

ENVIRONMENTAL ASSESSMENT REPORT

PROFUME GAS FUMIGANT (SULFURYL FLUORIDE)

Status	Final
Date	24 August 2006
Availability	Unrestricted
Department of the Environment and Heritage Environmental Protection Branch Chemical Assessment Section	

1. INTRODUCTION

Dow AgroSciences Australia Ltd has applied for the registration of ProFume Gas Fumigant containing the new active ingredient sulfuryl fluoride (998 g/kg).

ProFume Gas Fumigant will be used to control insect and rodent pests in dwellings, buildings, construction materials, furnishings (household effects), shipping containers (including those containing pallets), machinery and non-food items, and vehicles (including cars, buses, surface ships, rail cars and recreational vehicles, but excluding aircraft). It will also be used to control post-harvest insect and rodent pests in non-residential structures, such as food processing plants, mills, warehouses, stationary transportation vehicles (railcars, trucks, etc, excluding aircraft and passenger railcars), temporary and permanent fumigation chambers, and storage structures. The sites and commodities that can be fumigated are described in the ProFume Applicator's Manual. According to the submission, commodities that can be fumigated are those for which US registrations have been approved, such as dried fruit and tree nuts, as well as stored grain and export seed and hay.

Sulfuryl fluoride has been registered for use in the USA as a fumigant since 1961 and is registered in USA, Germany, Sweden, Norway, Puerto Rico, Indonesia and Japan for non-food uses as the product Vikane. It is registered as the product ProFume for food use in the USA, UK, Germany and Switzerland. In Australia only one product will be registered for use for both non-food and food use.

Despite its long history of use overseas, sulfuryl fluoride appears to be a completely new substance to Australia as it not listed on the Australian Inventory of Chemical Substances (AICS). Natural sources of emission are also very low. There have been international reviews on the environmental risk of sulfuryl fluoride from the US EPA, EU and Californian Environmental Protection Agency (CEPA, 2005).

ProFume Gas Fumigant is for use only by fumigators accredited under Dow AgroSciences' *PRECISION FUMIGATION** Training Program. Fumigators must carefully read the container label and associated Applicator's Manual before using the product. Use must not occur without the Fumiguide Program for ProFume, a computer program that calculates safe and effective levels for fumigating structures and commodities.

2. CHEMICAL IDENTITY & PHYSICO-CHEMICAL PROPERTIES

2.1 Identification

- | | |
|--------------------------|--------------------------------|
| (a) Chemical name: | sulfuryl fluoride |
| (b) CAS registry number: | 2699-79-8 |
| (c) Empirical formula: | SO ₂ F ₂ |
| (d) Molecular weight: | 102.1 g/mol |

2.2 Physical and Chemical Properties

(a) Appearance:	colourless gas
(b) Melting point:	-136.7°C (calculated from heat of fusion)
(c) Boiling point:	-54.1±1°C
(d) Vapour density:	4.3 g/L (from MSDS). Relative density (air =1): 3.5 ¹
(e) Vapour pressure:	1611467 Pa at 20°C (calculated)
(f) Solubility:	1.04±0.12 g/L in unbuffered water at 20°C
(g) Log Kow:	0.14
(h) Henry's Law constant	158142 Pa m ³ /mol

2.3 End-product formulation

Sulfuryl fluoride is not formulated into an end-use product, but is used in the form of very high purity technical material (99.8%).

An estimate of the amount of ProFume to be used in Australia was not given, but based on usage in California (681 tonnes in 1993 increasing to 1380 tonnes in 2002, CEPA 2005), usage in Australia could reach 1000 tonnes/annum.

3. APPLICATION RATES AND USE PATTERNS

Sulfuryl fluoride will be used to kill insect and rodent pests in enclosed situations, such as structures, vehicles and containers. The enclosure to be fumigated must be sealed to reduce the loss of the gas and to ensure an adequate exposure and dose for the gas to be an effective fumigant.

