

# **Application for the Reassessment of a Hazardous Substance under Section 63 of the Hazardous Substances and New Organisms Act 1996**

**Name of substance: methyl bromide**

**Application Number: HRC08002**

**Applicant:  
Chief Executive ERMA New Zealand**

**Appendix A Parties contacted for information**

**Appendix B International regulation and use of  
methyl bromide**

**Appendix C Use and adverse effects of methyl  
bromide**



## **Appendix A     Parties contacted for information**

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APVMA  
Australian Quarantine and Inspection Service  
CentrePort  
Craig Seymour for Nordiko Quarantine Systems  
Department of the Environment, Water, Heritage and the Arts (Australian Government)  
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Dr Ed Kiddle for Nelson Marlborough District Health Board  
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Michael Beasley for National Poisons Centre  
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Nelson City Council  
Nelson Marlborough District Health Board  
Nordiko  
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Plant and Food Research  
Port Marlborough New Zealand Limited  
Quarantine Treatment Centre  
STIMBR  
Pete and Takutai Beech for Guardians of the Sounds  
Ports of Auckland  
Port Chalmers  
Port Nelson  
Port of Napier  
Port Otago Limited  
Port Taranaki  
Port of Tauranga Limited  
Port of Westport  
PrimePort Timaru  
Scion Research  
Simon Terry for Sustainability Council of New Zealand  
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## Appendix B International regulation and use of methyl bromide

### B1.1 Montreal Protocol

B1.1.1 Methyl bromide is listed as an ozone-depleting substance under the Montreal Protocol. At the present time, three categories of methyl bromide use are exempt from the phase-out of use of methyl bromide under the Protocol. These are:

- use as a chemical feedstock;
- critical uses; and
- use for QPS purposes.

#### Chemical feedstock

B1.1.2 Methyl bromide may be used as an ingredient in the production of chemicals, including pharmaceuticals. Feedstock uses break down the methyl bromide during the production of the final chemical product.

B1.1.3 Feedstock use is exempt from consideration as “consumption” under the Montreal Protocol. However, the Ozone Layer Protection (OLP) Regulations 1996<sup>1</sup> passed in order to implement the Protocol in New Zealand, ban the import of any bulk methyl bromide without a permit from the Ministry of Economic Development (MED). The Agency has been advised that the MED has not, to date, issued any permits for feedstock use.

#### Critical-Use Exemptions (CUEs)

B1.1.4 Under the Montreal Protocol the import of methyl bromide for non-QPS purposes was prohibited as from 1 January 2005 and New Zealand applied to the *Meeting of the Parties to the Protocol for Critical-Use Exemptions (CUEs)* to import methyl bromide for a limited time for the use in soil by the strawberry industry only.

B1.1.5 Up until the end of 2007, a CUE for the import of methyl bromide for use in soil by the strawberry fruit and runner stock growers was supported by Cabinet. In September 2006, the Minister for the Environment advised the strawberry industry that the government would not support any further applications for a CUE for 2008 or beyond. The CUE for the strawberry industry, which expired on 31 December 2007, covered the importation of methyl bromide, not its use. Growers who imported methyl bromide prior to 31 December 2007 are still legally able to use it to fumigate strawberry beds until their stocks are exhausted.

B1.1.6 According to estimates supplied by the MED in March 2009 some 5.5 tonnes of methyl bromide remain in New Zealand available for non-QPS use. This figure was obtained based on stocks reported by wholesalers and does not include residual stocks held by growers, though these are not expected to be

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<sup>1</sup> <http://www.legislation.govt.nz/regulation/public/1996/0222/latest/DLM217751.html>

large. It was estimated that the current stocks might last through the 2010 growing season.

## Use trends

B1.1.7 The UNEP Technical and Economic Assessment Panel referred to in section 5.9 released a progress report on international usage of methyl bromide in mid 2009. This concluded that global consumption of methyl bromide for QPS purposes is steady at around 11,000 tonnes. The USA uses 27%, China 17% and Japan 10%. Australia and New Zealand are amongst a group of countries keeping use below 500 metric tonnes per annum (Nordiko Quarantine Systems Pty Ltd 2009).

