File No: NA/55

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

1-HYDROXY-4-[4-[[[1-[(4-METHOXYPHENYL)METHYL]-1H-TETRAZOL-5-YL]THIO]METHYL]-2-NITROPHENOXY]-N-[2-(TETRADECYLOXY)PHENYL]-2-NAPHTHALENECARBOXAMIDE

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989* and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Arts, Sport, the Environment and Territories and the assessment of public health is conducted by the Department of Health, Housing and Community Services.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

C-1809

1. APPLICANT

Kodak Australasia Pty Ltd., 173 Elizabeth Street, Coburg, Victoria 3058.

2. IDENTITY OF THE CHEMICAL

Other names: C-1809

Trade name: none

Molecular formula: $C_{47}H_{54}N_6O_7S$

Molecular weight: approx. 846

The toxicological profile of this chemical indicates that it is likely to be non-hazardous to humans. Therefore, the chemical name, molecular formula and structural formula have been exempted from publication in the Full Public Report and Summary Report.

3. METHODS OF DETECTION AND DETERMINATION

Separation: High Pressure Liquid Chromatography

Structural elucidation:

Infra-red Spectroscopy; Ultra-violet spectroscopy and Nuclear Magnetic Resonance Spectroscopy.

Spectral data:

Ultra-violet spectral data: (solvent: acetonitrile)

Absorbance Maximum (nm)	Molar Absorption Coefficient (L/mol cm)
354	13293
299.6	16618
256.1	30000
222.8	70390
196.6	96789

Infra-red and Nuclear Magnetic Resonance spectral data were provided for assessment.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: yellow powder

Melting point: 88.7^{O}C $\pm$ 0.1^{O}C

Density: 1.265 x 10^{3} kg/m^{3} @ 25^{O}C

Vapour pressure: <1 x 10^{-8} kPa @ 25 ^{O}C

Water solubility: 5.3 ppt (calculated)

Fat solubility: 0.628 g/100g fat @ 30^{O}C within 24 hours

Partition coefficient: estimated to be 9.1 @ 23^{O}C
log $P_{O/w}$

Hydrolysis:	not provided as the notified chemical is virtually insoluble in water
Adsorption/desorption:	not provided as the notified chemical is virtually insoluble in water
Dissociation constant:	not provided as the notified chemical is virtually insoluble in water
Flash point:	not provided as the notified chemical has negligible vapour pressure
Flammability:	combustible
Combustion products:	oxides of carbon, nitrogen and sulphur
Autoignition temperature:	not provided as the notified chemical has negligible vapour pressure
Explosive potential:	capable of dust explosion
Decomposition temperature:	>115 ^{O}C
Decomposition products:	methane, oxides of carbon and nitrogen
Reactivity:	oxidising agent; incompatible with strong oxidisers
Particle size:	3.44 x 10^{2} µm

Comments on physico-chemical properties:

The initial water solubility value submitted by the notifier was <0.1 mg/L, the detection limit of the analytical method used (1). The Commonwealth Environment Protection Authority (CEPA) indicated that a water solubility of this level may still be

environmentally significant and that the limit value precludes an accurate assessment of the chemical's fate in the water compartment. CEPA suggested this situation could be rectified through the use of a more sensitive High Pressure Liquid Chromatography (HPLC) detection limit or use of the HPLC method in (2) to determine log $P_{O/W}$, which in turn would allow calculation of a more accurate water solubility. The notifier responded by providing an estimated value of the partition coefficient according to the procedures outlined in (2). From this value, the notifier calculated the water solubility using the equation:

$\log(1/S) = 1.339 \log P_{O/W} - 0.978$; where S is in moles/L (3).

No data were provided for hydrolysis on the grounds that the test could not be performed on the notified chemical due to low solubility in water and lack of sufficiently sensitive analytical methods. The notified chemical contains an amide functionality but hydrolysis is expected to be slow under environmental conditions.