The required dosage is a function of time and concentration, and depends on the target species, their development stage, the prevailing temperature and the rate of leakage. To control rodents a minimum dosage of approximately 36 g-h/m³ is needed. The dosages (=duration X concentration) are not given on the label as it is dependent on several factors, including insect species and life cycle/stage, concentration, time of exposure and amount of leakage. Thus for insects the dosage is determined by the ProFume Fumiguide, an interactive computer program. From the examples given by the applicant, times are typically between 4 hours to 2 days. The concentration of sulfuryl fluoride has to be monitored with the structure being fumigated to ensure an adequate dosage is used. The maximum dosage is 1500 g-h/m³, and the maximum concentration 128 g/m³ (~30,000 ppm, for sulfuryl fluoride 1 ppm = 1.42 mg/m³).

The fumigant is released into the blast of air from one or more fans in order to ensure its distribution through the structure being fumigated. Fans may also be used to facilitate aeration when fumigation is complete. The concentration of sulfuryl fluoride must be reduced to below 3 ppm during aeration.

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http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc14/icsc1402.pdf#search=%22sulfuryl%20fluoride%20european%20union%22

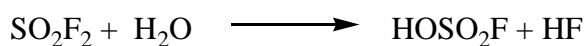
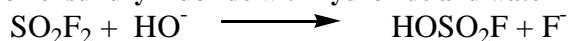
4. ENVIRONMENTAL FATE

The primary source of sulfuryl fluoride in the environment is from its use as a fumigant. Once released from the gas cylinder, sulfuryl fluoride is a gas under essentially all environmental conditions and is expected to remain in the atmosphere, with only very small amounts (0.007%) estimated to partition from the air to the water phase (Mackay Level II modeling, Krieger, 2001a).

Hydrolysis

The rate of hydrolysis of sulfuryl fluoride was estimated in a non-standard, non-GLP report using previously reported kinetics values (reported in Cady and Misra, 1974) for the reaction of sulfuryl fluoride with water and the nucleophilic reaction with hydroxide ion (see figure 1 for reaction) in water (Krieger, 2001b). The estimated half-lives in water at pH 5.9, 7.0 and 9.0 are 3.1 days, 4.6 hours and 2.8 minutes, respectively. The estimated half-life in the ocean (17°C, pH 8.1) is 41 minutes.

Figure 1. Reaction of sulfuryl fluoride with hydroxide and water



Biodegradation

No biodegradation studies for soils or water were presented. As it will be released to the atmosphere, exposure of soils and water to sulfuryl fluoride is expected to be negligible, <10⁻⁶% of the sulfuryl fluoride released to soil and <0.007% to the water from the Mackay modeling, hence the lack of studies is acceptable.

Atmospheric Degradation

The fate of sulfuryl fluoride in the atmosphere is unclear. Its atmospheric lifetime has been estimated as less than 4.5 years (half-life less than 3.2 years) based on the detection limit for its analysis in air in a non-GLP study (Krieger, 2002). This study used a global mass balance approach using the production history of sulfuryl fluoride and the upper limit for tropospheric concentration. The concentration of sulfuryl fluoride in the troposphere is less than 0.5 ppt, the limit of detection. The study states that significant sinks are likely to include hydrolysis in ocean waters (through deposition) and stratospheric dissociation. Reaction with hydroxyl radicals and uptake and degradation by soils and vegetation are also possible sinks.

The estimated global warming potential of sulfuryl fluoride was modeled by MCNC Environmental Programs, Research Triangle Park, USA, using a modified version of a 3D model for global circulation, transport and chemistry 'GLOBE', to be less than 378 based on a 100 year time horizon based on the infrared spectrum (Krieger, 2002). Two reference compounds were also modeled to give atmospheric half lives of 1.2 and 1.3 years in the GLOBE model compared to known half lives of 1.4 years from the IPCC (Intergovernmental Panel on Climate Change). In addition, the carbon dioxide equivalent

of sulfuryl fluoride was calculated to represent less than 0.004% of the total current emissions of carbon dioxide and 0.016% future emissions.

