

ERMA New Zealand

Update Paper

**Application for the reassessment of methyl bromide and
formulations containing methyl bromide**

Application number: HRC08002

**Prepared for the Environmental Risk Management
Authority**

May 2010

1. Introduction

The purpose of this Update Paper is to provide the decision-making committee of the Authority and submitters with a review of the submissions received in response to the public notification of the Chief Executive's application for the reassessment of methyl bromide and formulations containing methyl bromide.

As this is an update paper it should be read in conjunction with the reassessment application which is available on the ERMA New Zealand website at <http://www.ermanz.govt.nz/resources/publications/pdfs/Methyl%20Bromide%20Reassessment%20Application.pdf>

In preparing this paper, the staff of ERMA New Zealand (the Agency) have reviewed all the submissions and prepared responses to the significant issues. A summary of the submissions is attached as Appendix 1. The full text of the submissions can be viewed on the ERMA New Zealand website at <http://www.ermanz.govt.nz/hs/methyl%20bromide/index.html>

Following a review of the submissions, the Agency is recommending the approval of the continued availability of methyl bromide with controls for quarantine and pre-shipment (QPS) purposes. However, the Agency is proposing modifications to the preliminary recommendations on buffer zones and monitoring requirements that were set out in the reassessment application. The Agency is also of the view that the use of recapture technology should be mandatory for methyl bromide fumigation of shipping containers.

However, the proposals presented in this paper and the reassessment application are **only preliminary recommendations made by the Agency. A final decision will be made by members of the decision-making committee itself, after consideration of the submissions and evidence provided at public hearings.** If the adverse effects of using methyl bromide outweigh the positive effects, after taking account of all safety precautions that can be imposed and the likely effects of the substance being unavailable, the Authority may not approve the continued availability of methyl bromide.

The Agency notes that a report from Ngā Kaihautū Tikanga Taiao (the Authority's Māori advisory committee) is being provided as a separate item.

2. Preliminary recommendations from the application for reassessment

2.1. Introduction

- 2.1.1. The Chief Executive's application for the reassessment of methyl bromide and formulations containing methyl bromide contained the following recommendations from the Agency.

2.2. Continued availability of methyl bromide

- 2.2.1. The Agency recommended that methyl bromide should continue to be available for quarantine and pre-shipment (QPS) uses in New Zealand with additional controls and recommendations to ensure that the substance is used in a safe manner for people, communities and the environment.

2.3. Revocation of approvals for non-QPS use

- 2.3.1. The Agency recommended that the two HSNO approvals (HSR001637 and HSR001638) for importation of methyl bromide for non-QPS purposes should be revoked with immediate effect from the date of the Authority's decision on this reassessment. This would give formal effect to the prohibition already in place under the Montreal Protocol on further importation of these substances for non-QPS purposes.
- 2.3.2. The Agency recommended that the Authority should also issue a direction, by notice in the Gazette under section 66 of the Act, prohibiting further use of the substances for non-QPS use and requiring disposal at the owners' expense by 31 December 2010.

2.4. TELs

- 2.4.1. The Agency recommended the adoption of the following tolerable exposure limits (TELs):

TEL (chronic)	TEL(acute) - 24 hour average	TEL (acute) - 1 hour
0.005 mg/m ³	1.3 mg/m ³	3.9 mg/m ³
1.3 ppb	333 ppb	1000 ppb
0.0013 ppm	0.333 ppm	1 ppm

2.5. Buffer Zones

- 2.5.1. The Agency recommended that the following minimum buffer zones (the downwind distance between the ventilation release location and any non-occupational bystander) be observed when ventilation occurs:

Situation	Minimum Buffer zone (m)
Ship's hold (greater than 1000 kg methyl bromide used)	100
Ship's hold (less than 1000 kg)	50
Logs/timber under covers outdoors and indoors (without recapture technology)	50
Shipping containers	25

Note 1: Non-occupational bystanders include not just those persons living in nearby residential properties but also those who may be temporarily present in a location, for example, walking on footpaths.