No data were provided for adsorption/desorption on the grounds that results were not measurable for compounds of low water solubility It should be noted that similar notified chemicals in which the limit of water solubility was exceeded were seen to adhere to surfaces of vessels . Therefore it is assumed that the adsorption constant is high and the notified chemical is likely to adsorb onto solid materials. The high log $P_{O/W}$ is indicative of strong adsorption (3).

No data were provided for dissociation constant on the grounds that results were not measurable for chemicals of low water solubility. The notified chemical contains six nitrogen atoms but their basicity is unclear.

5. PURITY OF THE CHEMICAL

Degree of purity: approx. 99.2 $\pm$ 0.5 %

Impurities: unknown approx. 1%

Additives/adjuvants: none

6. USE

The notified chemical will be imported for use exclusively as a coupler in the manufacture of photographic film or paper. After importation, it will be reformulated into a gelatin dispersion which will later be melted with other ingredients before being incorporated into the film or paper. The notified chemial will be present at 2% by weight in the dispersion and 0.3% by weight in the melt. The notifier estimates that 700-1000 kg will be imported per year.

7. PUBLIC EXPOSURE

The notified chemical will be imported in sealed shipping containers. Therefore public exposure to this chemical during transport is unlikely.

Under correct usage, public exposure to the notified chemical will be minimal due to minimal release of the chemical into the environment as the notifier states that it will be totally consumed in the manufacture of the dispersion and once incorporated into the film or paper, it will be coated by layers of overcoatings. According to the notifier, approximately 10% of the gelatin dispersion containing the notified chemical could be released to the municipal sewer, with an additional 10% released from automated processing equipment. However, public exposure will be minimised by secondary treatment of the municipal sewer at a facility operated by the Melbourne and Metropolitan Board of Works. In addition, <1% of waste may be sent to secured landfill but bioaccumulation will be low due to its low level in the dispersion.

When the photographic film or paper is used, public exposure to the notified chemical will be negligible because it will be present as a minor component in the film or paper, and according to the notifier, once the dispersion is incorporated in the film or paper it will be coated by layers of overcoatings.

8. OCCUPATIONAL EXPOSURE

8.1 Reformulation process description

The notified chemical will be reformulated into a gelatin dispersion at only one site in Australia.

It is stated in the notification that the notified chemical will be imported as pre-weighed units therefore routine re-weighing in Australia will not be necessary. The pre-weighed chemical, in the form of a dry powder and other ingredients as determined by the formulation, will be added to mix tanks approximately 25 times a year. The addition of the notified chemical will take approximately 15 minutes each time. Mixing will be conducted under local exhaust ventilation. After mixing, the resulting gelatin dispersion will be chilled and then stored in closed plastic bags for up to several weeks. During use, the dispersion will be taken out of the bag and added to melt tanks, where other ingredients will be added. The resulting melt will then be pumped to controlled automatic processing equipment where the notified chemical will be incorporated into the film or paper.

8.2 Occupational Exposure

As the notified chemical will be imported and stored in sealed shipping containers, significant risk of worker exposure during transport and storage is unlikely. After reformulation, the notified chemical in a gelatin dispersion, will be stored in closed plastic bags in chilled storage areas. Significant risk of exposure to the notified chemical in the gelatin dispersion during storage is not anticipated even in the event of an accidental spillage as it will be present at a very low level (2% by weight) in the dispersion.

Potential exposure to the notified chemical will be during its handling and use. Operators involved with the mixing, packing, melting, equipment cleaning, and use of the gelatin dispersion, may come into direct contact with the notified chemical if engineering controls and personal protection measures are not implemented. The major route of direct contact with the notified chemical will be through inhaling the powder before reformulation, and dermally once the melt is formed. Before reformulation, if precautions to minimise contact are not taken, exposure to the notified chemical may be high. The notified chemical is of relatively large molecular size, is virtually

insoluble in water or fat, and has a particle size above the inspirable range (>185 µm). Therefore, it is unlikely to be absorbed through biological membranes such as the skin or through inhalation. Exposure to the notified chemical after reformulation is likely to be negligible due to its low level (2% by weight) in the dispersion before the melting process and in the melt (0.3% by weight). It is stated in the notification that once the notified chemical becomes incorporated in the film or paper, no exposure is likely as the chemical will be protected by layers of overcoating. Therefore, it is anticipated that exposure of handlers and users of the treated film or paper, to the notified chemical, will be negligible.