Sulfuryl fluoride will not contribute to stratospheric ozone depletion as it contains no chlorine or bromine atoms. Emissions of sulfur from sulfuryl fluoride are negligible relative to current anthropogenic sulfur emissions.

Field Study

A field study was conducted to determine the potential exposure to fumigators and bystanders from fumigation of an abandoned flour mill in Yorkshire (Perkins, 2002). The study was based on US EPA Test Guideline 95.88 and OECD guidance document for the Conduct of Studies of Occupational Exposure to Pesticides during Agricultural Application, 1997. Only the parts of the study relevant to the external concentration of sulfuryl fluoride will be reported here.

The mill was sealed using combination of tape, expandable foam and plastic sheeting, typical of a how building would be sealed during normal operations. The fumigation was conducted by a commercial fumigation company (IGROX, Suffolk, UK) for approximately 37 hours with the fumigant added into the building at time 0 (6 cylinders), then 4 (4 cylinders) and 20 (3 cylinders) hours later (total used was 742 kg of sulfuryl fluoride). The mill was treated to give a total of 1814 g h/m³ of sulfuryl fluoride before aeration. The aeration used fans to force the air out of the building through two internal chimneys that exited the building out of the second floor (approximate 2/3 of the height of the building) with an extra fan beside a second floor external door.

The air around the mill was monitored at 1.5 metres high using personal air samples with all air passing through tubes packed with activated charcoal. Samplers were intended to be placed along the cardinal points (North, South etc) at 5, 10, 25, 50 and 75 metres from the mill. Due to surrounding buildings and the boundary of the site mill, samples could not be placed on the cardinal points and positions are indicated in Table 1. Sampling of the air lasted for approximately 8 hours for each sample taken during the fumigation, except for the first samples where duration of sampling was approximately 5 hours, and hourly for 4 hours during venting. The activated charcoal was analysed by hydrolysis of the sulfuryl fluoride and analysis of the resulting free fluoride ion. The meteorology showed that the wind was westerly (300°) at 27 km/h (15 knots) at the start of fumigation and remained in the west to southerly quarter during the fumigation with average wind speeds of 18 to 27 km/h (10-15 knots). Table 1 gives the results.

Table 1. Sulfuryl fluoride concentration in air (ppm) during fumigation and aeration at various location around the mill.

Location No.	Direction and Distance from mill, m	Time of sample after initial treatment, hours						
		4.8	12	20.2	27.8	36.7	38 ¹	39 ¹
S1	E, 10	0.08	0.14	<LOQ	ND	<LOQ	ND	ND
S2	E, 25	<LOQ	0.05	<LOQ	ND	ND	ND	ND
S3	S, 25	<LOQ	<LOQ	0.08	ND	<LOQ	ND	ND
S4	S, 50	<LOQ	<LOQ	ND	ND	ND	ND	ND
S5	NW, 50	0.72	0.72	0.08	0.92	0.13	0.18	ND
S7	SW, 10	<LOQ	0.09	0.30	<LOQ	ND	ND	ND
S8	SW, 25	<LOQ	0.08	0.13	<LOQ	ND	ND	ND
S9	SW, 50	<LOQ	0.05	<LOQ	ND	ND	ND	ND
S11	NW, 5	2.26	2.46	1.42	0.48	0.11	<LOQ	<LOQ
S12	NW, 10	1.64	1.68	0.65	1.12	0.10	<LOQ	ND
S13	NW, 25	1.27	1.19	0.24	0.54	0.16	ND	<LOQ
S14	W, 50	<LOQ	0.08	0.14	ND	<LOQ	ND	ND
S15	W, 75	<LOQ	0.06	0.12	ND	ND	ND	ND
S17	SE, 10	<LOQ	0.33	<LOQ	ND	ND	ND	ND
S18	SE, 25	<LOQ	0.09	ND	ND	ND	ND	ND
S19	SE, 50	<LOQ	<LOQ	ND	ND	ND	ND	ND

¹Samples taken during the aeration of the mill and limit of detection = 0.07 ppm; Limit of Quantification = 0.17 ppm.

