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9 July 1992

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

OMC-586

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Director

Chemicals Notification and Assessment

FULL PUBLIC REPORT**OMC 586****1. APPLICANT(S)**

Henkel Australia Pty. Ltd., 83 Maffra Street, BROADMEADOWS, VIC., 3074.

2. IDENTITY OF THE CHEMICAL

Trade name: OMC 586

Type of Chemical: OMC 586 is a mixture of fatty acid esters

Other name(s): Petrofree, Terradril 586, Synthetic oil No. 2

Molecular weight: Average molecular weight = 312
(calculated from esterification number)

Methods of detection and determination:

OMC 586 can be identified from its Infra-red spectrum (see below).

Spectral data:

The infra-red spectrum of OMC 586 shows clearly defined absorption peaks at the following wavenumbers (cm^{-1}):

725, 1120, 1175, 1380, 1465, 1740, 2830, 2860.

3. PHYSICAL AND CHEMICAL PROPERTIES**Appearance at 20°C and 101.3 kPa:**

OMC 586 is a clear, colourless-to-slightly-yellow liquid.

Odour: Not stated in notification package.

Melting Point: Below -15°C

Boiling Point: Approximately 340°C

Density: 860 kg/m³ {for density}

Vapour Pressure:

100 kPa	at	342°C
10 kPa	at	259°C
1 kPa	at	196°C
0.1 kPa	at	147°C
6×10^{-3} kPa	at	100°C
8×10^{-5} kPa	at	45°C
4.5×10^{-5} kPa	at	38°C

Water Solubility:

< 5ppm by OECD TG 105 (1). The solubility of individual components would be expected to be well below this figure.

Partition Co-efficient: $\log P_{O/W} > 4$ (calculated)
(n-octanol/water)

Hydrolysis as a function of pH:

Ester hydrolysis takes place slowly in mud (<1% in 1 year) but more rapidly when the drilling mud is dispersed in water.

Adsorption/Desorption: Not determined

Dissociation Constant: The esters do not dissociate

Flash Point: 179°C

Autoignition Temperature: 240°C

Flammability limits: Lower flammability limit = 0.2%
(v/v)
Approximately (estimate)
Upper flammability limit = 2% (v/v)
approximately (estimate)

Pyrolysis products: Not determined

Explosive Properties: Not determined

Reactivity/Stability: Not determined

Particle size distribution: Not applicable to a liquid

4. PURITY OF THE CHEMICAL

Degree of purity: approximately 99%

Toxic or hazardous impurities:

- . **Chemical name:** 2-ethyl-1-hexanol
CAS No.: 104-76-7
Weight percentage: 0.5%
Toxic properties: Moderate irritant, also produces birth deformities (including hydronephrosis, tail and limb defects) in rats at oral doses of 812 mg/kg and 1.62 g/kg (2)

Non-hazardous impurities:

- . **Chemical name:** p-toluenesulfonic acid
CAS No.: 104-15-4
Weight percentage: 0.005%
- . **Chemical name:** fatty acids
Weight percentage: 0.5%

5. INDUSTRIAL USES

OMC 586 will be used as the carrier fluid in an oil-based drilling fluid (mud) for on-shore and off-shore oil and gas drilling, especially for deviated holes and when drilling through difficult geological formations. The fluid is circulated in the drill hole to remove drill cuttings and stabilise the hole. Drill cuttings are subsequently strained out of the fluid. Large volumes of fluid are required because of the size of such operations.

The liquid phase of the final mud system will contain 50 - 90% OMC 586 plus water, emulsifiers, solids and other materials to achieve the desired properties. Formulation of the mud may occur at specialized mud plants, or at the drilling site. The notifier

has indicated that initially the mud is expected to be produced at one mud plant and three drilling sites. This will later expand to up to four mud plants and twenty-one drilling sites.

