File No: NA/221

Date: 24 January 1995

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

S-6697

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 Environment, Sport and Territories and the assessment of public health is conducted by the Department of Human Services and Health.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

S-6697

1. APPLICANT

Cytec Australia Ltd, Suite 1, 7-11 Railway Street, Baulkham Hills, NSW 2153.

2. IDENTITY OF THE CHEMICAL

As the chemical will not be used in Australia the notifier was granted an exemption for the following data: hydrolysis as a function of pH; adsorption/desorption; dissociation constant; skin sensitisation; repeated dose toxicity; and chromosome damage under section 24 of the *Act,* variation to schedule requirements.

Chemical name: Phosphorothioic acid, 0,0-bis(2-methylpropyl) ester, sodium salt

Chemical Abstracts Service (CAS) Registry No.: 53378-52-2

Other name: Sodium diisobutyl monothiophosphate

Trade name(s): S-6697 (50% aqueous solution)
Aero 6687 Promoter (50% aqueous solution)

Molecular formula: $C_8 H_{18} O_3 P S Na$

Molecular weight: 257 (sodium salt)

Method of detection and determination:

Fourier transformed infra red spectroscopy (FTIR)

Spectral data:

. Infrared spectrum

Medium: KBr disc
Major peaks: 600, 800, 830, 900, 950, 1000, 1100, 1350, 1375, 1500, 2850, 2950 cm^{-1}

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: Clear yellow liquid

Odour: Strong sulphur odour

Freezing Point: -10°C (product)

Relative Density: 1120-1160 kg/m^3 (product)

Vapour Pressure:	Not determined
Water Solubility:	600 g/l at 25°C
Fat Solubility:	Not determined
Hydrolysis:	Not determined
Partition Co-efficient log P_{OW}:	Not determined
Hyrolysis as a function of pH:	13.0 to 13.7
Adsorption/Desorption:	Not determined
Dissociation Constant pKa**:**	Not determined
Flash Point:	> 93.3°C
Flammability Limits:	Not determined
Combustion Products:	Not applicable
Explosive Properties:	Not explosive
Pyrolysis Products:	Not determined
Decomposition Temperature:	Not determined
Decomposition Products:	Not determined
Autoignition Temperature:	Not determined
Reactivity/Stability:	Reactive with strong oxidising agents and acids
Particle size distribution:	Not applicable

. Comments on the physico-chemical properties

No information was provided to indicate the test protocols used or compliance with OECD principles of Good Laboratory Practice. This information will be required if the chemical is to be used in Australia.

4. PURITY OF THE CHEMICAL

Degree of purity: ≥ 92%

Impurities (%w/w):

Chemical name:	Sodium hydroxide
CAS No.:	1310-73-2
Weight percentage:	0.5

Chemical name:	Sodium diisobutyl dithiophosphate
CAS No.:	53378-51-1
Weight percentage:	3

Additive(s)/Adjuvant(s): none

5. INDUSTRIAL USE

S-6697 is a mining reagent used to concentrate gold and copper from ore slurries.

It is expected that 10 to 100 tonnes per annum of the notified chemical will be imported for five years.

The chemical will not be used in Australia. It will be exported.

6. OCCUPATIONAL EXPOSURE

The notified chemical as a 50% w/v aqueous (alkaline) solution will be imported in 100-200 litre steel containers or ISO containers.

5 to 10 workers will be:

. unloading ISO containers and drums, and loading to trucks for road transport;

. handling; and

. involved in warehousing and transport for exportation.

The maximum handling, transport and distribution time for a worker is 6 to 8 hours per day for ten days per year.

7. PUBLIC EXPOSURE

Under normal conditions, there will be very low public exposure to S-6697 during importation, road trnasport, storage and exportation. .

8. ENVIRONMENTAL EXPOSURE

. Release

With the exception of spills, disposal of the notified chemical (supplied as a 50% aqueous solution) will not occur in Australia. Spills that occur during transport or handling will be cleaned up in accordance with the procedures outlined in the MSDS. The recommended procedure involves mopping up the spill with an inert material and the collection and disposal of the absorbed material in accordance with local government regulations.

. Fate

Biodegradation tests were not performed. This is acceptable, as the notified chemical will not be used in Australia.