The highest atmospheric concentrations in Table 1 are 2.26 and 2.46 ppm, taken from the NW of the mill at 5 metres from the mill. However, the samples taken downwind (wind was blowing from WNW then swung around to the SW, thus the samples from E to SE from the mill are downwind) gave lower values. This could be due to air currents and eddies occurring around the building moving the material around the building (note that there were 3 buildings in the mill complex with only the central part being fumigated in this trial).

It is noted that the sampling points were only 1.5 metres above ground (human exposure level) rather than at the height of the venting of the building. However, as the highest concentrations were during fumigation rather than venting and that sulfuryl fluoride is heavier than air, this is acceptable. The study also shows that the fumigant dispersed rapidly in the air, although it was windy during application with at least a moderate breeze blowing at all times. In conclusion, the study is acceptable and clearly shows that 2.5 ppm is likely to be close to the maximum concentration likely to occur in air external to a treated structure during application and venting of structures.

5. ENVIRONMENTAL EFFECTS

Avian and terrestrial organisms

No studies were conducted on the toxicity of gaseous sulfuryl fluoride to birds, terrestrial insects, including bees, or earthworms. This is acceptable given that exposure to birds and insects is likely to be limited due to the use pattern and similarly for soil invertebrates such as earthworms. In addition, there are no standard ecotoxicological test methods for exposure to gases.

For mammals, the most sensitive results from inhalation testing are: LC50s in rats were 3020-3730 ppm for 1-hour exposure and 990-1500 ppm for 4-hour exposure (CEPA, 2005). The 4-hour LC50 in mice is >400 to 660 ppm.

Aquatic

In order to allow classification and labeling of sulfuryl fluoride, the toxicity to fish, daphnia and green algae was determined.

Fish

The toxicity of sulfuryl fluoride to zebra fish (*Brachydanio rerio*) was determined under semi-static conditions (Kirk, McClymont, McFadden, Rick and Yaroch, 2002). The study was conducted to meet OECD TG 203, US EPA Guideline 72-1 and EC Method C.1: Acute Toxicity for Fish.

The study was conducted under semi-static conditions for 96 hours with renewal every 24 hours at nominal concentrations of 0, 0.156, 0.313, 0.655, 1.25, 2.5 and 5.0 mg/L. The test system consisted of sealed vessels with no head space to minimize the loss of sulfuryl fluoride from the aqueous phase. There were 7 fish tested per test concentration in a single replicate.

All solutions were analysed by HPLC (limit of detection = 0.08 mg/L) when freshly prepared (all solutions were prepared daily) and mean concentrations were 0.518, 0.928, 1.60, 5.52, 4.92 (4 samples at 24 h intervals) and 14.0 (one sample only) mg/L, corresponding to 197 to 442% above nominal. As there was 100% mortality at 5.00 mg/L, the highest concentration, this test level was only tested once. The spent solutions after 24 hours were analysed and the 5.00 mg/L nominal dose level was the only spent solution with measurable levels of sulfuryl fluoride of 0.559 mg/L (~4% of initial). All other spent solutions (24, 48 and 72 hour solution sampled) were <0.08 mg/L. A time weighted average (TWA) concentration was determined using an OECD method from OECD Guideline 211 (*Daphnia magna* Reproduction Test) and assuming that 1% of sulfuryl fluoride was in the spent test solutions at 24 h when renewal occurred. This method of determining the TWA assumes first order kinetic degradation. The TWA concentrations were calculated as 0.11, 0.200, 0.344, 0.541, 1.06 and 3.01 mg/L, which correspond to 42 to 71% of nominal.