Import volumes for OMC 586 are:

First year	750 kL (645 tonnes)
Second - fifth year	1113 kL (960 tonnes)

6. OCCUPATIONAL EXPOSURE

The notifier has indicated that a maximum of 50 workers, being engineers, drilling crew, mud loggers and geologists, will have the potential for exposure to OMC 586. Exposure time per worker may vary from less than an hour a few days per year to intermittent exposure over a shift for more than 30 days per year.

Potential worker exposure at a mud plant would most likely occur through skin contact while handling, sampling and testing OMC 586 or the formulated mud. Mud plants feature a pit or container for mixing the components of the mud, a process which requires extremely high shear forces. Inhalational exposure of workers near these mixing processes should not be significant since OMC 586 is not highly volatile, and since the formation of respirable mists during the mixing process is unlikely.

The potential for worker exposure at drilling sites would be similar to that at mud plants, with even less chance of inhalational exposure since the substance will be used in the open where any vapours or mists are more readily dispersed. However since mud will be applied to the drilling process and later recovered, there would be greater opportunity for skin contact.

7. PUBLIC EXPOSURE

The potential for public exposure to OMC 586 appears negligible. This substance is a blend of fatty acid esters of low volatility and is used exclusively as a constituent of a drilling 'mud' in on-shore and off-shore oil and gas drilling. The notifier has indicated that 'small amounts' will be released from drilling holes to the environment but this is not likely to have any impact on public health.

The notifier has indicated that the product is to be imported to Australia 'for the time being'.

The information supplied indicates that OMC 586 is stored in steel drums and is transported by tank cars. The notifier has indicated that no special regulations for transportation of OMC 586 apply. Disposal is by incineration (>1200°C).

8. EVALUATION OF TOXICOLOGICAL DATA

8.1 Acute Toxicity

8.1.1 Acute Oral Toxicity in Rats (3)

This acute oral toxicity study was conducted according to OECD Test Guideline No. 401. Five male and five female Wistar rats received a single oral dose, by stomach tube, of OMC 586 (technical grade) suspended in arachidis oil. Following a 14 day observation period, surviving animals were sacrificed and necropsied.

No mortalities occurred and no signs of intoxication were recorded. Necropsy was unremarkable. The LD50 was >2000 mg/kg.

8.1.2 Skin Irritation in Rabbits (4)

0.5 ml of undiluted OMC 586 was applied to the shaved, intact dorsal skin of 4 male rabbits. The dorsal area was covered by an inert plastic wrap and gauze bandage for a 4 hour period. Any symptoms were reported over a 7 day period.

Slight erythema persisted to 72 hours in all four rabbits, while the slight oedema seen in two rabbits at one hour had resolved by 48 hours. No symptoms were evident at 7 days. The compound was classified as a slight skin irritant.

8.1.3 Human Skin Compatibility (Open Epicutaneous Test) (5)

OMC 586 at concentrations of 50% (in paraffin perliquid) or 100%, was applied to the inner forearm surface of 10 male and female human volunteers. One to two drops of the test compound was applied every 30 seconds for up to 60 minutes. Pure paraffin perliquid also served as a negative control.

No subjective or objective reactions were reported after 60 minutes of application of either concentration of the test compound.

8.1.4 Human Skin Compatibility (Closed Epicutaneous Test) (6)

OMC 586, at concentrations of 25%, 50% or 100%, was applied dermally on the back of 20 healthy male and female human volunteers and held under an occlusive patch for a period of 24 hours. Paraffin perliquid, demineralised water, physiological saline, SDS 0.5%. AS and Texapon N25 1.0% AS served as reference substances. Cutaneous responses were evaluated at 6, 24, 48 and 72 hours after patch removal.

No skin reaction was reported at the 25% or 50% dilutions. Mainly slight erythema was seen with the undiluted compound, with an apparent smaller incidence of moderate erythema and slight oedema. However, the number of individuals reacting, the time course involved and the reversibility or otherwise of reactions is unclear from the data provided.