9. ENVIRONMENTAL EXPOSURE

. Release

The notifier states that there are no anticipated releases to the environment of the pure chemical. Approximately 10% (to be confirmed) of the aqueous gelatin dispersion containing the notified chemical could be released to the municipal sewer. Further losses of about 10% will be encountered from the incorporation of the notified chemical to the film or paper. However, this waste will be routed through the silver recovery plant and from its physico-chemical properties the notified chemical is likely to be adsorbed to solids from which silver (approx. 10%) is recovered at Port Kembla and the remainder incinerated. The notifier is presently undertaking some analytical testing of the intial effluent, the recoverd cake and the filtrate to confirm this. The municipal sewer flow will be routed for secondary treatment at the Werribee treatment facility. Less than 1% of wastes may be sent to a secured landfill.

. Fate

The notified chemical will mainly enter the environment when the gelatin dispersion is discharged to the sewer. It would be unlikely for it to undergo significant microbial or chemical breakdown in the sewerage system. Three treatment systems are combined throughout the course of a year at the Werribee treatment complex, land filtration in summer and grass filtration

and lagoon treament in winter (4). Most likely the fate of the notified chemical would be sorption onto suspended solids and settling out over the land or into lagoon sludge, as sewage inflow passes through the filtration systems at Werribee. This may result in the accumulation of the notified chemical in the soil, but prospects of leaching to any appreciable extent appear minimal, in view of the low water solubility and expected strong adsorption.

. **Biodegradation**

Ready biodegradability was investigated using the modified Sturm test (5) with measurement of evolved carbon dioxide. The extent of biodegradation amounted to approximately -3% in 29 days at nominal concentration of 10 ppm (i.e. slightly less CO_2 was evolved from the test carboy compared to the background blank) and 2% at 20 ppm. The results indicate that the notified chemical is not readily biodegradable. The activated sludge respiration inhibition test (6) indicates that the notified chemical does not inhibit respiration of microorganisms (3 hr IC50 >100 mg/L).

. **Bioaccumulation**

The notified chemical has low water solubility and is not readily biodegraded. Therefore, it may bioaccumulate. However, the high molecular weight and relatively large molecular size may preclude this (7). Further, as the log $P_{O/W}$ value has been estimated as 9.1, these considerations taken together would indicate that the notified chemical's bioaccumulation potential is likely to be low. The molecule is also not very fat soluble.

The possibility of soil accumulation needs consideration. However, the notified chemical contains linkages such as the amide which would be expected to be vulnerable to microbial cleavage in the soil. Thus, significant accumulation is not expected.

10. EVALUATION OF TOXICOLOGICAL DATA

10.1 Acute toxicity

Table 1. Summary of the acute toxicity of the notified chemical, C-1809.

Test	Species	Outcome	Reference
Oral	rat	LD_{50}: >5000 mg/kg	8
Dermal	rat	LD_{50}: >2000 mg/kg	9
Skin irritation	rabbit	non-irritant	10
Eye irritant	rabbit	slight irritant	11
Skin sensitisation	guinea pig	non-sensitising	12

10.1.1 Oral toxicity (8)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 401* (13).

A single dose of 5000 mg/kg of C-1809 in a 0.5% aqueous solution of guar gum was administered by gavage to 10 CD(SD)BR rats (five males and five females). The animals were observed for 14 days. No deaths were noted during the study. Gain in bodyweight was unaffected. Yellow discoloured faeces were noted in all animals. Necropsy reveals two cases of hydrometra which the notifier has indicated as not being treatment related.