## Quarantine and Pre-Shipment (QPS) use of methyl bromide in New Zealand

B1.1.8 Under the Montreal Protocol, **quarantine applications** are treatments to prevent the introduction, establishment and/or spread of quarantine pests (including diseases), or to ensure their official control, where:

- a. official control is that performed by, or authorised by, a national plant, animal or environmental protection or health authority; and
- b. quarantine pests are pests of potential importance to the areas endangered thereby and not yet present there, or present but not widely distributed and being officially controlled.

B1.1.9 Pre-shipment applications are non-quarantine applications applied, within 21 days prior to export, to meet the official requirements of the importing country or the existing official requirements of the exporting country. Official requirements are those which are performed or authorised by a national plant, animal, environmental, health, or stored product authority.

B1.1.10 An important aspect of these definitions is that they both relate to *official* actions. Contractual or commercial requirements alone are not sufficient reason to allow exemption from phase-out under the QPS exemption.

B1.1.11 Thus methyl bromide can only be used if authorised for QPS purposes by MAF Biosecurity New Zealand (MAFBNZ) or other relevant government department.

B1.1.12 QPS use of methyl bromide encompasses the control of pests:

- in export products (pre-shipment) for example, in logs;
- on products or items that are imported (quarantine);

and within New Zealand for:

- imported pests that are limited in distribution and will spread if not controlled for example, subterranean termites (quarantine);
- pests in an export crop that must be totally removed from that crop to allow it to fulfil the export requirements for that crop (pre-shipment);
- under an emergency use provision to enforce a regional quarantine similar to the regional controls that are in place in Australia to prevent fruit fly spreading outside Queensland (quarantine).

B1.1.13 The use of methyl bromide for QPS uses has increased in many countries over recent years. This reflects an increase in international trade and an increased

awareness of the need for biosecurity measures. New Zealand is among the countries whose use of methyl bromide has increased largely because of an increase in supply of export timber (logs) and an increased demand for it. For instance, New Zealand log exports to China are increasing rapidly at present due to restrictions applying to logs from Russia.

## **B1.2 Use of methyl bromide in other jurisdictions**

### *Australia*

- B1.2.1 In June 2007, the Australian Pesticides and Veterinary Medicines Authority (APVMA) released its decision on a review into the continued use of methyl bromide in Australia which it began in 2005 ([\*Methyl Bromide Final Review Report and Regulatory Decision\*](#)).
- B1.2.2 The review was based on environmental concerns and considered whether use in accordance with the existing product labels would be likely to have unintended effects which are harmful to the environment.
- B1.2.3 The APVMA was satisfied that the labels of all methyl bromide products could be varied in such a way that the continued use of methyl bromide products would not be likely to have an unintended effect that is harmful to the environment. It therefore recommended that product labels should be amended to only allow QPS and approved CUE uses under the Montreal Protocol.
- B1.2.4 As regards recapture, the APVMA noted that:
- recapture can significantly reduce occupational health and safety and environmental exposure;
  - Tasmania had already made methyl bromide recapture mandatory for quarantine treatment;
  - the Montreal Protocol does not expect adoption of technologies for methyl bromide reduction, if there are no available options or the cost of options is not economical,

and decided, for economic and logistical reasons, that the technology was not then mature enough for mandatory implementation within the Australian fumigation industry. The APVMA therefore decided to keep a watching brief on developments in recapture technology and liaise with fumigators, regarding developments in the economics and logistics of its possible implementation as a registration requirement. It also required all labels to carry a comment that recapture is recommended, where feasible. Allied to this, the APVMA proposed to monitor any changes in the Australian occupational health and safety threshold limit value (TLV) for methyl bromide and any implications this may have on mandatory degassing and/or recapture immediately after fumigation.

### *European Union*

- B1.2.1 At its meeting on March 25, 2009, the European Parliament banned the use of methyl bromide within the European Union (EU) from March 18, 2010. This ban is significantly sooner than the 2015 phase-out originally proposed by the European Commission and supported by EU governments.