Note 2: The buffer zone distance used should be recorded for all fumigations using the site evaluation form in Appendix A of the STIMBR monitoring protocol (see Appendix P of the reassessment application). This information should be kept by those conducting the fumigation and should be available upon request to the appropriate regulatory agencies. It also should be noted that these buffer zones apply only if there are potential non-occupational bystanders in the downwind direction.

2.6. Monitoring

2.6.1. The Agency recommended that appropriate air quality monitoring be required for all types of fumigation to assess the potential exposures of non-occupational bystanders to ensure that exposures are below the recommended acute and chronic TELs.

2.6.2. Monitoring of shipping container, outdoor tarpaulin enclosure and ship hold fumigations should adhere to the STIMBR Methyl Bromide – Ambient Air Monitoring Protocol (see **Appendix P** of the reassessment application). Monitoring devices must be located appropriately at a downwind position where the non-occupational bystander might be exposed and measurements made when detectable concentrations of methyl bromide are likely to be present. The Agency noted that:

- for sites with complicated geography and weather conditions, the Protocol recommends that specialist help should be obtained in selecting appropriate monitoring sites;
- monitoring needs to be maintained until methyl bromide gas is no longer detectable; and
- the results of such monitoring should be kept by those conducting the fumigation and should be available upon request to appropriate regulatory agencies.

2.7. Classification changes

2.7.1. The Agency recommended the following classification changes:

- change from 6.3A (skin irritancy) to 8.2C (skin corrosive);
- change from 6.4A (eye irritancy) to 8.3A (eye corrosive); and
- change from 9.2A (very ecotoxic in soil) to 9.2D (slightly harmful in soil).

3. Submissions and additional information

- 3.1.1. The Chief Executive’s application for the reassessment of methyl bromide and formulations containing methyl bromide was publicly notified on 5 November 2009. Submissions closed on 26 February 2010; however, late submissions were accepted until 16 April 2010.
- 3.1.2. A total of 95 submissions were received. The Agency has summarised the issues raised in the submissions under topic headings (see **Appendix 1** - Summary of Submissions). The full text of the submissions is available on the ERMA New Zealand website <http://www.ermanz.govt.nz/hs/methyl%20bromide/index.html>
- 3.1.3. In the reassessment application, the Agency outlined 3 possible scenarios. It should be noted that scenario 1, the continued availability of methyl bromide for QPS purposes, is not limited to a 10 year period. In the reassessment application, the Agency evaluated the effects of the continued (and increasing) use of methyl bromide taking into account that external constraints on its use may see its availability curtailed in approximately 10 years. Thus the Agency’s risk assessment is based on continuing use of methyl bromide for the foreseeable future.
- 3.1.4. Each of the scenarios found support amongst the submitters and the responses can be grouped as follows:

IN SUPPORT OF: -		REASONS
Scenario 1 – baseline	The continued availability of methyl bromide for QPS uses.	There are presently no alternatives available and the economic and ecological consequences of the unavailability of methyl bromide would be unacceptable.
	The continued availability of methyl bromide for QPS uses but with the introduction of recapture technology.	The availability of methyl bromide is important for the market economy and the use of recapture technology is necessary to minimise the risks to human health and the environment.
Scenario 2 – phase out	A phase-out of methyl bromide use in a 5 year period.	This would hasten the introduction of alternative means of treating goods.
Scenario 3 – immediate ban	An immediate prohibition of the use of methyl bromide.	The nature of adverse effects on human health.

