Material Safety Data Sheet

Infosafe No. NU01R Issue Date: September 2004

Product Name: METHYL BROMIDE 980 Fumigant

Classified as hazardous according to criteria of NOHSC

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product Name: METHYL BROMIDE 980 Fumigant
Product Code: 7015
Product Use: For use by professional and registered fumigators for control of soil-borne pests and diseases as specified in the Directions for Use table.

Company Name: NUFARM AUSTRALIA LIMITED. (ABN 80 004 377 780)
Address: 103-105 Pipe Road Laverton North
Victoria 3026  Australia
Emergency Tel.: 24hr  1800 033 498
Telephone/Telex Number: Tel: (03) 9282-1000  Fax: (03) 9282-1001
Product Type: Group 8A Insecticide

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Characterization: Gas

Ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl bromide</td>
<td>74-83-9</td>
<td>980 g/kg</td>
</tr>
<tr>
<td>Chloropicrin</td>
<td>76-06-2</td>
<td>20 g/kg</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

Toxic by inhalation.
Irritating to eyes, respiratory system and skin.
Very toxic to aquatic organisms.
May cause long term adverse effects in the aquatic environment.
Dangerous for the ozone layer.

Human Health Effects:
Methyl Bromide may be fatal if inhaled and harmful if swallowed or absorbed through the skin. It is a neurotoxin and a severe irritant to the upper and lower respiratory tract, skin and eyes.
This product contains 2% chloropicrin (trichloronitromethane), which is used as a lachrymatory warning agent, and at this level does not affect the properties of the product, except for its odour.

Other Information:
Poisons Schedule S7
Acute poisoning from methyl bromide is characterised by marked irritation to the respiratory tract which may lead, in severe cases, to pulmonary oedema.

4. FIRST AID MEASURES

First Aid: A 24-HOUR MEDICAL SURVEILLANCE PERIOD IS MANDATORY IN ALL CASES OF EXPOSURE TO METHYL BROMIDE, EVEN IN THE ABSENCE OF ANY IMMEDIATE SIGNS OF POISONING.

Inhalation: Remove person to fresh air. Keep patient quiet and warm. Apply artificial respiration if necessary, and get medical attention immediately.

Ingestion: If swallowed, wash mouth thoroughly with plenty of water and give water or milk to drink. Get medical attention immediately. NOTE: Do not give liquids to an unconscious person.

Skin: Remove contaminated clothing and place in closed containers.
Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Seek medical advice immediately.
All leather items should be discarded; other contaminated clothing must be discarded or thoroughly ventilated and washed before re-use.

Eye: If in eyes, hold the eyelids apart, flush at once with copious flowing water for at least 15 minutes. Seek medical attention immediately.

First Aid Facilities: If poisoning occurs, contact a doctor or Poisons Information Centre on 13 11 26 (Australia).
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Advice to Doctor
Treat symptomatically.
Intense vesicant. Signs and symptoms of toxicity are primarily referable to the CNS, respiratory tract and the cardiovascular system.
No specific antidote.
Give artificial respiration if necessary but oxygen or stimulants only under qualified supervision. Human systemic effects by inhalation: anorexia, nausea or vomiting. A powerful fumigant gas which is one of the most toxic of the common organic halides. It is nematoxic and narcotic with delayed action, it is cumulative and damaging to nervous system, kidneys, lungs.
Delayed effects can include pulmonary oedema.

5. FIRE FIGHTING MEASURES

Specific Hazards
Although the product is considered practically non flammable, it can be ignited with a high energy source of ignition. Containers may rupture violently if exposed to fire or excessive heat for sufficient time. In confined spaces such as buildings or sewers, there is a danger of vapour accumulation, which may result in explosion in the presence of an ignition source.
If product involved in a fire, stop methyl bromide flow immediately. Do not extinguish burning gas unless flow can be shut off immediately. Use water spray, fog nozzle or CO2 to keep cylinder cool. If there is no risk, move cylinder away from fire. Use self-contained breathing apparatus with a full face-piece operating in positive pressure mode, and appropriate protective clothing.
Extinguishing media: Water spray or fog, dry chemical foam and carbon dioxide.