Bioaccumulation tests were not performed. However, as the notified chemical is a highly soluble salt, bioaccumulation is considered unlikely.

Release to the environment will only occur as a result of spills during transport or handling. Such spills are unlikely to represent a significant environmental release, particularly when handled in accordance with MSDS recommendations. All care should be taken to limit the direct release of the chemical to the aquatic compartment.

9. EVALUATION OF TOXICOLOGICAL DATA

9.1 Acute Toxicity

Table 1 Summary of the acute toxicity of S-6697

Test	Species	Outcome	Reference
Oral	rats	LD_{50} >5000 mg/kg	(1)
Dermal	rabbit	LD_{50} >2000 mg/kg	(3)
Skin irritation	rabbit	non-irritant	(5)
Eye irritation	rabbit	severe irritant	(8)

9.1.1 Oral Toxicity (1)

This study was carried out according to OECD Guidelines for Testing of Chemicals No: 401 (2).

A single dose of 5000 mg/kg of S-6697 was administered by gavage to Sprague-Dawley rats (5 males). The animals were observed at 1, 4 and 24 hours after dosing and subsequently once daily for 7 days. No deaths were noted during the study. All animals showed the expected gain in body weight and signs of lethargy, ataxia, chromodacryorrhea, dyspnea and wetness of the anogenital area over the study period. Necropsy findings were not recorded in the study.

The results of this study indicate an oral LD_{50} of >5000 mg/kg for S-6697 in male rats.

9.1.2 Dermal Toxicity (3)

This study was carried out in accordance with OECD Guidelines for Testing of Chemicals No: 402 (4).

A single dose of 2000 mg/kg of S-6697 was administered by semi-occlusive application to the shaved skin of New Zealand Albino rabbits (5 males) for 24 hours. The animals were observed at 1, 4 and 24 hours after dosing and subsequently once daily for 7 days after removal of the bandage. No deaths were noted during the study. All animals showed expected gain in body weight during the study. One animal exhibited yellow nasal discharge up to day one. All animals showed slight to moderate erythema and oedema. Necropsy findings were not recorded in the study.

The results of this study indicate a dermal LD_{50} of >2000 mg/kg for S-6697 in male rabbits.

9.1.3 Skin Irritation (5)

This study was carried out in accordance with OECD Guidelines for Testing of Chemicals No: 404 (6).

A single dose of 500 ml of S-6697 moistened with water was administered by occlusive application to one intact and one abraded site on the clipped flank of three male New Zealand White rabbits for four hours. The site of application was examined approximately 60 minutes and 1, 2 and 3 days after removal of the dressing. There were no signs of erythema or oedema in any of the animals.

The results of this study indicate that S-6697 is non-irritant to the skin of rabbit. At the concentration tested.

9.1.4 Eye Irritation (7)

This study was carried out in accordance with OECD Guidelines for Testing of Chemicals No: 405 (8).

Three New Zealand White rabbits (3 males) were used in the study. Initially, a single dose of 0.1 ml of S-6697 was instilled into the conjunctival sac of both eyes of each rabbit. The left eye of each animal was washed with water soon after exposure.. Ocular reactions were assessed after 1 hour and 1, 2 and 3 days post-exposure.

Slight to moderate corneal opacity observed in all animals after 1 hour post exposure, persisted up to day seven in two animals. Moderate iritis was observed in two animals after 24 hours post exposure, and this appeared normal on day seven in all animals. Moderate to severe conjunctival redness and chemosis were observed in all animals after 1 hour post-exposure, and these persisted up to day 7 in two animals. Moderate conjunctival discharge was observed in all animals after 1 hour post exposure, which persisted up to day seven in one animal.

The results of this study indicate that S-6697 is a severe eye irritant in rabbits. At the concentration tested.

9.2 Genotoxicity

9.2.1 Salmonella typhimurium Reverse Mutation Assay (9)

This study was carried out according to OECD Guidelines for Testing of Chemicals No: 471 (10).

S-6697 at dose levels of 10000, 6667, 3333, 1000, or 667 µg/plate was tested for gene mutation using *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537 and TA1538 both in the presence or absence of metabolic activation (S9-mix). Positive controls used were 2-nitrofluorene, sodium azide, ICR-191 (without S-9 mix) and 2-aminoanthracene (with S-9 mix). Distilled water was used as the diluent for the test substance and as the negative control.