- 3.1.5. In commenting on the various options relating to the use of methyl bromide, the submitters raised a large number of issues. This Update Paper comprises the Agency’s review of the following key issues raised by submitters:

CATEGORY	ISSUE
International considerations	International trends
	International obligations
Environment Court/Nelson Air Plan	Monitoring, Buffer zones, exposure limits,

CATEGORY	ISSUE
	planning provisions
The Agency's risk assessment	Health issues
	The environment
	Relationship of Māori to the environment
	Market economy
	Society and community
Alternatives	
Control options	Emission control (recapture)
	Minimum buffer zones
	Ambient air quality monitoring
	Notification
	Tolerable exposure limits (TELs)
	Personal protective equipment (PPE)
	Stenching agents
General issues	Soil use
	Classification

4. International considerations

4.1. *EU ban*

- 4.1.1. The submissions included references to the European Union (EU) ban on methyl bromide for all uses including QPS purposes from 18 March 2010. A call for New Zealand to follow the lead of the EU and ban the use of methyl bromide was also made. One submitter stated that the EU ban shows that there are no technical or financial impediments to implementing a ban.
- 4.1.2. Horticulture New Zealand (101787) notes that the biosecurity requirements of the EU are lower than that established in New Zealand. When pests are detected, the EU this does not require that the product is either rejected or treated (as occurs in New Zealand) so the change has had a lower impact than would a similar policy change in New Zealand for the horticultural sector. Horticulture New Zealand notes (as discussed in the application) that some countries require certain produce to be fumigated with methyl bromide before leaving New Zealand. Horticulture New Zealand states also that this policy change is likely to have “driven some exporting countries with high risk goods to implement precautionary pre-export fumigation”, thus simply moving the use of methyl bromide to the exporting country rather than the importing country.
- 4.1.3. The EU decision cannot be considered to be directly applicable to the New Zealand context. Whilst recognising that for some products there are alternatives, including heat treatment and other pesticides, the use of methyl bromide for biosecurity purposes for many imported products is crucial to ensuring that particular pests are not introduced. In terms of exported products, New Zealand is required to use methyl bromide to maintain access to a range of markets. The Agency notes that the Montreal Protocol requires that where possible, alternatives should be used (see Section 12 of this application on Alternatives).

4.2. *International obligations – the Montreal Protocol*

- 4.2.1. One submitter stated that “ERMA has disregarded the Montreal Protocol”, while another stated that “ERMA’s proposals are in breach of its obligations under the Montreal Protocol, are contrary to international trend and risk, significantly undermining New Zealand’s reputation.” Another submitter believes that New Zealand should “honour the spirit of the Montreal Protocol” and stop the use of methyl bromide.
- 4.2.2. The Montreal Protocol on Substances that Deplete the Ozone Layer 1987 is the tool designed to initiate and progress phase-out targets for different ozone-depleting substances. The phase-out schedules are based on production and consumption levels within each country. New Zealand ratified the Protocol in 1988.
- 4.2.3. The Montreal Protocol specifically exempts use of methyl bromide for quarantine and pre-shipment purposes from control and phase-out but does urge parties to consider minimising its use.

- 4.2.4. New Zealand phased out uses of methyl bromide for other than QPS purposes by 2005 as per the requirements of the Montreal Protocol. It was noted at the time by Parties to the Protocol that there remained some applications of methyl bromide for which no technically and economically feasible alternatives existed. Parties could apply to have critical use exemptions (CUEs) granted in these cases provided certain criteria were met. Critical use exemptions were granted to New Zealand under the Montreal Protocol from 2005-2007 for the import of methyl bromide by the strawberry industry. 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 expired on 31 December 2007.
- 4.2.5. We are advised by the Ministry for the Environment (the government department responsible for the Ozone Layer Protection Act 1996 and Regulations which give force to the Montreal Protocol in New Zealand) that New Zealand is complying with its obligations under the Montreal Protocol. The only uses of methyl bromide are for QPS purposes which are valid purposes under the Protocol. While the Protocol does not require the phase-out or the minimisation of use of emissions of methyl bromide used for QPS purposes, it does urge parties to consider minimising use. The Agency does not consider that New Zealand is in breach of its obligations under the Montreal Protocol, and points to the active work on identifying and testing alternatives that is being undertaken.
- 4.2.6. The Agency is also aware that the parties to the Montreal Protocol are investigating potential incentives to promote the transition to alternatives such as deposit/rebate schemes or other financial measures. However, since there have not been any formal recommendations as yet, New Zealand is not in contravention of any international agreements. However, if formal recommendations come out of the next meetings of the meeting of the parties to the Protocol, then New Zealand would need to consider such proposals.
- 4.2.7. Thus, while there are not any formal requirements under the Montreal Protocol to restrict the use of methyl bromide for QPS uses, the Agency is aware that, due to increased exports of logs, its use is likely to increase. Accordingly, the Authority may wish to consider the desirability of reducing its use or limiting the amount of gas released into the atmosphere when considering matters such as the development and use of alternative fumigants and treatments and the use of recapture technology.