The dissolved oxygen (mean of 91% of saturation), pH (mean 6.8) and temperature (mean 19.5°C) were all satisfactory.

After 24 hours there was 100% mortality at 5.00 mg/L and 1 and 5 mortalities (14 and 71%) after 96 hours at 1.25 and 2.5 mg/L respectively. The 96 hour LC50 was 0.89 (CI 0.64-1.24) mg/L using the TWA concentrations and calculated using Trimmed Spearman Karber (0% trim).

These results indicate that sulfuryl fluoride is highly toxic to zebra fish. The study is rated as reliable.

Daphnia

The 48 hour EC50 of sulfuryl fluoride to *Daphnia magna* was determined according to OECD TG 202, US EPA Guideline 72-1 and EC Method C.1 Acute Toxicity for *Daphnia magna* (Kirk, Yaroch, Rick, McClymont and Krieger, 2002).

The study was conducted under static conditions for 48 hours with test vessels crimp sealed with no head space to minimize the loss of sulfuryl fluoride from the aqueous phase at nominal concentrations of 0, 0.078, 0.156, 0.313, 0.655, 1.25, 2.5 and 5.0 mg ac/L. There were 20 daphnids used per test concentration and 2 replicates with 10 daphnids each.

All solutions were analysed by GC/EDC (limit of detection = 0.04 mg/L) when freshly prepared and mean concentrations were 140 to 253% above nominal. Sulfuryl fluoride was not detected in any of the spent solutions after 48 hours and were all <0.04 mg/L. A TWA concentration was determined using the OECD method as before and assuming that 0.5% of sulfuryl fluoride was in the spent test solutions. The amount of sulfuryl fluoride left in the spent solutions was estimated from the dissipation data (no further details given in report – using the hydrolysis half life of 4.8 hours at pH 7.0, DEH calculates that after 48 hours there is 0.07% of initial remaining). The TWA concentrations were calculated as 0.037, 0.0633, 0.136, 0.261, 0.492, 0.659 and 1.5 mg/L over the exposure period, corresponding to 26-47% of nominal.

The dissolved oxygen (mean of 91% of saturation), pH (mean 7.3) and temperature (mean 19.7°C) were all satisfactory.

After 48 hours there were 1, 0, 4, 14 and 20 immobile daphnids (5, 0, 20, 70 and 100% mortality) at 0.313, 0.655, 1.25, 2.5 and 5.0 mg ac/L nominal respectively. The 48 hour EC50 was determined as 0.62 (CI 0.51-0.76) mg/L using the TWA concentrations and calculated using the moving average angle method. These results indicate that sulfuryl fluoride is highly toxic to *D. magna*. The study is rated as reliable.

Green algae

The 96 hour EC50 to the green alga *Selenastrum capricornutum* was determined according to OECD TG 201, US EPA Guideline 123-2 and EC Method C.3: Algal Inhibition Test (Kirk, Rick, Krieger and McFadden, 2002).

The study was conducted under static conditions for 96 hours with test vessels crimp sealed with no head space to minimize the loss of sulfuryl fluoride from the aqueous phase at nominal concentrations of 0, 0.195, 0.391, 0.781, 1.56, 3.13, 6.25 and 12.5 mg ac/L. There were 5 replicates per dose level with each replicate inoculated with approximately 14,600 cells/mL and 2 of these replicates were used for analysis at 48 hours. In addition, blanks were also prepared for each dose and incubated under the same conditions, but not inoculated with algal cells.