The test substance did not induce increases in the number of revertant colonies of *Salmonella typhimurium* strains both in the absence or presence of S-9 mix. The positive controls induced the expected increases in all strains tested.

The results of this study indicate that S-6697 is not mutagenic.

9.3 Overall Assessment of Toxicological Data

S-6697 has low acute, oral and dermal toxicity (oral LD50 in rats: >5000 mg/kg; dermal LD50 in rabbits >2000 mg/kg). It is a severe eye irritant but not a skin irritant. S-6697 was not mutagenic in the *Salmonella typhimurium* reverse mutation assay.

On the basis of submitted data, the notified chemical is classified as hazardous in accordance with *Approved Criteria for Classifying Hazardous Substances* (11).

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The following tests to assess the environmental effects of S-6697 were performed according to OECD and EEC test guidelines.

Species	Test	Result
Rainbow Trout Oncorhynchus mykiss	96 hour acute OECD TG 203	NOEC = 18 mg/L LC_{50} = 30 mg/L (nominal test conc. 5.6, 10, 18, 32 & 56 mg/L)
Bluegill Lepomis macrochirus	96 hour acute OECD TG 203	NOEC = 18 mg/L LC_{50} = 42 mg/L (nominal test conc. 5.6, 10, 18, 32 & 56 mg/L)
Daphnia Daphnia magna	48 hour static acute OECD Annex2, 7-28	NOEC = 32 mg/L LC_{50} = 47 mg/L (nominal test conc. 18, 32, 56, 100, 180 & 230 mg/L)

The toxicity data provided above indicates that the notified chemical may be classified as slightly toxic to the aquatic species tested.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The insignificant levels of notified chemical likely to be release as a result of transport, storage and handling in Australia, together with its lack of significant biological activity, indicate the environmental hazard should be negligible.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

There is no information on the effects of S- 6697 on human health. It has been shown in animal studies to have low acute oral and dermal toxicities. It is not a skin irritant. However, it is a severe eye irritant. Therefore, eye contact should be avoided.

S-6697 is expected to have a low partition coefficient. It is not explosive but can react with strong oxidising agents and acids.

The maximum exposure of each worker to the notified chemical during handling is 6 to 8 hours/day for 10 days per year. Under normal handling conditions, given the toxicological profile of the notified chemical, this exposure is unlikely to result in any adverse health effects.

There will not be any public exposure to the chemical.

13. RECOMMENDATIONS

To minimise occupational exposure to S-6697 the following guidelines and precautions should be observed:

. good work practices to avoid accidental spills.

. a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to all employees.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for S-6697(Attachment 1) was provided in Worksafe Australia format (12). This MSDS was provided by Cytec Australia 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 Cytec Australia` Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of S-6697 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise or if the chemical is to be imported for use in Australia.

16. REFERENCES

1. MB Research Laboratories., "CT-473-91: Acute Oral Toxicity to the Rat". Data on file, Report No: MB 91-488 A, June 1991.

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

3. MB Research Laboratories., "CT-473-91: Acute Dermal Toxicity to the Rabbit". Data on file, Report No: MB 91-488 D, June 1991.

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

5. MB Research Laboratories, ":CT-473-91: Skin Irritation to the Rabbit". Data on file, Report No: MB 91-488 D, June 1991.

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

7. MB Research Laboratories, "CT-473-91: Eye Irritation to the Rabbit". Data on file, Report No: MB 91-488 D 1991.

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

9. MB Research Laboratories, "CT-473-91: An Evaluation of Mutagenic Potential Using Salmonella typhimurium". Data on file, Report No: T9870.501015, May 1991.

10. OECD Guidelines for Testing of Chemicals, "Genetic Toxicology: Salmonella typhimurium, Reverse Mutation Assay" No: 471, 1983.

11. Approved Criteria for Classifying Hazardous Substances, [NOHSC:1008(1994)], AGPS, Canberra, March 1994.

12. National Occupational Health and Safety Commission, *Code of Practice for the Preparation of Material Safety Data Sheet*, AGPS, Canberra, March 1994.