5. The Environment Court and the Nelson situation

5.1. *The Agency's understanding of the Environmental Court decision and the Nelson Air Quality Plan*

- 5.1.1. Some submitters, such as the Nelson City Council (101751), referred to the Environment Court case (*Genera Limited v Nelson City Council, ENV-2006 – WLG-154*) involving consideration of the Nelson Air Quality Plan. The submitters argued that any re-approval of methyl bromide should effectively mirror the provisions of the Nelson Air Quality Plan.
- 5.1.2. A significant amount of scientific work was undertaken in order to confirm the provisions of the Nelson Air Quality Plan so the findings of the Environment Court should be carefully considered by the Authority.
- 5.1.3. Nevertheless, there is no requirement that the HSNO approval should mirror the provisions in the Nelson Air Quality Plan. Indeed, section 142 (3) of the HSNO Act specifically envisages situations where a local authority may choose to impose more stringent requirements on the use of a hazardous substance than that required by the HSNO Act.
- 5.1.4. The Environment Court heard evidence on the use and dispersion patterns of methyl bromide at Nelson, its toxicity and the potential adverse health effects of fumigation. The Court found that in order to maintain public health protection, emissions of methyl bromide at the limit of the Port Security Area should not exceed 1 ppm (averaged over 1 hour) or 0.0012 ppm (averaged over a human lifetime). The Agency's recommended TELs are consistent with this finding.
- 5.1.5. The Environment Court also discussed buffer zones. Nelson City Council argues that the Agency's proposed buffer zones are "grossly inadequate" as they are less than those agreed in the Nelson case.
- 5.1.6. It is important to recognise that the buffer zones and TELs work together in the "belts and braces" fashion. If we could be assured that the TEL would be met at all times then buffer zones would not be required. Hence, buffer zones are intended to provide an additional level of assurance that bystanders will not be exposed to concentrations of methyl bromide that are higher than the TELs.
- 5.1.7. The minimum buffer zones recommended by the Agency in the reassessment application are based on the evaluation of monitoring data from Nelson (including the expert evidence at the Environment Court) and elsewhere.

5.2. *The Relevance of the Nelson Air Quality Plan*

- 5.2.1. It may be helpful to set out the provisions of the Nelson Air Quality Plan in so far as it is relevant to the Authority's final decision on the future of methyl bromide.
- 5.2.2. Air Quality Rule 41 of the Nelson Plan, states that methyl bromide fumigation is a permitted activity if:

