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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

C-1804

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

C-1804

1. APPLICANT

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

2. IDENTITY OF THE CHEMICAL

Name: C-1804

Molecular weight: 372.2

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: White powder

Melting Point: 184°C

Specific Gravity/Density: not available

Vapour Pressure: not available

Water Solubility: not available

Fat Solubility: not available

Partition Co-efficient: not available
(n-octanol/water)

Adsorption/Desorption:	not available
Dissociation Constant:	not available
Flash Point:	not available
Flammability Limits:	not available
Decomposition Temperature:	> 235°C
Decomposition Products:	boron compounds, oxides of carbon, nitrogen and sulphur, hydrogen fluoride
Autoignition Temperature:	not available
Explosive Properties:	not expected to be explosive.
Reactivity/Stability:	Not compatible with strong oxidisers.
Particle size distribution:	Not available

Specific density, vapour pressure, hydrolysis as a function of pH, partition coefficient, absorbtion/desorbtion, dissociation constant and particle size were not measured due to the small volume to be imported and negligible occupational and environmental exposure. The notifier states that preliminary solubility tests showed the chemical was too insoluble in water to allow measurement of a UV-VIS absorption spectrum which was run using DMF (N-N-Dimethylformamide) as the solvent and the chemical at a concentration of 100 $mg.L^{-1}$. From this it is inferred the water solubility is much less than 100 $mg.L^{-1}$ (100 ppm).

The lack of an accurate water solubility precludes estimation of partition coefficient and adsorption/desorption values. However,

the Commonwealth Environmental Protection Agency calculated a log K_{OW} of at least > 3.4, using the following equation;

$\log(1/S) = 1.339 \log K_{OW} - 0.978$; where S is in moles/L (1) and the maximum solubility of 100 ppm is assumed.

A log K_{OW} of > 3.4 indicates C-1804 has moderate to high absorption potential (2)

C-1804 is potentially susceptible to hydrolysis as it contains a sulphonyl carbamate linkage.

C-1804's salt form indicates it is unlikely to volatilise under environmental conditions.

4. PURITY OF THE CHEMICAL

Degree of purity: 99.9%

Impurities: Not identified, 0.1%

Additives/Adjuvants: None

5. INDUSTRIAL USES

C-1804 is used in the manufacture of photographic film and paper. The chemical is approved in France in quantities < 1000 kg per year and is approved in the United States. It will be imported into Australia as the preweighed pure substance in quantities less than 10 kg per year for the next five years.

6. OCCUPATIONAL EXPOSURE

C-1804 is weighed and added to a mixing tank. The mixture is later added to other formulations. The chemical will finally be incorporated into photgraphic film or paper beneath several overcoat layers. Workers handling the dry chemical will handle it under extractor hoods and will wear protective clothing, safety glasses, surgical gloves and half face masks with particle filters. Workers handling mixes to which C-1804 has been added will wear protective clothing, safety glasses and surgical

gloves. Under these conditions, occupational exposure is expected to be minimal.

7. PUBLIC EXPOSURE

The compound, C-1804, is to be imported into Australia where it will be used within the confines of the importing company in the manufacture of photographic film or paper. The chemical will be incorporated into photographic film or paper under overcoat layers.

The notifier has also indicated that discharge into the municipal sewer is likely to result in concentrations of C-1804 of 0.08 ppb. Additionally, less than 1% of waste may be sent to secured landfills.

Decomposition products are likely to be oxides of carbon, nitrogen, sulphur, hydrogen fluoride and boron compounds. Compound C-1804 is not classified as a Dangerous Good according to the Australian Code for the Transport of Dangerous Goods by Road and Rail

Under the stated condition of use and release to the environment the potential for public exposure is low.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

Volume and Use

C-1804 will be imported at less than 10 kg per annum.

Manufacture or reformulation of the chemical will not occur in Australia. Therefore, there will not be any environmental release of the chemical via this route.

C-1804 will be used in the manufacture of photographic film/paper.