8.1.5 Skin Sensitisation in Guinea Pigs (7)

Thirty Pirbright white guinea pigs were used in the maximisation test to assess the sensitising potential of OMC 586. Preliminary studies indicated that 0.5% and 40% of OMC 586 in paraffin oil were the minimally irritating concentrations following intracutaneous and epicutaneous induction respectively. These concentrations were therefore used for the induction phases. A 20% solution of OMC 586 was used for the challenge phases in both treated and control animals. Exposure chambers were employed for epicutaneous exposures in the challenge phase.

One treated animal died after the first induction treatment. Slight erythema was seen in 7/20 treated animals at 1 hour following the intracutaneous induction and in 11/20 animals at 24 hours post injection. No effects were seen in controls. After epicutaneous induction, slight to moderate erythema and/or oedema was recorded in 16/19 treated animals and 7/10 control animals. At 24 hours, effects were generally weaker and were seen in 10/19 treated and 2/10 control animals. One treatment animal revealed slight erythema 24 hours after the challenge application, while a slight skin reaction was recorded in 5/10 control animals. No effects were evident in treated animals at 48 hours, while slight erythema persisted in one control animal. These results indicate

that OMC 586 has no sensitising potential under the test conditions.

8.1.6 Toxicology review of constituent fatty acid ester

The notifier submitted a review paper on a fatty acid ester which is a constituent of OMC 586. The following acute toxicological properties were reported for this substance.

An acute oral LD50 in rats of >55 g/kg was estimated from 3 separate studies. No mortalities were reported in any study and the only signs were slight ocular haemorrhage and moderate diarrhoea at 55 g/kg.

In a 24 hour dermal exposure study in rabbits, at doses up to 8.1 g/kg, the only reported effect was mild skin irritation which had fully resolved by day 10.

The substance was classified as a mild skin irritant in a rabbit study. Results of 2 other rabbit studies demonstrated a lesser irritant effect. Reported results of 3 separate Draize rabbit eye irritation studies, indicated that the substance is minimally irritating to the rabbit eye. In two separate studies, the substance was reported as non-sensitising in guinea pigs, using the Landsteiner and Jacobs technique.

In a 48 hour occlusive patch test and an 18-day repeated patch test conducted in humans, no dermal irritant effects were reported. Mild irritation was noted in some volunteers in a 21-day repeat patch test in humans, with a 42% formulation.

8.2 Repeat Dose Studies

8.2.1 28 Day Repeat Dose Oral Toxicity in Rats (8)

Groups of five male and five female Sprague-Dawley rats were dosed daily by oral gavage, with OMC 586 in corn oil, at dose rates of 0, 100, 300 or 1000 mg/kg bw 5 days/week for 28 days. Signs of intoxication, food consumption and body weights were monitored and recorded. Haematological and biochemical analyses were performed on samples taken prior to study initiation and at study termination. Neurotoxicological assessment was also performed at periodic intervals throughout the study. At termination, the surviving animals were necropsied and selected tissues were sampled for histological examination.

No mortalities or signs of intoxication were recorded at any dose level. A statistically significant decrease in platelet count and increase in lymphocyte count, coupled with a decreased neutrophil count in low dose males. Because these responses were not dose-related they were considered not to be toxicologically significant. Clinical chemistry analysis revealed no toxicologically significant findings. Necropsy, organ weight analysis and histopathological analysis revealed no treatment-related effects.

8.3 Genotoxicity

8.3.1 Salmonella/Mammalian Microsome Mutagenicity Test (9)

The mutagenic potential of OMC 586 was assessed using histidine dependent auxotrophic mutants of *Salmonella typhimurium* (TA 98, TA 100, TA 1535, TA 1537, TA 1538), in the presence or absence of metabolic activation (Aroclor 1254 induced rat liver S9 mix). Two independent assays were performed. OMC 586 was suspended in Tween 80/bidistilled water, at concentrations of 8-5000 ug/plate. Sodium azide (TA 100, TA 1535), 9-aminoacridine (TA 1537) and 4-nitro-o-phenyldiamine (TA 98, TA 1538) served as the positive controls without activation. 2-aminoanthracene served as the positive control in the presence of activation in all strains.