- outside the Port area, the volume fumigated at any one time does not exceed 34 m³; a buffer zone of 50 m is in place; and there are not more than ten fumigations per year on the site;
 - inside the Port area, less than 3 kg of methyl bromide is used; a landward buffer zone of 100 m is in place; a seaward buffer zone of 100 m of a berthed passenger ship is in place; and the container is ventilated between 9 am and 5 pm. If two to four containers are ventilated during an hour, then 200 m buffer zones must be in place.
- 5.2.3. The rule (AQR41.2) also provides for methyl bromide fumigation to be a controlled activity if the 1 hour and chronic TELs are not exceeded; a 50 m buffer zone is in place and the methyl bromide is recaptured.
- 5.2.4. In addition, the rule (AQR41.3) provides that any of fumigation is a restricted discretionary activity; i.e. subject to the need to obtain resource consent.
- 5.2.5. The Plan envisages fumigation using methyl bromide even if the recapture, TEL, or buffer zone requirements are not met. In order to undertake fumigation which does not meet the recapture, or TEL, or buffer zone requirements a resource consent is required (rule AQR41.3 – restricted discretionary activity).
- 5.2.6. If the Authority were to adopt the TEL and buffer zones set out in the Air Quality Rule 41.2 of the Nelson Air Quality Plan as mandatory controls under the HSNO Act the effect could be considerably more restrictive than the current Nelson Air Quality Plan. In essence, rule (AQR41.3) would need to be modified and a new prohibited activity rule inserted. The new rule would prevent resource consents from being issued where the TEL and /or buffer zones requirements are not met. This is because the effect of Section 142 of the HSNO Act is that plans (and resource consents) under the Resource Management Act 1991 cannot be less restrictive than approvals under the HSNO Act.
- 5.2.7. In addition, the Agency's reading of the Nelson Air Quality report, is that recapture is not a mandatory requirement of the plan in Nelson as indicated in the (Nelson City Council submission) as those fumigations may be allowed by way of a resource consent.
- 5.2.8. Nevertheless, for fumigations at Port Nelson, the Agency notes that the Port's code of practice requires recapture for all methyl bromide fumigations carried out at the Port.
- 5.2.9. It may be helpful for the Authority to seek clarification from the parties involved in the Nelson situation (particularly the Nelson City Council) to determine whether the findings of the Court and provisions of the Nelson Air Plan generally are applicable throughout the country and are applicable within the framework of the HSNO Act.

6. The Agency's risk assessment

6.1. Approach to Risk

Review of Submissions

6.1.1. The NZCTU (101774) and other submitters expressed the view that, in terms of the use of methyl bromide, four of the five characteristics in clause 33 of the HSNO (Methodology) Order 1998 are present:

- Exposure is involuntary
- Risk will persist over time
- Potential adverse effects are irreversible and risk is not known or understood by the public
- There is little experience or understanding of possible measures for managing effects.

6.1.2. These submitters, therefore, consider that the Authority should give greater weight to the human health risks posed by use of the substance.

Agency response

6.1.3. The Agency agrees with the submitters with respect to the characteristics in clause 33, and took them into account in the reassessment application. For example, in paragraph 9.2.5 of the reassessment application, the Agency recommends that the Authority adopts a cautious approach with respect to recommendations relating to the use of personal protective equipment (PPE).

6.2. Precautionary approach

Review of Submissions

6.2.1. Some submitters, such as the Nelson Marlborough DHB (101781) also consider that there is significant scientific and technical uncertainty relating to the adverse effects of methyl bromide and therefore the Authority needs to adopt a more precautionary approach.

6.2.2. MAF (101783) acknowledges that ERMA is required to take a precautionary approach in the face of uncertainty, but is of the view that given that the level of risk to health of non-occupational bystanders has been assessed as negligible there is little uncertainty for this situation and therefore limited need for introduction of buffer zones and monitoring to address this risk.

Agency response

6.2.3. The Act requires the Authority to take into account the need for caution in managing adverse effects where there is scientific and technical uncertainty. As noted in paragraphs 9.1.3-4 of the reassessment application, this has been factored into the Agency's analysis. Further discussion on the level of precaution involved in assessing risks and proposing controls is set out in this application.

- 6.2.4. The precaution that the Agency used in the setting of the proposed minimum buffer zones is set out in section 14 of this update paper. The buffer zones are set based on the distance necessary to keep the concentration below the 1 hour TEL.
- 6.2.5. The precaution involved in the setting of TELs based on toxicological information is set out in section 17 of this update paper. If a member of the public is present at a location where gas concentration was at the 1-hour TEL, and the person were present for that hour, an adverse health effect is unlikely to occur due to the use of safety factors in the derivation of the TEL.
- 6.2.6. The Agency view is that its recommendations include a significant degree of precaution in respect to the overall analysis of the technical information available.
- 6.2.7. The Agency does not accept MAF's view that there is little uncertainty in assessing the risks to the public. Thus, the Agency recommends that the Authority takes account of uncertainty in terms of effects on non-occupational bystanders.