The results of this study indicate an acute oral LD_{50} of >5000 mg/kg for C-1809 in male and female rats.

10.1.2 Dermal toxicity (9)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 402* (14).

A single dose of 2000 mg/kg of C-1809 moistened with water was administered by occlusive application to the shaved backs of 10 (five males and five females) CD(SD)BR rats for 24 hours. The animals were observed for 14 days. No deaths were noted during the study period. Gain in bodyweight was unaffected. No abnormal clinical findings were observed. Necropsy, reveals two cases of hydrometra which the notifier has indicated as not being treatment related.

The results of this study indicate an acute dermal LD_{50} of >2000 mg/kg for C-1809 in male and female rats.

10.1.3 Skin irritation (10)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 404* (15).

A single dose of 0.5 g of C-1809 moistened with water was administered by occlusive application to the clipped dorsal skin of three New Zealand White rabbits for four hours. The site of application was examined at 1, 24, 48 and 72 hours post-exposure and thereafter at 7 and 14 days after the administration of the test substance. Effects were graded according to the numeric system described in the OECD Guideline No: 404 (15). No abnormal clinical signs or signs of irritation were observed during the study period. All animals survived the 14-day observation period and gain in bodyweight was unaffected. No necropsy was performed.

The results of this study indicate that C-1809 is not a skin irritant in rabbits at the concentration tested.

10.1.4 Eye irritation (11)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 405* (16).

A single dose of 0.1 g of C-1809 was instilled into the conjunctival sac of one eye of each of six New Zealand White rabbits. Three of the eyes were immediately washed with running distilled water; the other three eyes were not irrigated. The untreated eye of each rabbit served as the control. The eyes were observed immediately after exposure and at 1, 24, 48 and 72 hours, and 7 days thereafter. The eyes were tested with fluorescein dye and were examined for staining 24 hours post-exposure. Effects were graded according to the numeric system described in the OECD Guideline No: 405 (16). Slight to moderate redness and chemosis of the conjunctiva, and slight corneal opacity were observed in the unwashed eyes, and in two animals some of these effects were still evident 72 hours post-exposure. Also observed in the unwashed eyes were injection of the irides (2/3) and slight to moderate disharges (1/3). Slight redness of the conjunctiva was observed in two of the three washed eyes one hour post-exposure but these eyes were normal at 24 hours. Staining of the cornea was observed in all unwashed eyes. No non-ocular effects were observed. No necropsy was performed. Washing of the eyes was palliative.

The results of this study indicate that C-1809 is a slight to moderate eye irritant in rabbits at the concentration tested.

10.1.5 Skin sensitisation (12)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 406* (17).

The Buehler method (18, 19) was used. Effects were graded according to the numeric system described in (17). The sensitivity of the strain of guinea pigs to be used in this study was tested with a known skin sensitiser, 1-chloro-2,4-dinitrobenzene. Positive sensitisation responses were observed in the animals tested.

Preliminary study

A single dose of 0.5 g of C-1809 moistened with water (100% concentration) was administered by occlusive application to the shaved backs of three (HA)BR Hartley guinea pigs for six hours. The application site was examined at 24 and 48 hours post-exposure. No signs of irritation were seen in the animals

tested. The minimal irritation concentration was not determined and the maximal non-irritant concentration was 100%.

Induction and Challenge study

Twenty (HA)BR Hartley guinea pigs (10 control and 10 induced animals - males and females) were used.

A 100% concentration of 0.5 g of C-1809 moistened with water was administered by occlusive application to the shaved backs of 10 guinea pigs for six hours. This procedure was repeated weekly for three weeks. Two weeks after the last induction procedure, the same 10 animals were challenged with the maximal non-irritant concentration of 100% but on the opposite side of the midline from the side used previously. The 10 control animals which were previously untreated were also subjected to the same challenge procedure. Evaluations were made of both groups of animals at 24 and 28 hours post-challenge. Effects were graded according to the numeric system described in (18). No signs of irritation or abnormal clinical signs were seen in any animal from both groups. Gain in bodyweight was unaffected. Animals were not necropsied at the conclusion of the study.