Approximately 25 times per year, the chemical will be reweighed in an Australian laboratory, then added to a mixing tank containing water. The solution will be stored in closed plastic

bottles for up to several weeks. The solution will be taken from storage and added to the photographic emulsion, where other addenda will be added. The photographic emulsion will then be pumped to closely controlled automated processing equipment where the new chemical will be incorporated into articles.

Once the chemical becomes part of the article, there will be no potential exposure to the new chemical, as the chemical will be under overcoat layers.

The company states there are no anticipated releases to the environment of the pure chemical. Less than 1% of the solution containing C-1804 could be released to the sewer. An additional 10% could be released from the automated processing equipment to the sewer. However, this waste is routed through the silver recovery plant and the chemical is likely to be absorbed to the removed solids from which silver (~10%) is recovered in Port Kembla and the remainder incinerated. The company is presently undertaking some analytical testing of the initial effluent, the recovered cake and the filtrate to confirm this. The municipal sewer flow is routed for secondary treatment at the Werribee treatment facility. Less than 1% of wastes may be sent to a secured landfill.

8.2 Fate

C-1804 will mainly enter the environment when waste from the automated processing equipment is discharged to the sewer. No biodegradation studies were provided by the notifier (these are not part of the small volume chemicals requirements). It is unclear whether C-1804 will biodegrade in the sewer. The structure indicates C-1804 is potentially susceptible to hydrolysis (3). 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 treatment in winter (4). Its most likely fate would appear to 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.

8.3 Bioaccumulation

C-1804's relatively low water solubility and molecular weight indicate it may bioaccumulate. A characteristic of organic chemicals which exhibit bioaccumulation is a molecular weight >

100 giving a maximum capacity at about 350, then declining to a low capacity about 600 (5). C-1804's molecular weight of 372.2 indicates it has some capacity to bioaccumulate, but the presence of ionisable groups is likely to reduce its lipophilicity. Had the notifier provided a log P value, CEPA would have been able to define the bioaccumulation potential of C-1804 more accurately, eg a log P less than 3 or greater than 6 would indicate a reduced bioaccumulation potential (5).

The possibility of soil accumulation needs consideration. However, C-1804 contains a sulphonyl carbamate linkage which would be expected to be vulnerable to microbial cleavage in the soil. Also, less than 1 kg C-1804 per annum is likely to find its way to Werribee. Thus significant accumulation is not expected.

9. EVALUATION OF TOXICOLOGICAL DATA

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* no toxicology data is required to be submitted on the notified chemical. However, some toxicology tests have been carried out. Results are:

9.1 Acute Toxicity

Test	Species	Outcome	Ref
Oral	Rat	> 5000mg/kg	(6)
Dermal	Rat	> 2000mg/kg	(8)
Skin irritation	Rabbit	non-irritating	(10)
Eye irritation	Rabbit	moderately irritating	(12)
Skin sensitisation	Guinea pig	non-sensitiser	(14)

9.1.1 Oral Toxicity (6) OECD Test Guideline 401 (7).

Five male and five female CD^{R}(SD)BR rats received 5000 mg/kg C-1804 by gavage as a 25% suspension in an aqueous suspension of guar gum. During the fourteen day observation period, the only

clinical sign reported was diarrhoea, in one female, four hours after administration of the dose. The animal subsequently recovered fully. No abnormalities were noted at necropsy. In this test, the oral LD_{50} was determined to be
> 5000 mg/kg.

9.1.2 Dermal Toxicity (8) OECD Text Guidelines #402 (9).

A single dose of 2000 mg/kg C-1804 moistened with distilled water was placed on a fibre pad, applied to the clipped backs of five male and five female CD^{R}(SD)BR rats. The pad was held in place for 24 hours by an occlusive dressing before the chemical was washed off. Animals were observed for 14 days. No signs or symptoms of toxicity were observed, and no treatment related lesions were reported at necropsy.

The dermal LD_{50} in the rat was found to be >2000 mg/kg.

9.1.3 Skin Irritation (10) OECD Guideline #404 (11).

Five hundred mg of C-1804 moistened with distilled water, was applied to the clipped back of each of three young adult New Zealand White rabbits and held in place for four hours with an occlusive dressing before being removed.