No significant increase in the mean number of revertant colonies was seen at any dose level of OMC 586 compared with the negative controls in the presence or absence of metabolic activation. The positive controls confirmed the sensitivity of the assay. OMC 586 is therefore not considered to be mutagenic under the conditions of this assay.

8.3.2 Rodent Bone Marrow Micronucleus Test (10)

Groups of five male and five female CD-1 mice received a single *ip* dose of OMC 586 in corn oil (50/50 v/v) at 1.25, 2.5 or 5 ml/kg bw. Vehicle controls were also employed. Cyclophosphamide served as the positive control (30 mg/kg). Groups of 5 animals/sex/dose level were sacrificed at 24, 48 and 72 hours post dosing. Positive control animals were sacrificed 24 hours post dosing. Bone marrow smears were obtained from the excised femur, stained and the numbers of micronucleated polychromatic erythrocytes were assessed.

No signs of intoxication were reported. No increase in the mean number of micronucleated erythrocytes was seen at any dose level of OMC 586 when compared to the negative control marrow smears at any time point. No treatment related effect on polychromatic erythrocyte production was noted. The positive control confirmed the sensitivity of the assay. OMC 586 is not considered to be mutagenic under the conditions of the assay.

8.4 Overall Assessment of Toxicological Data

OMC 586 has low acute oral toxicity and is a slight skin irritant in rats. OMC 586 was not a skin sensitiser in guinea pigs. When undiluted OMC 586 was held in contact with human skin for 24 hours, it produced slight to moderate erythema and slight odema. OMC 586 was not genotoxic in either a Salmonella/mammalian microsome mutagenicity test or a mouse bone marrow micronucleus test. A 28-day repeat dose toxicity study showed that OMC 586 has low systemic toxicity.

A constituent ester of the OMC 586 fatty acid ester blend, showed a similar toxicological profile to that summarised for OMC 586 above, and additionally was slightly irritating to the rabbit eye.

It is expected that OMC 586 would be metabolised via hydrolysis to its constituent fatty acids and alcohol. These metabolites would then be further metabolised, but their fate cannot be predicted.

Acute dermal toxicity, acute inhalational toxicity, and eye irritancy test reports were not supplied by the notifier, and were granted a Variation of Schedule Requirements.

The rationale for granting the Variation on acute dermal toxicity was:

- . that no acute toxic effects were produced in rats by a fatty acid ester (structurally typical of the mixture of fatty acid esters comprising OMC 586) which is a constituent of OMC 586 at high dermal doses of up to 8.1 g/kg;
- . that esters of fatty acids with lower alcohols (including methyl caproate, pentyl caproate, and n-hexyl caprylate), which are structurally related to the constituents of OMC

586, have low acute dermal toxicity (all having dermal LD₅₀ values in rodents of > 5 g/kg) (11); and

- . that OMC 586 otherwise showed low overall toxicity (low acute oral toxicity, no treatment-related effects in a repeat-dose oral toxicity test, and no genotoxic effects).

On the basis of the above information, there are reasonable grounds for assuming that OMC 586 will have low acute dermal toxicity.

The rationale for granting the Variation on acute inhalational toxicity was:

- . that OMC 586 is not highly volatile and the notified pattern of use indicates that inspirable and/or respirable mists of OMC 586 will not be formed; and
- . that esters of fatty acids with lower alcohols (methyl capronate and isopropyl palmitate), which are structurally related to the constituents of OMC 586, have low acute inhalational toxicity (LC₅₀ values in rodents of 14 g/m³/2h and >200 g/m³/h, respectively) (11).