- B1.2.2 The ban covers the use of methyl bromide as a pesticide, as well as its use for QPS purposes prior to transport. This ban includes the gassing of containers to control vermin. The only remaining exceptions to the ban will be the use of methyl bromide for analytical use in laboratories and for its use in emergencies, such as where a large-scale epidemic occurs (methyl bromide used for emergencies may be used for a period not exceeding 120 days and up to a quantity not exceeding 20 metric tonnes).
- B1.2.3 The calculated level of methyl bromide which may be used in the period from 1 January 2010 to 18 March 2010 in the EU is not to exceed 45 (ODP) tonnes. Until 18 March 2010 methyl bromide may be placed on the market and used for QPS purposes for treatment of goods for export, under the condition that at least 80 % of methyl bromide released from the consignment is recovered.
- B1.2.4 Until 31 December 2014, companies within the EU may produce or import for re-export methyl bromide to countries outside the EU where it is intended for QPS applications.

### *United States of America*

- B1.2.5 In its Re-registration Eligibility Decision released in June 2008, the US EPA assessed the risks arising from the use of methyl bromide in soil and decided that CUE and QPS exempt uses under the Montreal Protocol were eligible for re-registration provided certain mitigation measures were adopted and labels amended accordingly. The mitigation measures imposed included buffer zones, application rates, fumigant and emergency management plans, worker protection measures and operator training programmes. The EPA's decision did not have specific regard to the main types of QPS uses in New Zealand, in particular the treatment of logs and cut timber for overseas market access purposes and thus is of limited relevance to this reassessment.

### *Canada*

- B1.2.6 In Canada, the Pest Management Regulatory Agency released its Re-evaluation Decision Document in March 2004, which permitted the continuation of CUE, QPS and emergency uses in accordance with Canadian regulations implementing the Montreal Protocol. In the decision, PMRA noted that it was working with other Canadian agencies to implement a phase out of methyl bromide use and promote and develop alternative strategies. The PMRA intended that phase out schedules and exemptions should be harmonised with those of the US EPA and the EU.

## Appendix C Use and adverse effects of methyl bromide

### C1.1 Introduction

- C1.1.1 Methyl bromide is imported as a liquid and held under pressure in the metal cylinder and is applied by passing it through an evaporator/<sup>2</sup>vaporiser which converts it to a jet of gas.
- C1.1.2 Methyl bromide is a liquid at zero degrees Celsius, so one of the main effects of cold conditions is reduced volatility and a greater tendency to condense on cold surfaces. It is the vapour phase that penetrates into the materials being treated and also into the pests.
- C1.1.3 To provide the required efficacy methyl bromide must be applied at temperatures above 10°C and maintained at that temperature for the duration of the treatment. Temperature digital data loggers are used to record the temperature throughout the treatment period or minimum/ maximum thermometers are placed within the treatment area to provide less detailed monitoring. If the temperature falls below 10°C at any stage during the fumigation the product must be re-fumigated.
- C1.1.4 To ensure that the temperature remains above 10°C the container or product under the tarp may be heated before and/or during fumigation. This may require up to two days pre-heating in cold areas during the winter.
- C1.1.5 The amount of methyl bromide required for successful fumigation is in turn temperature dependent for example the MAFBNZ's standard for wood packaging provides the following information on dosage:

**Table C1: Methyl bromide rates for wood fumigation at normal atmospheric pressure**

Temperature	Dosage g/m <sup>3</sup>	Minimum concentration (g/m <sup>3</sup> ) at:			
		2 hrs.	4 hrs.	12 hrs.	24 hrs.
21° C +	48	36	31	28	24
16° C +	56	42	36	32	28
10° C +	64	48	42	36	32

- C1.1.6 The minimum concentration of methyl bromide and the time of fumigation is product dependent and is specified in the relevant import or export standard. For example, wood imported into New Zealand that is not compliant with the wood packaging standard requires 24 hour fumigation. Cabbages exported to Fiji require 2 hour fumigation to remove white butterfly caterpillar while not impacting shelf life.

<sup>2</sup> An evaporator consists of 5 m of copper tubing surrounded by hot water at approximately 70C.