All solutions were analysed by GC/EDC (limit of detection = 0.10 mg/L) when freshly prepared and mean concentrations were 83 to 144% above nominal. Sulfuryl fluoride was not detected in any of the solutions after 48 hours for the lowest 5 test concentrations (ie all were <0.1 mg/L). For the two highest concentrations, the measured test

concentrations for 6.25 mg/L nominal were 8.36, 0.493 and 0.165 mg/L for the day 0, 2 and 4 samples respectively and for the 12.5 mg/L nominal the measured concentrations were 18.0, 3.34, and 2.12 mg/L respectively. A TWA concentration was determined using the OECD method as before with the calculations using the measured concentrations for the 2 highest test concentrations and for the remaining test solutions it was assumed that 0.5% of sulfuryl fluoride remained after 48 hours and none after 96 hours. The TWA concentrations were calculated as 0.0166, 0.0354, 0.061, 0.166, 0.398, 1.54 and 5.69 mg/L, corresponding to 8-46% of nominal.

The measured pH values after the exposure showed that there was an elevated pH in the lower test concentrations where algal growth was more vigorous, reaching pH 9. This resulted in higher hydrolysis rates at lower concentrations of sulfuryl fluoride. At initiation the pH ranged from 6 to 7.3.

There was increased growth compared to control at lower test concentrations and growth was inhibited at the higher test concentrations. The 96 hour E_bC_{50} was 0.83 mg/L and the E_rC_{50} was 6.36 mg/L. These results indicate that sulfuryl fluoride is highly toxic to the green alga *S. capricornutum*. The study is rated as reliable.

Summary

Environmental exposure

The primary source of sulfuryl fluoride in the environment is from its use as a fumigant. Sulfuryl fluoride is a gas under essentially all environmental conditions and is expected to disperse in the atmosphere, with only very small amounts (0.007%) estimated to partition from the air to the water phase. Sulfuryl fluoride is expected to dissipate from the atmosphere with a half-life of about 3 years.

Sulfuryl fluoride is rapidly hydrolysed to fluorosulfate and fluoride in water. The estimated half-lives at pH 5.9, 7.0 and 9.0 are 3.1 days, 4.6 hours and 2.8 minutes, respectively. The estimated half-life in the ocean (17°C, pH 8.1) is 41 minutes.

Exposure of soils to sulfuryl fluoride is expected to be minimal.

The fate of sulfuryl fluoride in the atmosphere is unclear. Its atmospheric lifetime has been estimated as less than 4.5 years (half-life less than 3.2 years) based on the detection limit for its analysis in air. The concentration of sulfuryl fluoride in the troposphere is less than 0.5 ppt. Significant sinks are likely to include hydrolysis in ocean waters and stratospheric dissociation. Reaction with hydroxyl radicals and uptake and degradation by soils and vegetation are possible sinks. The estimated global warming potential of sulfuryl fluoride is less than 378 based on a 100 year time horizon. The carbon dioxide equivalent emissions of sulfuryl fluoride represent less than 0.004% of the total current and 0.016% of future emissions of radiatively active gases.

Sulfuryl fluoride will not contribute to stratospheric ozone depletion as it contains no chlorine or bromine atoms. Emissions of sulfur from sulfuryl fluoride are negligible relative to current anthropogenic sulfur emissions.

Environmental effects

No studies were conducted on the toxicity of gaseous sulfuranyl fluoride to terrestrial organisms, which is acceptable given the low likelihood of exposure of these organisms. The most sensitive result from inhalation testing in mice was a 4-hours LC50 of 400 ppm.

Static renewal testing was conducted in zebra fish, and static testing in *Daphnia magna* and green algae, in order to allow classification and labeling of sulfuranyl fluoride. The 96 hour LC50 for zebra fish was determined according to OECD, US EPA and EU guidelines as 0.89 mg/L based on time-weighted average concentrations. Measured concentrations declined to below the limit of detection between 24 h renewals for all test solutions except the highest. The 48 hour EC50 for *Daphnia magna* was 0.62 mg/L, again using time-weighted average concentrations and where all test solution had declined to below the limit of detection after 48 hours. The 96 hour EC50s for *Selenastrum capricornutum* were 0.83 mg/L based on biomass and 6.36 mg/L based on growth rate using the time-weighted average concentrations. These results indicate that sulfuranyl fluoride is highly toxic to aquatic life.