On the basis of the above information, there are reasonable grounds for assuming that OMC 586 will have low acute inhalational toxicity.

The rationale for granting the Variation on eye irritation tests was:

- . that a fatty acid ester which is a constituent of OMC 586 is known to be a slight eye irritant; and
- . that OMC 586 was found to be non-irritating in an *in vitro* assay using the chick chorioallantoic membrane, details of the validation of which (against the Draize test in rabbits) are published (12,13).

On the basis of the above information, there are reasonable grounds for assuming that OMC 586 will be a slight eye irritant. Consistent with skin and eye irritation, OMC 586 can also be considered a possible respiratory tract irritant.

It should also be noted that one of the impurities, 2-ethyl-1-hexanol present at 0.5%, was investigated in a rat teratology study (2). Birth deformities (including hydronephrosis, tail and limb defects) were produced in offspring at oral doses of 2-ethyl-1-hexanol of 812 mg/kg and 1.62 g/kg.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

9.1 Environmental Release

. Volume

Imports will be high at 645 - 960 tonnes per annum over the next five years.

. Formulation, handling and disposal

Mud formulation will take place initially at a fully bunded liquid mud plant at Dampier, licenced by the WA EPA, and later at the drilling site. Future mud plants may be constructed in Victoria to service the oil and gas fields in Bass Strait and the Otway Basin, with production expanding to as many as four plants and twenty-one drilling sites. The notifier indicates that any spills at Dampier will either be recycled or disposed of at a designated waste disposal site in accordance with licence conditions.

The mud will basically be a dense colloid slurry of barite (barium sulphate) in OMC 586 and water, with smaller amounts of emulsifiers, surfactants, viscosifiers, fluid loss agents and lime added to achieve a water in oil emulsion with the required properties. Blending will take place in surface pits.

. Use

OMC 586 will constitute the carrier fluid in oil-based drilling muds, which lubricate and cool drilling operations, stabilise the drill hole by creating an impermeable lining, and serve as a medium for removal of drill cuttings. Wells are drilled using a rotating bit turned by a hollow shaft through which the drilling mud is pumped more or less continuously, returning to the surface with suspended cuttings through a mud return line (14). The notifier indicates that used mud will be returned to the mud plant for reconditioning, where cuttings will be strained out for

disposal in a designated waste disposal site. Literature reports indicate that drill cuttings are typically discharged to form piles around the drilling site in North Sea operations (15) using low toxicity base oils (paraffins and saturated cyclic compounds) and on the US outer continental shelf (16).

9.2 Environmental Fate

It would appear that most of the OMC 586 will be disposed of to landfill when drill cuttings or mud which cannot be recycled, for example because of excessive colloidal solid content, are disposed of. While the terrestrial fate of OMC 586 has apparently not been investigated, as a mixture of fatty acid esters it can be expected to sorb to soils and undergo chemical or microbial hydrolysis followed by mineralisation. Hydrolysis is more likely to be initiated microbially as the esters proved stable in formulated mud systems (approximately 1% hydrolysis in one year) and did not undergo significant hydrolysis under field conditions (23 days at bottom hole temperatures of 120-140°C).

The notifier states that drilling muds containing OMC 586 will be returned to the mainland for recycling or disposal. While significant amounts should not enter the marine environment under normal conditions, accidents at sea during transport, or leaks resulting from sudden oil and gas shows or well overflows during drilling, may give rise to some exposure. Ready biodegradability of OMC 586 in the marine environment was evaluated according to established protocols in the closed bottle test using natural seawater. The 5 day biological oxygen demand at concentrations of 0.5 and 2.5 ppm was 83 and 70% respectively, indicating that biodegradation of the ester component of mud spills and leaks should proceed rapidly after dispersion in seawater.