**Table C2: Quantities of methyl bromide used in New Zealand on exported goods 2006/2007**

Export	Kg Methyl bromide		%increase
	2006	2007	
<b>Types of items treated</b>			
Bulb, corms, tubers and rhizomes (intended for planting)	6.65	0.000	
Cut flowers and branches (including foliage)	406.114	129.300	-68%
Fresh fruit and vegetables	1,727.58	899.631	-48%
Grain and cereals for consumption including rice (not intended for planting)	9.4	83.716	791%
Dried foodstuffs (including herbs, nuts, dried fruit, coffee, cocoa)	117.174	43.002	-63%
Nursery stock (plants intended for planting other than seed)	159	14.900	-91%
Seeds (intended for planting)	98.46	228.299	132%
Wooden packaging materials, other pckging materials including cardboard, pallets & dunnage	4,419.23	8,347.618	89%
Wood (including round sawn, sawn wood, wood chips)	16,628.31	19,187.775	15%
Whole logs (with or without bark)	105,371.35	154,452.300	47%
Hay, straw, dried animal fodder (other than grains and cereals listed above)	491.22	333.522	-32%
Cotton and other fibre crops and products	67.676	499.760	638%
Buildings (including dwellings, factories, storage facilities)	0	134.828	
Equipment (including used agricultural machinery & vehicles); and empty shipping containers	3,525.38	3,883.830	10%
Tyres	87.5	71.700	-18%
Personal effects, furniture, crafts, artefacts, hides, fur and skins	1,166.08	1,092.620	-6%
Other	1,519.00	527.700	-65%
Unknown	6,579.69	2,768.270	-58%
<b>Total</b>	<b>142,379.82</b>	<b>192,698.771</b>	<b>35%</b>

**Table C3: Quantities of methyl bromide used in New Zealand on imported goods 2006/2007**

Import	Kg methyl bromide		
	2006	2007	%increase
<b>Types of item treated</b>			
Bulb, corms, tubers and rhizomes (intended for planting)	16.548	43.300	162%
Cut flowers and branches (including foliage)	104.01	120.940	16%
Fresh fruit and vegetables	3,887.08	3,499.078	-10%
Grain and cereals for consumption including rice (not intended for planting)	340.816	584.939	72%
Dried foodstuffs (including herbs, nuts, dried fruit, coffee, cocoa)	446.201	270.762	-39%
Nursery stock (plants intended for planting other than seed)	25.491	19.260	-24%
Seeds (intended for planting)	21.84	66.366	204%
Wooden packaging materials, other pckging materials including cardboard, pallets & dunnage	1,135.03	3,568.577	214%
Wood (including round sawn, sawn wood, wood chips)	3,457.85	5,543.585	60%
Whole logs (with or without bark)	2	30.300	
Hay, straw, dried animal fodder (other than grains and cereals listed above)	1,393.12	813.542	-42%
Cotton and other fibre crops and products	336.816	161.480	-52%
Buildings (including dwellings, factories, storage facilities)	0	92.656	
Equipment (including used agricultural machinery & vehicles); and empty shipping containers	9,436.36	10,738.635	14%
Tyres	1,593.48	1,785.755	12%
Personal effects, furniture, crafts, artefacts, hides, fur and skins	4,508.18	4,474.421	-1%
Other	1,541.60	448.828	-71%
Unknown	6,749.75	2,581.952	-62%
<b>Total</b>	<b>34,996.17</b>	<b>34,844.376</b>	<b>0%</b>

### ***Logs in ships' holds***

C1.1.7 The required quantity of methyl bromide is injected as a gas, by means of a vaporiser, and the holds sealed up for 12–24 hours depending on the importing country requirements. The holds are then ventilated. The procedure used for venting can vary significantly between ports and under different circumstances. The following is the preferred process used at the ports of Wellington and Picton (see **Appendix I**):

- the manhole covers and fixed vents are opened;
- after about 30 minutes the main hold covers are lifted to a height of about 0.5–1 m;
- the hold covers are fully opened 60 minutes later. Ventilation is by natural dispersion, without fan assistance.

C1.1.8 Possible variations to the procedure can occur if there are no vents or manholes (omit step 1), or the cover mechanism doesn't allow partial opening (modify step 2, for example, if the covers are in two parts, remove one side first). In addition, other ports may allow opening of the holds in a single step.

### ***Logs carried as deck cargo***

C1.1.9 These are fumigated onshore, preferably on a sealed surface. The piles of logs are covered with low-permeability tarpaulins, and a ground seal is achieved by use of water or sand 'snakes' placed around the edges. The fumigant is injected inside the enclosure and left for 12 to 24 hours. The snakes are then removed, followed by the tarpaulins.