6. ENVIRONMENTAL RISK ASSESSMENT

Environmental release and exposure to sulfuranyl fluoride is expected to be limited to leaks during fumigation and atmospheric release following fumigation. DEH acknowledges that some sulfuranyl fluoride is expected to react with the substrates or products being fumigated but as no data was presented on these reactions, it is assumed that all material used will be released to the atmosphere. Assuming that use in Australia closes mirrors that in California, up to 1000 tonnes per annum could eventually be released in this way. Although degradation pathways are undefined, sulfuranyl fluoride is expected to dissipate from the atmosphere with an estimated half-life of <3.2 years based on a lack of detection from current global releases. The submission indicates that the concentration of sulfuranyl fluoride in air in the vicinity of the treated areas when the fumigant is released after fumigation is likely to remain below 2.5 ppm, based on atmospheric monitoring in the UK (see above). However, DEH notes that this result was not taken downwind of the mill being fumigated but could be material caught in an air current eddy and therefore not worst case.

The risk of sulfuranyl fluoride to terrestrial organisms is expected to be low because exposures due to atmospheric concentrations are unlikely to greatly exceed 2.5 ppm (less than 1% of the most sensitive inhalational endpoint in mice), giving a wide margin of safety for mammals and presumably birds at 5 metres from the treatment site. Atmospheric concentrations will decline rapidly as the fumigant disperses in the atmosphere, further reducing the risk.

For aquatic exposure, the applicant has estimated a concentration of 175 ng/L, based on an import volume of 100 tonnes per annum used in a small area (100 km²) where 1% is covered by surface water with average depth of 15 cm. The modelling used the Mackay Level II model with the following input parameters: volume of air of 10⁸ m³, volume of water of 1.5 X 10⁵ m³ and volume of soil of 9.9 X 10⁶ m³. Under this scenario and with the lowest EC50 of 0.62 mg/L the risk of such exposures to aquatic life is assessed as minimal with Q = 0.03 using an assessment factor of 100 (3 acute toxic data points only).

Given the low amount of sulfuryl fluoride that partitions to the aquatic phase and the short aquatic half life calculated, risk is acceptable.

7. HAZARDS ARISING FROM FORMULATION, HANDLING AND DISPOSAL

Accidental release of the product could cause harm to organisms and should be avoided. The proposed label has adequate warnings and as the product is a compressed gas in a gas cylinder, the chance of a spill is low.

- Formulation/Packaging

The product will not be formulated in Australia and the gas cylinders are imported into Australia therefore the risk to the environment is low.

- Transport

The draft label is satisfactory.

- Storage

The draft labels are satisfactory with regard to storage.

- Protection of Wildlife, Fish, Crustaceans and Environment.

The label directions for use are satisfactory.

- Use

The label directions for use are satisfactory.

- Disposal

The directions for disposal on the labels are satisfactory with regard to disposal of the gas cylinders (returned to supplier).

7. CONCLUSIONS & RECOMMENDATIONS

Sufficient data have been submitted to allow an adequate risk assessment of sulfuryl fluoride. Exposure to sulfuryl fluoride is expected to be mainly atmospheric where it will dissipate with a half life of about 3 years. The estimated global warming potential of sulfuryl fluoride is relatively low. Based on a single field study sulfuryl fluoride concentrations in the atmosphere are not expected to greatly exceed 2.5 ppm close to the fumigation site and be significantly lower further away. Exposure of living organisms, water and soils is expected to be minimal. It is recommended that the APVMA be satisfied that use of sulfuryl fluoride as proposed would not be likely to have an unintended effect that is harmful to animals, plants or things, or to the environment.

Our assessment is complete.

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