Release of OMC 586 to the marine environment will be followed by partitioning between the sediment and the water column. Anaerobic degradability was determined by the ECETOC method (No 28, 1988) which involves measurement of net gas production and dissolved inorganic carbon formation from a mineral salt solution inoculated with secondary digester sludge from a municipal sewage treatment plant. Based on gas production, which steadily increased to reach 63% of theoretical in 35 days, the first half-life was about 3 weeks. Inclusion of dissolved inorganic carbon increased the measured extent of biodegradation to 82%, indicating that OMC 586 would not be expected to persist under the anaerobic conditions characteristic of marine sediment.

In summary, the structural features and experimental performance of OMC 586 indicate that it should be readily biodegraded in both terrestrial and marine environments. Bioaccumulation is not envisaged as the esters are readily hydrolysed.

9.3 Environmental Effects

Results for the following are available:

Test	Species	Result
96h exposure (base oil)	Brown Shrimp (<i>Crangon crangon</i>)	LC ₅₀ > 10000ppm
96h exposure (mud)	"	LC ₅₀ > 32000ppm
Growth inhibition(72h)	Alga (<i>Skeletonema costatum</i>)	EC ₅₀ = 15800ppm
Retardation of sedimentation and metamorphosis (240h)	Acorn barnacle (<i>Balanus improvisus</i>)	EC ₅₀ =125000ppm
Growth inhibition (120h)	Blue mussel (<i>Mytilus edulis</i>)	EC ₅₀ = 5.6ppm

The toxicity of base oil to brown shrimp was investigated under semi-static conditions, with surface slicks skimmed off and recirculated through the test medium as fine droplets. In the mud test, mud was allowed to settle evenly over the tank floor before addition of the shrimp. Thus the exact concentrations to which the shrimp were exposed are unclear, but it appears unlikely that mud spills will give rise to mortality of brown shrimp under environmental conditions.

The remaining results were obtained in Norwegian tests and, according to the test reports, indicate moderate toxicity of the test substance (used mud). The exact concentrations to which the algae and barnacles were exposed are unclear as test media were filtered before use to allow sufficient light infiltration. The

mussel test was conducted in natural sea water with a microencapsulated emulsion of the test substance (apparently the ester rather than mud, although this is not clear). Substances are regarded as being of moderate toxicity to mussels when the EC₅₀ is above 1ppm.

Acute toxicity test results were also provided for zebrafish exposed under semi-static conditions to a fatty acid ester (representative of the heavier fractions of OMC 586). No significant acute toxicity was recorded (LC₅₀>10000ppm). This mixture of substances also proved nontoxic to bacteria when tested according to OECD Guideline 209.

Toxic effects on marine biota from drilling muds have been correlated with diesel oil, which is sometimes added to muds to improve lubricity (16), and with levels of petroleum hydrocarbon contaminants (17), particularly water soluble oil fractions (18). By comparison, the toxicity of the ester appears relatively insignificant.

9.4 Environmental Hazard

In contrast to North Sea drilling operations where cuttings are discharged directly to the marine environment, cuttings from Western Australian wells drilled using OMC 586 based muds will be returned to the mainland for disposal. The exposure of the marine environment to OMC 586, and to the more hazardous petroleum contaminants which may form part of used mud systems, should be restricted to leak and accident situations such as overflows or loss of ships at sea.

As a mixture of esters, OMC 586 can be expected to be readily metabolised through hydrolysis both in the environment and in living organisms. The marine toxicological profile appears low, exposure should be low, and accumulation and bioaccumulation are not predicted. The environmental hazard from the proposed use of OMC 586 appears low. Esters such as those which comprise OMC 586 would appear preferable on environmental grounds to hydrocarbon lubricants which may prove more persistent and biaccumulative.

10. ASSESSMENT OF OCCUPATIONAL HEALTH AND SAFETY EFFECTS

OMC 586 is unlikely to cause significant effects on the health and safety of workers exposed to this substance. OMC 586 has low

toxicity, producing slight skin irritation and probably slight eye irritation.