The application site was observed at one, 24, 48 and 72 hours, 7 and 14 days. No signs of erythema or oedema were observed at any time interval. No other signs of toxicity were observed. The notified chemical was non-irritating to the skin in this test.

9.1.4 Eye Irritation (12) OECD Guideline #405 (13)

Six New Zealand White rabbits received 0.1 g C-1804 in the conjunctival sac of one eye. The other eye was untreated. Eyes of three rabbits were washed immediately after treatment. Irritation was assessed one, twenty four, forty eight and seventy two (72) hours and seven (7) days after administration.

C-1804 proved to be irritating to the eye. Eye washing was palliative. The unwashed eye of all three animals showed moderate erythema, moderate-strong oedema, as well as slight

corneal opacity. Lids were affected and one animal had a slight discharge from the eye at 24 hours. Fluorescein testing at 24 hours showed staining of the adnexa in all animals and of the cornea in two. Unwashed eyes appeared normal after 7 days. Washed eyes were affected less severely and did not have any corneal opacity. The chemical can be regarded as moderately irritating to the eye.

9.1.6 Skin Sensitization (14) OECD Guideline #406 (15)

A dose of 500 mg C-1804 was moistened with water and applied to the clipped skin of three HA(BR) Hartley guinea pigs. No skin reaction was observed at 24 or 48 hours and 100% was judged to be the maximum non irritating concentration of C-1804.

Five hundred mg of C-1804 as a solid moistened with water was applied to the clipped skin of three HA(BR) Hartley guinea pigs (of the above strain) and covered with an occlusive bandage for six hours. The procedure was repeated weekly for three weeks. A group of ten control animals were untreated. No positive control was used.

Two weeks later, animals both previously treated and untreated were challenged by the application of the same dose of C-1804 to the opposite side of the previous treatment (if any). Application sites were observed at 24 and 48 hours. No animal showed any reaction to challenge with C-1804, which was considered to be a non-sensitiser.

9.2 Overall Assessment of Toxicological Data

C-1804 has low oral and dermal toxicity in the rat. It is a non-irritant to the rabbit skin but moderately irritating to the rabbit eye and could be expected to irritate the respiratory tract. C-1804 is not a skin sensitiser in guinea pigs.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No environmental effects studies were provided which is acceptable for a chemical where importation is to be less than 1 tonne/year.

11. ASSESSMENT OF ENVIRONMENTAL HAZARDS

It should be noted that C-1804 will be a very minor component of a number of new chemicals that will be used during the one product run, resulting in Kodak releasing approximately a total of 3.6 tonne of new chemical substances per annum to the sewer. Discussions with the company as well as Melbourne Water, including a site visit, has indicated that the company has initiated an active program aimed at identifying and reducing the amount of these discharged chemicals. This includes a renegotiation with Melbourne Water of the amount of treated effluent allowed to be discharged.

The usage of C-1804 is < 10 kg per annum. In a worst case situation, approximately 44g of C-1804 goes to the sewer per batch. This will be diluted into 500 megalitre at Werribee, giving a concentration of ~0.09 ppb. Further dilution (of between 1:5 and 1:25) will occur when water is discharged into the receiving waters in a 1 km mixing zone around the outlets, leading to a worst case concentration of 0.02 ppb.

This calculation assumes there will be no losses due to adsorption to sediment etc. In line with the notifications of similar chemicals the substance is likely to remain with the Werribee sewerage complex, either in solution, adsorbed to either sediments or soil, and the expected exposure to natural organisms and bioaccumulation is likely to be low. Therefore, C-1804 is likely to present a low hazard to the environment.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

The most likely route of worker exposure is by skin or eye contact with C-1804 in the powder form. The chemical is moderately irritating to the eye and would be expected to be a respiratory irritant. No data is available on particle size. As C-1804 is a moderate eye irritant eye protection is required. All precautions should be taken against the formation of dusts and (for liquid products) mists or aerosols. Engineering measures to decrease airborne contamination and protective clothing and respiratory protection will be recommended.