### ***Stacks of timber***

C1.1.10 These may be treated outdoors or inside a building. The stacks are covered with tarpaulins and treated in much the same way as logs. The buildings may be either naturally ventilated (via open doors, windows and vents) or force-ventilated using fans. At the Port of Nelson timber stacks are fumigated within a building, and after fumigation are initially connected to an activated carbon absorption unit. When methyl bromide concentrations have dropped below a set level, each timber stack, with the tarpaulins still in place, is connected to an air extraction system and the gases are discharged from the building through 13m-high stacks.

### ***Containers***

C1.1.11 Treatment of containers may take two forms. Groups of containers are covered with tarpaulins, with the container doors left slightly ajar to assist fumigant penetration. Ventilation is done in two stages, with the tarpaulins being removed first, and the containers doors fully opened after about 30–60 minutes.

C1.1.12 Alternatively, and more commonly, containers may be fumigated without using tarpaulins. The fumigant is injected through the door seal. At the end of the treatment period, the doors are opened wide to allow the gas to disperse.

### ***Transitional facilities***

C1.1.13 Fumigation with methyl bromide can be carried out at venues other than ports at MAFBNZ approved transitional facilities where cargo is consolidated. There are approximately 6,000 transitional facilities some of which may fumigate only one or two containers per year

- C1.1.14 At most transitional facilities treatment takes place either under a tarpaulin or inside a shipping container.
- C1.1.15 The tarpaulin is designed specifically for fumigation purposes and is made of a woven canvas that has been heat sealed to ensure it is gas tight. The tarpaulin is put over the product to be treated and then several rows of sand snakes are placed along the edges to anchor the tarpaulin to the ground. The container is sealed by ensuring small holes and door surrounds are sealed with masking tape or by using an expanding foam.
- C1.1.16 Once the methyl bromide is introduced to the fumigation site the surrounding area is checked for the presence of methyl bromide with a halide lamp or a Toxi Rae and any leaks are stopped with the addition of sand snakes to the sides of a tarpaulin or use of tape or expanding foam. Temperature is most often measured with minimum/maximum thermometers.
- C1.1.17 Once the fumigation is completed the tarpaulin is removed or the container doors are opened and a turbo fan is introduced to clear any residual gas. One operator indicated that a turbo fan capable of moving 700 cu ft/minute will usually remove all methyl bromide from a container within 10 minutes. Ventilation continues until all gas has been removed. The area is checked again using the halide lamp or Toxi Rae.

#### ***Auckland Quarantine Treatment Centre***

- C1.1.18 The Quarantine Treatment Centre at Auckland Airport handles all the items that arrive via the airport (personal luggage), and mail that requires fumigating. In addition a range of produce and personal effects that arrive by sea and air are treated.
- C1.1.19 In terms of quantity of methyl bromide used, the Centre is one of the smallest operators in New Zealand but in terms of individual items treated, one of the largest. Typically it treats 300 to 400 items per week using approximately 2.4 kg of methyl bromide for the mail and passenger items.
- C1.1.20 The Centre has 8 treatment cells and provides the full range of fumigation treatments allowed by MAFBNZ apart from radiation. Three of the cells are ex-sea containers, 3 are specially built vacuum cells, 1 is a purpose built heat cell and 1 a freezer. 4 of these cells can be used for methyl bromide treatment.
- C1.1.21 Treatment is applied from a control room behind the container and the dosage is applied using a sight glass that allows methyl bromide to be applied in 100g graduations. Once methyl bromide has been released into the fumigation containers the external surrounds are inspected with a halide lamp to ensure there are no leaks. If leaks are found they are blocked. Dosage levels are monitored throughout the treatment with the fumiscope to ensure correct levels are maintained. An unusual drop in the dose level may indicate leakage which will prompt another halide lamp test being carried out.
- C1.1.22 Once treatment is completed the container is vented and the gas sucked out by a powerful pump. The gas is released into the atmosphere through the roof of the building in which the centre is housed. The container doors are opened once all the methyl bromide has been removed (as measured by the fumiscope). Because of the range and number of treatments undertaken, the Centre is audited by MAFBNZ approximately 8 times a month.

## **C1.2 Reports of adverse effects of methyl bromide**

C1.2.1 As part of its identification of sources of effect associated with methyl bromide use, the Agency sought information on reported incidents relating to the use of the substance in New Zealand and overseas.