Decomposition Temp.
Decomposes from ca. 400°C
When heated to decomposition, may release poisonous and corrosive fumes of CO and HBr.

Other Information
Hazchem code 2 X E.

6. ACCIDENTAL RELEASE MEASURES

Spills & Disposal
Evacuate area and keep personnel upwind. Use self-contained breathing apparatus in positive-pressure mode. If practicable, stop flow of vapour. Shut off all sources of ignition. Ventilate and/or allow to evaporate, keeping people away from area until safe re-entry levels are shown by an appropriate measuring device.

7. HANDLING AND STORAGE

Storage
DO NOT drop, bump or drag cylinders. DO NOT dent cans.
DO NOT unload by rope-sling, hooks or tongs.
Keep cylinders upright in tamper-proof airy stores, away from dwellings and food and feed stuffs.
Test periodically for leaks by halide leak detector.
DO NOT spill or splash; avoid contact with the liquid or gas.
Put out all pilot lights and glowing heating units.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits
NOHSC has set the following exposure standard for methyl bromide: TLV (TWA) 5 ppm 19 mg/m³, STEL -. SK
'SK' notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.
Other threshold limit values:

<table>
<thead>
<tr>
<th></th>
<th>Methyl bromide:</th>
<th>Chloropicrin:</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>STEL:C 20ppm (C 80mg/m3), skin</td>
<td>TWA 0.1ppm (0.7mg/m3)</td>
</tr>
<tr>
<td>ACGIH</td>
<td>TWA: 1ppm (3.9mg/m3), skin</td>
<td>TWA 0.1ppm (0.67mg/m3)</td>
</tr>
<tr>
<td>UK</td>
<td>TWA: 5ppm (20mg/m3)</td>
<td>TWA 0.1ppm (0.68mg/m3)</td>
</tr>
<tr>
<td></td>
<td>STEL: 15ppm (59mg/m3), 10 min</td>
<td>STEL 0.3ppm (2.1mg/m3)</td>
</tr>
</tbody>
</table>
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Hand Protection
DO NOT WEAR GLOVES when working with Methyl Bromide because of the danger that liquid or concentrated vapour may be trapped inside them. DO NOT wear rings or watches, especially watches with a leather band.

Personal Protective Equipment
Very dangerous. Product is poisonous if inhaled. Attacks eyes. May irritate nose, throat and skin. Repeated minor exposure may have a cumulative poisoning effect. The liquid can cause burns. Avoid contact with eyes, skin and clothing. Do not inhale vapour. Protect eyes while using. When using the product wear full-face respirator with canister specified for Methyl Bromide. Detailed instructions for safe use appear in State regulations. Thoroughly ventilate treated areas before re-occupying.

If clothing becomes contaminated with product, remove clothing immediately. After use, and before eating, drinking or smoking wash hands, arms and face thoroughly with soap and water. After each day's use, wash respirator or face piece. If respirator is rubber, wash with detergent and warm water.

General Fumigation: Wear full-face respirator (with Methyl Bromide 'O' canister) complying with AS1716 when releasing gas and when opening up structures for aeration. Use a halide detector for locating gas leaks from cylinders and outside structures. Use detection tubes or other monitoring devices inside structures. The above canister masks are suitable for low levels of methyl bromide. If high levels of methyl bromide gas are expected, it is advisable to wear self contained breathing apparatus with a mask in positive pressure mode.

Do NOT enter fumigation areas until methyl bromide free as indicated by appropriate measuring devices. If however treated area must be entered, a self-contained breathing suit or apparatus conforming to AS1715 and AS1716 MUST BE WORN.

Warning: Chloropicrin is corrosive to metals and care should be taken to protect metal surfaces and equipment during treatment. Methyl Bromide gas is colourless, odourless and highly dangerous. Extreme caution is required when handling.