Once compound C-1804 is incorporated into articles under overcoat layers, the potential for exposure to the general public is low.

Exposure through the municipal sewers and secured landfills is anticipated to be negligible.

13. RECOMMENDATIONS

The following guidelines and precautions should be observed when using C-1804:

. Workers handling C-1804 and products containing the chemical should use good housekeeping procedures and minimise the formation of dusts containing the chemical and avoid splashing solutions containing the chemical.

. Local exhaust ventilation should be used in areas when C-1804 and products containing it are in use.

. Workers handling C-1804 powder should wear protective clothing conforming to Australian Standard (AS) 3765.1-1990 (16), safety glasses conforming to AS 1337-1984 (17), disposable gloves conforming to AS 2161-1978 (18) and half masks with particle filters conforming to AS 1715-1991 (19) if local exhaust ventilation is inadequate.

. Workers handling non-powder products containing C-1804 should wear protective clothing conforming to AS 3765.1-1990, safety glasses conforming to AS 1337-1984 and disposable gloves conforming to AS 2161-1978.

. C-1804 should be stored apart from oxidisers.

. Spills should be swept up and packaged for incineration or for disposal by a licensed chemical waste disposal agent.

. If the material does enter the eye, it should be washed out immediately and the eye irrigated for 10 minutes.

. The company, in conjunction with Melbourne Water, should continue to look at ways of minimising the amount of these chemicals discharged to the sewer.

14. MATERIAL SAFETY DATA SHEET

Attached to this Full Public Report is a Material Safety Data Sheet (MSDS) for C-1804. 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. However, the accuracy of this information remains the responsibility of Kodak Australasia Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of C-1804 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. Accurate values should be provided for physico-chemical properties, in particular, partition coefficient and water solubility, should the level of importation rise above 1 tonne. No other specific conditions are prescribed.

16. REFERENCES

(1) Lyman, W J (et al). (1982), "Handbook of Chemical Property Estimation Methods", Mc Graw-Hill, p2-34.

(2) Wild S R & Jones K C. "Organic chemicals entering agricultural soils in sewage sludges: screening for their potential to transfer to crop plants and livestock", The Science of the Total Environment, 119 (1992), p85-119.

(3) Lyman W J (et al). "Handbook of Chemical Property Estimation Methods - Environmental behaviour of organic compounds", (1982), McGraw-Hill Book Company, p7-5.

(4) "Australian Sewage Profile". (1988), DASET internal report.

(5) Connell D W, (1990). "Bioaccumulation of Xenobiotic Compounds", CRC Press, p56.

(6) Acute Oral Toxicity of C-1804. TX-89-224. Data on File, Eastman Kodak Company Rochester NY USA.

(7) OECD Guidelines for the Testing of Chemicals #401 Acute Oral Toxicity.

(8) Acute Dermal Toxicity of C-1804. TX-89-225 Data on File, Eastman Kodak Company Rochester NY USA.

(9) OECD Guidelines for the Testing of Chemicals #402 Acute Dermal Toxicity.

(10) Acute Dermal Irritation of C-1804. TX-89-226. Data on File, Eastman Kodak Company, Rochester NY USA.

(11) OECD: Guidelines for the Testing of Chemicals #404 Acute Skin Irritation.

(12) Acute Eye Irritation of C-1804. TX-89-228. Data on File, Eastman Kodak Company, Rochester, NY USA.

(13) OECD Guidelines for the Testing of Chemicals #405 Acute Eye Irritation.

(14) Skin Sensitization Study (Buehler Method) of C-1804. TX-89-227 Data on File Eastman Kodak Company, Rochester New York, USA.

(15) OECD Guidelines for the Testing of Chemicals #406 Skin Sensitisation.

(16) Australian Standard 3765.1-1990 *Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals* Standards Association of Australia Publ, Sydney 1990.

(17) Australian Standard 1337-1984 *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ, Sydney 1984.

(18) Australian Standard 2161-1978 *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ, Sydney 1978.

(19) Australian Standard 1715- 1991 *Selection, use and maintenance of Respiratory Protective Devices*, Standards Association of Australia Publ, Sydney 1991.