If spilt onto smooth surfaces OMC 586 may make such surfaces more slippery, which would increase the chance of worker slips and falls.

11. ASSESSMENT OF PUBLIC HEALTH EFFECTS

The acute to short-term toxicity of OMC 586 is low, and the potential for public exposure to OMC 586 appears to be negligible. The product is a blend of fatty acid esters of low volatility and is used exclusively as a constituent of a drilling 'mud' in on-shore and off-shore oil and gas drilling. In conclusion, the use pattern outlined by the notifier and the toxicological profile provided suggests that OMC 586 presents a negligible public health hazard.

12. RECOMMENDATIONS

To minimise public, worker and environmental exposure to OMC 586 the following guidelines and precautions should be observed:

- . copies of the Material Safety Data Sheet for OMC 586 should be made available to all personnel who may have exposure to the substance;
- . spillages of OMC 586 should be cleaned up as soon as possible to avoid causing slips and falls, for example by covering with a suitable absorbent material and subsequent disposal according to local regulations;
- . to minimise environmental exposure to OMC 586, other States where drilling is proposed should adopt similar standards to those which apply in Western Australia; and
- . mud formulation plant workers and drilling rig workers who come into direct contact with drilling fluids containing OMC 586 should:
 - avoid contact of OMC 586 with the skin by wearing impermeable gloves (for example rubber or PVC gloves) complying with Australian Standard AS 2161 *Industrial Safety Gloves (excluding electrical and medical gloves)* (19);

- avoid contact of OMC 586 with the eyes by wearing safety glasses or goggles complying with Australian Standard AS 1337 *Eye Protectors for Industrial Applications* (20), and chosen and used in accordance with Australian Standard AS 1336 *Recommended Practices for Eye Protection in the Industrial Environment* (21); and
- observe good personal hygiene practices at work.

13. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for OMC 586 is at Attachment 1. This MSDS was supplied by Henkel Australia Pty. Limited as part of their notification statement. The MSDS is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Henkel Australia Pty. Limited.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of OMC 586 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

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- (3) OMC 586 - Acute Oral Toxicity in Rats (Sterzel. W, Henkel, Study no. HTX 890241, 1990)
- (4) OMC 586 - Acute Dermal Irritation (Steiling W, Henkel, Study no. HTX 890242, 1989)

- (5) Test on Skin Compatibility of OMC 586 in an Open Epicutaneous Test after Burckhardt (Krachter, Henkel, study no. HTX 900415, 1990)
- (6) Test on Skin Compatibility of OMC 586 in a Closed Epicutaneous Test (Krachter, Henkel, Study no HTX 900468, 1990)
- (7) OMC 586 - Skin Sensitisation (Maximisation Method) (Steiling. W, Henkel, Study no. HTX 900318, 1991)
- (8) 28 Day Repeated Dose - Oral (Fitzgerald G, Toxilcon Corporation, Project no 91G-0422, 1991)
- (9) OMC 586 - Salmonella/Mammalian Microsome Mutagenicity Test (Banduhn. N, Henkel, Study no. HTX 900383, 1990)
- (10) Rodent Bone Marrow Microucleus Test (Paika I.J., Toxikon, Project no. 91G-0423, 1991)
- (11) U.S. National Institute for Occupational Safety and Health, *Registry of Toxic Effects of Chemical Substances (RTECS)*, May 1992.
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- (16) Tompkins,D.F., Handel,E.D., and Telliard,W. Analysis for diesel oil components in drilling fluids, pp 223-227 in Lichtenberg,J.J., Winter,J.A., and Weber,C.I. (Eds), *Chemical and Biological Characterisation of Sludges*,

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- (20) Standards Australia, AS 1337 *Eye Protectors for Industrial Applications*, Sydney, 1984
- (21) Standards Australia, AS 1336 *Recommended Practices for Eye Protection in the Industrial Environment*, Sydney, 1982