Body Protection
No specially designed protective clothing is available.

Eng. Controls
Ventilation must be sufficient to maintain methyl bromide level below the TLV. Mechanical ventilation is recommended. Use local exhaust at source of vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Colourless gas, with a sharp, penetrating odour.

Decomposition Temperature
Decomposes from ca. 400°C

Boiling Point
3.5 - 4°C

Solubility in Organic Solvents
Infinitely soluble in most organic solvents

Specific Gravity (H2O=1)
1.73 (liquid)

Vapour Pressure
1420mm Hg at 20°C

Vapour Density (Air=1)
3.3 at 20°C

Evaporation Rate
>1

Partition co-efficient, log 10 Kow - ca. 1.92

Flash Point
None

Flammability
Non flammable, can be ignited with a high energy source.

Ignition Temperature
537°C
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<table>
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<tr>
<th>Flammable Limits</th>
<th>Lower 10 (vol); Upper 16 (vol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>94.94</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability: Stable in sealed containers and under normal conditions.

Hazardous Polymerization: Hazardous polymerisation is not possible.

Hazardous Decomposition: Hydrogen bromide and carbon monoxide.

Hazardous Reaction: Incompatibility: Strong oxidizers, aluminium and magnesium metals and their alloys, natural rubber and certain types of plastic.

Conditions to Avoid: Ignition sources, water contamination and heating above 400°C.

11. TOXICOLOGICAL INFORMATION

Inhalation: Acute poisoning from methyl bromide is characterized by marked irritation to the respiratory tract which may lead, in severe cases, to pulmonary oedema. High concentrations may damage the liver, kidneys and central nervous system. Symptoms of poisoning include headache, dizziness, somnolence, vertigo, blurred vision, slurred speech, nausea and vomiting and possibly convulsions and coma. ONSET OF TOXIC SYMPTOMS MAY BE DELAYED FROM 30 MINUTES TO SEVERAL DAYS.

Ingestion: Severe irritant to mucous membranes and extremely toxic poison if ingested, although ingestion is highly unlikely.

Skin: Liquid splashed on clothing or leather and/or high gas concentrations held in contact with skin, may cause skin burns with large blisters appearing after several hours. Less severe exposure may cause itching skin rash after several days. May be absorbed through the skin in sufficient quantities to cause systemic toxicity.

Eye: Severe irritant. Contact of liquid or high concentrations of gas with the eyes may cause severe but usually reversible injury involving temporary blindness.

Chronic Effects: Chronic exposure to low concentrations of methyl bromide may produce central nervous system effects. Signs include: mental confusion, lethargy, inability to focus one's eyes, inco-ordination and muscle weakness. Repeated skin exposure may cause contact dermatitis.

Mutagenicity: Mutagenic by the Ames Test.

Methyl bromide induced DNA damage in rat test is following inhalation exposure at 250ppm (6 hours/day for 5 consecutive days). In vivo, methyl bromide induced sister chromatid exchanges in bone marrow cells and micronuclei in peripheral erythrocytes of female mice exposed by inhalation for 14 days.

Carcinogenicity: Studies conducted with Methyl bromide, exposing animals both by inhalation (raths and mice) and by oral route (fumigated feed, rats), showed that there was no evidence of carcinogenic activity. Not included in NTP 9th Report on Carcinogens.

Acute Toxicity - Oral: LD50 (rat) 104 mg/kg for liquid MBr in corn oil
LD50 (rat) 133 mg/kg for microencapsulated MBr in corn oil

Acute Toxicity - Inhalation: LC50 (inhalation, mouse) = 1540mg/m3/2hr
LC50 (inhalation, rat) = 1175mg/m3/8hr
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Other Information: The Australian Acceptable Daily Intake (ADI) for methyl bromide for a human is 0.0004 mg/kg/day, set for the public for daily, lifetime exposure. This is based on the NOEL of 0.4 mg/kg/day, the level determined to show no effects during long term exposure for the most sensitive indicators and the most sensitive species. (Ref: Comm. Dept. of Health and Ageing, 'ADI List', TGA, June 2004).