The results of this study indicate that C-1809 is not a skin sensitiser in guinea pigs at the concentration tested.

10.2 Repeated dose oral toxicity (20)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 407* (21).

C-1809 in corn oil was administered by gavage once daily to groups of five male and five female (CD(SD)BR) rats at dose levels of 0, 100, 300 and 1000 mg/kg/day, five days a week for a total of 21 doses over 29 days.

No deaths occurred during the study. Mean bodyweight was unaffected by treatment. Yellow discolouration of the urine was observed in all treated rats (males and females) from Day 3 of the study. Other clinical symptoms observed were in treated males, single cases of porphyrin nasal discharge and face wound; and in females, red discolouration of the right ear and diarrhoea in all animals, and one case of regurgitation. Diarrhoea was

likely to be caused by the vehicle, corn oil; and the other signs were considered incidental.

Haematology, clinical chemistry and necropsy results were unremarkable.

10.3 Genotoxicity

10.3.1 Salmonella typhimurium reverse mutation assay (22)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 471* (23).

C-1809 at concentrations of 10000, 6670, 3330, 1000, 667 and 333 µg/plate was tested in two independent experiments for gene mutation according to the direct plate incorporation method (24) using *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537 and TA1538, both in the presence and absence of microsomal enzymes (S9 mix). Positive controls used were 2-aminoanthracene, 2-nitrofluorene, sodium azide and ICR-191. Dimethylsulphoxide was used as the vehicle control. When compared to the vehicle control, in the presence or absence of microsomal activation, C-1809 at the concentrations tested did not produce any statistically significant dose-related increase in the number of revertant colonies. On the other hand, the positive controls showed marked increases.

The results of this study suggest that C-1809 was non-mutagenic under the test conditions reported.

10.3.2 Micronucleus assay in the bone marrow cells of the mouse (25)

This study was carried out in accordance with the *OECD Guidelines for Testing of Chemicals No: 474* (26).

C-1809 in corn oil was administered by gavage to groups of 30 (fifteen males and fifteen females) ICR mice at dose levels of 0, 500, 2500 and 5000 mg/kg. The vehicle, corn oil, was used as the negative control and cyclophosphamide was used as the positive control. Groups of 10 animals (five males and five females) from each dose level and from the vehicle control group were harvested at 24, 48 and 72 hours post-exposure. The positive control group

which consisted of 10 mice (five males and five females) was harvested only at 24 hours post-exposure. When compared to the vehicle control, no statistically significant increase in the number of micronucleated polychromatic cells was observed in any of the animals treated with C-1809. In contrast, the positive control showed statistically significant increases in micronucleated cells at 24 hours in both male and female mice.

The results of this study suggest that C-1809 was not genotoxic under the test conditions reported.

10.4 Overall assessment of toxicological data

C-1809 has very low acute toxicity (LD_{50} in rats: >5000 mg/kg) and low acute dermal toxicity (LD_{50} in rats: >2000 mg/kg). Animal tests show that it is a slight to moderate eye irritant but not a skin sensitiser nor a skin irritant. A short-term repeated dose study shows no treatment-related effects on the animals tested. Results from both the *Salmonella typhimurim* reverse mutation assay and the *in-vivo* mouse micronucleus assay suggest that C-1809 is not genotoxic.

11. ASSESSMENT OF ENVIRONMENTAL EFFECTS

Table 2. Summary of the ecotoxicity of the notified chemical, C-1809

Test	Species	Outcome	Ref
Acute toxicity	Fathead minnow	96 hr LC50>52 mg/L NOEC=52 mg/L	27
Acute toxicity	*Daphnia magna*	48 hr EC50>52 mg/L NOEC=0.52 mg/L	28

Reports were provided and these indicate that the above tests were conducted according to the OECD Guidelines (29, 30).