### **New Zealand incident reports**

- C1.2.2 The Institute of Environmental Science and Research Ltd (ESR) conducted a search of the Chemical Injury Surveillance System (CISS) database on behalf of the Agency in order to identify harms from methyl bromide since 2001. The CISS involves the collection and analysis of hazardous substance injury data from a variety of sources. These sources of data include the Coronial Services Office, the New Zealand Health Information Service (NZHIS), the National Notifiable Disease Surveillance Database (EpiSurv), District Health Boards, the National Poisons Centre and Public Health Units (PHUs).
- C1.2.3 The results of the search were presented as a spreadsheet containing anonymised line listings for each incident. This search provided data on the number of hospital admissions, emergency department admissions and injuries associated with methyl bromide as well as the presence of methyl bromide in toxicology tests done for deaths.
- C1.2.4 Methyl bromide was not confirmed in any toxicology tests carried out for deaths since 2001. The files held by the Coronial Services Office post-July 2007 were unable to be accessed at the time the analysis was performed due to updates to their Information Technology requirements.
- C1.2.5 The NZHIS database identified only one hospital admission associated with methyl bromide. This related to a toxic effect of methyl bromide occurring in 2008 and the primary external cause of the admission was reported as being accidental poisoning by, and exposure to, pesticides. For any injury recorded in this database, both an external cause code as well as a diagnosis code is reported. The diagnosis code was identified as being from 'other pesticides'. Due to this hospital admission being coded to 'other pesticides', as opposed to methyl bromide specifically, the Agency notes that there are potentially other methyl bromide cases in the NZHIS database that are unable to be identified. Many records are reported as being attributed to 'other pesticides' and do not contain information relating to the specific pesticide involved.
- C1.2.6 Data obtained from eight PHUs shows that methyl bromide was not attributed to any emergency department admissions between 2001 and 2008. It should be noted that this data is voluntarily supplied and there are data gaps for many of the emergency department hospitals between 2001 and 2008. This is understandable when data is voluntarily supplied.
- C1.2.7 EpiSurv is operated by ESR on behalf of the Ministry of Health. Notifiable disease information is collected in this database from the Public Health Services (PHS) in New Zealand. The hazardous substances injury case report form (introduced by EpiSurv in September 2007) is used to record illnesses that are caused by exposure to substances that are hazardous under the HSNO Act. One methyl bromide notification has been recorded in this database since 2001 and this case occurred in 2007. The notification was associated with the opening of a shipping container that

had been fumigated with methyl bromide. The record indicates that the individual was not hospitalised as a result of this potential exposure.

- C1.2.8 Furthermore, ESR advised that chemical poisoning from the environment is notifiable under the Health Act and no methyl bromide illnesses have been reported.
- C1.2.9 In July 2009 the Department of Labour provided the Agency with a summary of all the monitoring and investigative work carried out between 1999 and 2009 regarding methyl bromide. During the ten year period, the Department of Labour recorded a total of one prosecution, three monitoring reports, 17 health and safety complaints or incidents and 25 records of engagement.
- C1.2.10 The prosecution involved an employee being acutely and chronically exposed to methyl bromide and the employer was fined on two offences. Monitoring reports were carried out in Nelson (Lewis 2005) and Tauranga, and a third in 2007. Further details of the third monitoring exercise were not available to be accessed by the Department of Labour at the time this summary was collated.
- C1.2.11 There have been 17 Health and Safety related incidents or complaints recorded between September 2000 and May 2009. Information specifying the outcome of the complaint or incident was not available for eight of the 17 records. Of the remaining nine records, one is currently still under investigation, one was passed to the Maritime Safety Authority and no further action was taken or improvement notices, if issued, were complied with, for six incidents/ complaints. One of these 17 incidents/complaints led to the prosecution mentioned in a previous paragraph. The majority of the incidents/complaints (76%) related to possible adverse use of methyl bromide as a fumigant and 12% related to individuals being exposed to the gas after goods they had been in contact with had been fumigated with methyl bromide.
- C1.2.12 During the period between May 2000 and July 2009, 25 matters of engagement were recorded by the Department of Labour. The greatest proportion of these was associated with the assessment of methyl bromide fumigation practices at various locations (16), three were compliance assessments and two were routine HSNO assessment visits. Overall, of the 13 records with available information, the Department of Labour found one company to be fully compliant and three companies were compliant with the exception of minor issues. In all other cases, the records indicate that the companies complied with any enforcement action taken and no further action was needed.
- C1.2.13 The monitoring report at the Port of Nelson in 2005 showed the risk of exposure to methyl bromide and other volatile organic compounds (VOCs) to be low during the gas introduction phase however the risk rises during the ventilation period and the removal of the covers. The report considers the assistance of air extraction fans to be effective in reducing the amount of methyl bromide released into the general work environment. As a result of this report, recommendations from the Department of Labour were given to the Port of Nelson around the management of hazardous substances. These recommendations include a revision of the current 50m exclusion zone after further atmospheric testing, fan assisted stack ventilation is to continue with the minimum ventilation time of stacks of timber not less than 12 hours, the height of the extraction flue be not less than 3 metres, with the use of a truncated cone at the top of the flue to increase the exit velocity of the substance, shed clearance for entry should not be given until the averaged levels of VOC's and methyl bromide are at or below the relevant WES values and the use of PPE.