Single exposure vapour inhalation neurotoxicity study in rats: NOEL 100ppm
Acute oral toxicity (single dose) study in Beagle dogs: Lethal dose 500mg/kg; No clinical signs were observed at 1 mg/kg.

12. ECOLOGICAL INFORMATION

Environ. Protection: DO NOT fumigate more than once as commodity is likely to become unfit for use. DO NOT treat within 50cm of desirable vegetation. Signs as below must be prominently shown in all approaches to fumigation site. 'DANGER - POISON GAS - KEEP AWAY'
Station a guard at the treatment site to prevent entry of unauthorised persons, children and animals, during treatment and aeration period. After fumigation, aerate structures well, until an appropriate measuring device indicates fumigation area free of methyl bromide.

Acute Toxicity - Fish
LC50 (96 hr) for rainbow trout is 3.9 mg/l.
LC50 (96 hr) for zebrafish is 56.28 mg/l.

Acute Toxicity - Daphnia
EC50 (48 hrs): 2.6 mg/l

Acute Toxicity - Algae
EC50 (72 hrs) for selenastrum capricornutum 5 mg/l.

Acute Toxicity - Other Organisms
LD50 for northern bobwhite is ca. 73 mg/kg

Ecotoxicity: Methyl bromide is listed in the Montreal Protocol as a controlled substance with an ODP (Ozone Depleting Potential) of 0.4.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Observe all federal, state or local environmental regulations when disposing of this material. The recommended method of waste disposal is incineration. If a suitable designated combustion chamber is not available, return MARKED containers to supplier.

14. TRANSPORT INFORMATION

U.N. Number: 1062
Proper Shipping Name: METHYL BROMIDE
DG Class: 2.3
Sub.Risk: -
Hazchem Code: 2 X E
Packaging Method: 5.9.2RT2
Packing Group: N/A
Storage and Transport: Considered dangerous for transport by the Australian Code for the Transport of Dangerous Goods by Road and Rail.

EPG Number: 2B1
IERG Number: 07
UN Number (Air): Cargo Aircraft - Forbidden
Transport, ICAO: Passenger Aircraft - Forbidden

15. REGULATORY INFORMATION
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## Classified as hazardous according to criteria of NOHSC

### Risk Phrase
- R23 Toxic by inhalation.
- R36/37/38 Irritating to eyes, respiratory system and skin.
- R50 Very toxic to aquatic organisms.
- R53 May cause long term adverse effects in the aquatic environment.
- R59 Dangerous for the ozone layer.

### Safety Phrase
- S1/2 Keep locked up and out of reach of children.
- S15 Keep away from heat.
- S27 Take off immediately all contaminated clothing.
- S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
- S38 If insufficient ventilation, wear suitable respiratory equipment.
- S45 In case of accident or if you feel unwell seek medical advice immediately.
- S59 Refer to manufacturer/supplier for information on recovery/recycling.
- S61 Avoid release to the environment. Refer to special instructions/safety data sheet.

### Poisons Schedule
- S7

### Hazard Category
- Toxic, Irritant

### Packaging & Labelling
- DANGEROUS POISON
- KEEP OUT OF REACH OF CHILDREN
- READ SAFETY DIRECTIONS BEFORE OPENING OR USING

### AICS (Australia)
- All of the components in this product are listed on the Australian Inventory of Chemical Substances.

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## 16. OTHER INFORMATION

### Contact Person/Point
- **Normal Hours:** Mr Volker Maier  Phone: (03) 9282 1000
- **After Hours:** Shift Supervisor  Phone: 1800 033 498

### Revisions Highlighted
- The MSDS was reviewed. Minor changes were made to the information. The MSDS is now issued in a 16 header format.

...End Of MSDS...