Concentrations tested (0.52, 5.2 and 52 mg/L) for Fathead minnows and *Daphnia magna* all exceeded the aqueous solubility of the notified chemical and undissolved material was observed throughout in all solutions. Although the actual concentrations are unclear, Fathead minnows and Daphnia are unlikely to suffer acute effects up to the limit of solubility (calculated as 5.3 ppt) of the notified chemical.

In the Daphnia study, 20% mortality occurred at the 5.2 mg/L dose level in repliate A, whereas replicate B showed no mortalities at the concentrations used in the study. Immobilised controls did not exceed 10% of the population. The notifier states the presence of undissolved material is known to have a physical effect on daphnids and this may explain the non-dose related findings, rather than chemical toxicity.

The above results indicate that the notified chemical is practically non-toxic to aquatic fauna. While reproduction tests for daphnids were not conducted, the apparent lack of acute toxicity and the probability the notified chemical, given its relatively high molecular and complex functionality, will not be absorbed by living cells, indicate that reproductive effects are unlikely to be observed.

Algal tests were similarly not conducted, but significant exposure of algae is not expected given the notified chemical will be discharged to the Melbourne sewerage system and is expected to become associated with the soil compartment at Werribee.

12. ASSESSMENT OF ENVIRONMENTAL HAZARD

Up to 0.2 tonne (to be confirmed) of the notified chemical may be discharged to sewage treatment works per annum where it is likely to adsorb to sludge or soil. It should be noted that six new chemicals (with similar physico-chemical properties) will be used during the one product run, resulting in the notifier releasing approximately 3.6 tonne of such chemicals per annum to the sewer. This is a "worst case" assuming 20% discharged to the sewer. Discussions with the notifier as well as Melbourne Water, including a site visit, has indicated that the notifier has initiated an active program aimed at identifying and reducing the amount of these discharged chemicals. This includes a

renegotiation with Melbourne Water on the amount of treated effluent allowed to be discharged.

As noted above, the dispersion will be made up about 25 times per year and assuming equal lots, about 20 kg per batch will be discharged. The following "worst case" calculation, using the notifier's estimates, indicates that the final concentration reached will be 0.3 ppb.

rate of dilution in the notifier's sewer	$= 10^{-4}$
concentration in the sewer as it leaves the notifier's premise	= 2 ppm
flow rate of notifier's sewer at exit point	$= 4 \times 10^{5}$ L/day
flow rate (average) into Werribee	$= 5 \times 10^{8}$ L/day
concentration reaching Werribee	= 1.6 ppb
rate of dilution in receiving waters	= 5 - 25 times
final concentration	= 0.3 - 0.06 ppb

This calculation assumes there will be no losses due to adsorption to sediment etc. The concentration is several orders of magnitude above the calculated water solubility. While aquatic organisms were exposed to levels several orders of magnitude higher than this with no apparent effects, this was largely due to undissolved material and the real level of exposure is unclear. However, the notified chemical is likely to remain with the Werribee sewerage complex, adsorbed to either sediments or soil, and the expected exposure to natural organisms and bioaccumulation is likely to be low. Therefore, the notified chemical is likely to present a low hazard to the environment.

13. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

So far, there is no information on any work-related diseases/ injury or occupational hazards which could have been caused by the notified chemical. There is also no information on any health conditions with which it should not be used. Animal tests indicate that it is a slight to moderate eye irritant.

The notified chemical is combustible and is capable of a dust explosion. However, good housekeeping and the implementation of control measures in the workplace such as adequate ventilation, the elimination of ignition sources, hot surfaces and high temperatures, and the earthing and dustproofing of all electrical fittings, machinery and equipment, will minimise the possibility of a dust explosion.

Under normal use conditions when control and precautionary measures are implemented, it is unlikely that the notified chemical will present any significant acute health or safety hazard to workers.

Under normal use, the notified chemical is unlikely to present any acute health or safety hazard to the public.