C1.2.14 The Methyl Bromide and Light Organic Solvent Preservative – Personal Exposure and Workplace Monitoring Survey was carried out by the Department of Labour in Tauranga in 2006. The results of the monitoring exercise indicated that workers may be exposed to high methyl bromide levels over a short duration and should be provided with (and wear) personal protective equipment for appropriate protection.

## **Overseas reports**

- C1.2.15 An incident involving fumigation with methyl bromide occurred at a port in the Netherlands involving two dock workers who opened and entered a sea container without wearing protective equipment (Spijkerboer, de Vries et al. 2008; Breeman 2009). There was no warning sign present on the sea container indicating that the contents had been fumigated with methyl bromide. Shortly after exposure to the toxic gas, the two men experienced various acute neurological symptoms. Despite treatment, both men suffer from prolonged neurological symptoms such as concentration disturbances, ataxia and convulsions. It is thought that the container was fumigated with methyl bromide approximately one month before the incident.
- C1.2.16 In August 2007, three factory workers in England were taken to hospital after being overcome by fumes when they opened a shipping container that had been fumigated with methyl bromide. The workers were overcome by fumes and were taken to hospital where they were decontaminated and treated. Source: Shropshire Star Newspaper – UK.
- C1.2.17 The following overseas incidents involving fumigants, presumably methyl bromide, have recently been reported (Nordiko Quarantine Systems Pty Ltd 2009).
- C1.2.18 Giessendam, 4 December 2007. Two workers at Giessendam port were exposed to methyl bromide when unpacking a container from China. They experienced irritation to the eyes and airways and were transferred to the medical centre straight away. The police believed that the cause would be improper degassing of the container.
- C1.2.19 Rotterdam, 2006. An incident occurred at Port of Rotterdam, where high level of fumigant was released due to insufficient degassing process. The incident affected the workers as well as the ambulance crew and medical team. The victims displayed symptoms of sore throat, irritated eyes and one of them also suffered from multiple epileptic seizures. Two workers were admitted to intensive care and the others were treated on site.
- C1.2.20 Sydney, 20 October 2005. Three workers were overcome by toxic fumes when they opened a container at a loading dock in Sydney, one of the worker lost consciousness after 10 seconds exposure to the fumes. Fire Brigades were called to evacuate the victims from the affected areas. All victims were treated by paramedics as well as in-house medical staff. The cause of the injury believed to be from the fumigant used before it was shipped off.
- C1.2.21 California, 2005. Two men from California, USA working as the fumigation tarp remover, were left permanently injured after repeated exposure to methyl bromide. They suffered from damage to their lung, and had difficulty speaking and breathing.
- C1.2.22 Sydney, 20 February 2009. 50 workers were evacuated from a Sydney FedEx depot because of a suspected chemical leak. Fire crews were called after it was feared a toxic chemical had leaked from a shipping container.

C1.2.23 Sydney, 14 September 2007. Port Botany was closed and evacuated after a release of toxic fumes from an import container. Fire crews were called and exclusion zone was established, while the fire crews were clearing the container. Clarification was given that the substance detected came from the container, most likely due to improper degassing.