the results of the range-finding tests, a definitive test was conducted according to the guideline above without significant deviations

from the protocol. The test media were renewed daily.

RESULTS

Concentration mg ai/L*		*Number of Fish*	*Mortality (%)*				
Nominal	*Actual*		*3 h*	*24 h*	*48 h*	*72 h*	*96 h*
0	N/A	7	0	0	0	0	0
10	N/A	7	0	0	0	14	14
18	N/A	7	0	0	0	0	0
32	N/A	7	0	0	0	0	0
56	49.6	7	0	0	0	0	0
100	88.3	7	0	0	0	0	29

* ai = Active ingredient

LC50	> 100 mg ai/L at 96 hours.
NOEC	56 mg ai/L
Remarks – Results	The actual concentration of the test substance was determined for the test solutions at 0, 24 and 96 hours and the recoveries of the test substance were between 82% and 94%, indicating that the results can be based on the nominal concentration. The highest test concentration resulting in 0% mortality was observed to be 56 mg/L. A single mortality was observed at 10 mg/L after 72 hours exposure. This mortality was considered to be due to natural causes rather than a toxic effect given that no further mortalities occurred and no mortalities were observed at the higher test concentrations of 18, 32 and 56 mg/L. In the definitive test, sub-lethal effects were observed at 96 hours, whereby 2 fish were observed swimming at the surface, at the test concentration of 100 mg ai/L. All validity criteria for the test were satisfied.
CONCLUSION	The notified chemical is not harmful to fish.
TEST FACILITY	Harlan (2012i)

C.2.2. Acute toxicity to aquatic invertebrates

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 202 *Daphnia* sp. Acute Immobilisation Test – Static.
Species	*Daphnia magna*
Exposure Period	48 hours
Auxiliary Solvent	None
Water Hardness	250 mg $CaCO_3$/L
Analytical Monitoring	HPLC-MS-MS
Remarks - Method	Based on the results of the range-finding test, a definitive test was conducted according to the guideline above without significant deviations from the protocol.

RESULTS

Concentration mg ai/L*		*Number of D. magna*	*Number Immobilised*	
Nominal	*Actual*		*24 h*	*48 h*
Control	N/A	20	0	0
0.10	N/A	20	0	0
0.18	N/A	20	2	2
0.32	0.27	20	0	0

0.56	0.45	20	4	19
1.0	0.77	20	12	18

* ai = Active ingredient

LC50	0.43 mg ai/L at 48 hours (95% confidence limit of 0.42-0.45 mg/L)
NOEC	0.32 mg ai/L
Remarks - Results	The actual concentration of the test substance was determined at the exposure time of 0 and 48 hours. The recoveries of the test substance were between 77% and 87% of the nominal concentration. This was not considered to affect the integrity of the test given that the overall mean of the test concentrations was within ± 20% throughout the test. In the definitive test, two daphnids were observed to be immobilised at the test concentration of 0.18 mg/L after 24 hours exposure. This was considered to be due to natural causes rather than a toxic effect given that no further immobilisation was observed at the higher concentration of 0.32 mg/L. All validity criteria for the test were satisfied.
CONCLUSION	The notified chemical is very toxic to aquatic invertebrates.
TEST FACILITY	Harlan (2012j)

C.2.3. Algal growth inhibition test

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 201 Alga, Growth Inhibition Test – Static..
Species	*Pseudokirchneriella subcapitata*
Exposure Period	72 hours
Concentration Range	Nominal: Control, 0.00073, 0.0023, 0.0073, 0.023 and 0.073 mg ai/L Actual: 0.00022-0.0763 mg ai/L
Auxiliary Solvent	None
Water Hardness	3 mg $CaCO_3$/L
Analytical Monitoring	HPLC-MS-MS
Remarks - Method	Following a preliminary range–finding test, *Pseudokirchneriella subcapitata* was exposed to the test media at the above nominal concentrations in the definitive test. The test was conducted according to the guideline above without significant deviations from the protocol.

RESULTS

Yield		*Growth*	
E_bC50	*NOE_bC*	*E_rC50*	*NOE_rC*
mg ai/L at 72h	*mg ai/L*	*mg ai/L at 72 h*	*mg ai/L*
0.0045	0.0023	0.0089	0.0023
(95% Confidence limits: 0.004-0.005)		(95% Confidence limits: 0.008-0.01)	

* ai = Active ingredient

Remarks - Results	The measured concentration for the test substance at the exposure time of 72 hours was in the range of 31-113% of the nominal concentration. Additional samples were prepared at 0 hours with the omission of algal cells. These additional samples were incubated in parallel with the test from which samples were taken for analysis at 72 hours. The measured concentrations for these additional samples were 95-118% of the nominal concentrations, indicating that the decline of the test substance was due to adsorption of the test item to the algal cells present rather than instability of the test substance. Therefore, the study authors note that the results can be based on nominal concentrations only.

	All validity criteria for the test were satisfied.
CONCLUSION	The notified chemical is very toxic to algae.
TEST FACILITY	Harlan (2012k)

C.2.4. Inhibition of microbial activity

TEST SUBSTANCE	Notified chemical (≤ 73% in aqueous solution)
METHOD	OECD TG 209 Activated Sludge, Respiration Inhibition Test.
Inoculum	Activated sludge
Exposure Period	3 hours
Concentration Range	Nominal: Control, 0.01, 0.1, 1, 10 and 100 mg/L Actual: Not reported
Remarks – Method	Conducted according to the guidelines above without significant deviations from the protocol.
RESULTS	
EC50	10-100 mg/L
Remarks – Results	All validity criteria for the test were satisfied. In the range-finding test, no significant effects were observed at concentrations of 0.01 and 0.1 mg/L of the test substance, while toxic effects were observed at concentrations of 1.0, 10 and 100 mg/L. No definitive test was conducted since the EC50 value could be deduced based on the results obtained in the range-finding test.
CONCLUSION	The notified chemical is expected to significantly inhibit microbial respiration at concentrations greater than 1 mg/L
TEST FACILITY	Harlan (2012l)

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