14. RECOMMENDATIONS

To minimise worker and environmental exposure, and occupational hazard, the following guidelines and precautions should be observed:

. the workplace should be well ventilated and local exhaust ventilation should be employed, particularly for the collection of foreseeable escapes of dust;

. good work practices should be implemented to avoid the generation of a dust cloud, splashings or spillages;

. storage of the notified chemical and its dispersion should be in robust sealable containers. The powder form of the notified chemical should be stored in well ventilated places away from heat and sources of ignition;

- good housekeeping and maintenance should be practised especially to avoid the accumulation of dust in the workplace. Spillages should be cleaned up promptly and a vacuum cleaner should be used to pick up the powder so as to avoid the generation of a dust cloud;

- suitable personal protective equipment which comply with Australian standards (AS) should be worn such as:

    - safety glasses (AS 1336, AS 1337) (31, 32);

    - impervious gloves (AS 2161) (33) when prolonged contact with the notified chemical is necessary; and

    - respirators (AS 1715, AS 1716) (34, 35) in situations when ventilation is not available or insufficient.

- all sources of ignition, hot surfaces or high temperatures should be eliminated in areas where the powder form of the notified chemical will be handled. Electrical fittings, machinery and equipment should be earthed and dust-proof;

- good personal hygiene should be observed.

- a copy of the Material Safety Data Sheet for the notified chemical should be easily accessible to employees;

- the notifier in conjunction with the Melbourne Water should continue to look at ways of minimising the amount of chemical being discharged to the sewer.

15. MATERIAL SAFETY DATA SHEET (MSDS)

The Material Safety Data Sheet (MSDS) for C-1809 (Attachment 1) was provided in Worksafe Australia format (36).This MSDS was provided by Kodak Australasia Pty Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Kodak Australasia.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *National Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of C-1809 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

17. REFERENCES

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3. Lyman, W.J., (et al), eds., *Handbook of Chemical Estimation Methods*, McGraw-Hill, New York, 1982.

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5. Eastman Kodak Company, USA, "Ready Biodegradability (Modified Sturm Test) of C-1809". Data on file, Report No: ES-90-005, 1990.

6. Eastman Kodak Company, USA, "Activated Sludge Respiration Inhibition Test of C-1809". Data on file, Report No: ES-90-004, 1990.

7. Connell, D.W., "Bioaccumulation of Xenobiotic Compounds", CRC Press, 1990.

8. Eastman Kodak Company, USA, "Acute Oral Toxicity Study of C-1809". Data on file, Report No: TX-89-309, 1989.

9. Eastman Kodak Company, USA, "Acute Dermal Toxicity of C-1809". Data on file, Report No: TX-89-310, 1989.

10. Eastman Kodak Company, USA, "Acute Dermal Irritation of C-1809". Data on file, Report No: TX-89-311, 1989.

11. Eastman Kodak Company, USA, "Acute Eye Irritation of C-1809". Data on file, Report No: TX-89-313, 1989.

12. Eastman Kodak Company, USA, "Skin Sensitisation Study (Buehler Method) of C-1809". Data on file, Report No: TX-89-312, 1989.

13. *OECD Guidelines for Testing of Chemicals*, "Acute Oral Toxicity" No: 401, 1981.

14. *OECD Guidelines for Testing of Chemicals*, "Acute Dermal Toxicity" No: 402, 1987.

15. *OECD Guidelines for Testing of Chemicals*, "Acute Dermal Irritation/Corrosion" No: 404, 1981.

16. *OECD Guidelines for Testing of Chemicals*, "Acute Eye Irritation/Corrosion" No: 405, 1987.

17. *OECD Guidelines for Testing of Chemicals*, "Skin Sensitisation" No: 406, 1981.

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20. Eastman Kodak Company, USA, "Four-week Oral Toxicity Study of C-1809 in the Rat". Data on file, Report No: TX-89-289, 1990.

21. *OECD Guidelines for Testing of Chemicals*, "Repeated Dose Oral Toxicity - Rodent: 28-day or 14-day Study" No: 407, 1981.

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