6.3. *The Agency's evaluation of risks, costs and benefits*

Review of Submissions

- 6.3.1. Some submitters expressed concern that the application gives greater weight to financial benefits than to human health risks. Others considered the Agency's cost-benefit analysis to be incomplete.

Agency response

- 6.3.2. Section 6 of the HSNO Act requires the Authority to take into account the following matters when assessing applications to approve the release of hazardous substances in New Zealand:
- (a) The sustainability of all native and valued introduced flora and fauna;
 - (b) The intrinsic value of ecosystems;
 - (c) Public health;
 - (d) The relationship of Maori and their culture and traditions with their ancestral lands, waters, sites, waahi tapu, valued flora and fauna, and other taonga;
 - (e) The economic and related benefits and costs of using a particular hazardous substance;
 - (f) New Zealand's international obligations.
- 6.3.3. The Agency notes that the Act requires the Authority to make its decision based on whether the positive effects outweigh the adverse effects. Accordingly, the reassessment application focussed on providing the Authority with the available information on adverse and beneficial effects on each of the matters listed in section 6 of the Act for its consideration and evaluation.
- 6.3.4. The Agency agrees with Melanie Miller and Tom Batchelor (101818) with particular reference to effects on the market economy, that the positive effects (particularly to the market economy) evaluated in the application are indirect effects of methyl bromide rather than direct effects. However, we consider that these are sufficient to outweigh the adverse effects in the short to medium term.

7. Health Issues

7.1. Neurotoxicity

Review of Submissions

- 7.1.1. A large number of submitters, such as the New Zealand Green Party (101761) expressed concern that methyl bromide is neurotoxic (toxic to the nervous system).
- 7.1.2. The NZCTU (101774) drew attention to the toxicology review referred to in Appendix D of the reassessment application (paragraph 23.2) which indicated that, in an inhalation study in mice, neurotoxicity developed in some animals after exposure had ceased.

Agency response

- 7.1.3. The Agency agrees that methyl bromide is neurotoxic. While in humans some reversibility is apparent after most non-lethal cases, recovery in the event of serious poisoning is often slow and incomplete, even months later.
- 7.1.4. The Agency also agrees that the study referred to by the NZCTU demonstrated neurotoxicity in mice. However, the Agency notes that the exposure of the mice was very severe. The exposure concentration was 100 ppm, 6 hours per day, 5 days per week, for 20 weeks. The exposure concentration (100 ppm) is close to the Immediately Dangerous to Life and Health (IDLH) value of 250 ppm, and exceeds the time-weighted average worker exposure standard (WES-TWA) by a factor of 20.
- 7.1.5. Accordingly, the Agency agrees with the submitter that the study appears to contradict the conclusion reached by ESR Ltd¹ that: “there is no evidence of continued degeneration after cessation of exposure”, but notes that extremely high exposures were involved.

7.2. Motor neurone disease (MND)

The reassessment application

- 7.2.1. The conclusion in the reassessment application (paragraph 5.2.14) was: “Based on the available information, no consistent environmental cause of MND has been identified and, in particular, no association between exposure to methyl bromide and the incidence of MND has been identified”.

Review of Submissions

- 7.2.2. The Ministry of Health (101638) expressed the view that the scientific link between methyl bromide and MND has not been established.
- 7.2.3. A number of submitters, such as Takutai Beech (101800) referred to experimental work that has been conducted by Professor Ian Shaw, Professor of Toxicology at the University of Canterbury and suggested that this work throws doubt on the Agency’s conclusion with regard to any connection between methyl bromide and

¹ Fitzmaurice et al, 2005 referred to in Appendix E of the reassessment application (para E1.2.19)

MND.

Agency response

- 7.2.4. The Agency has reviewed Professor Shaw's paper² and comments as follows.
- 7.2.5. The research Professor Shaw and colleagues are involved in relates to reactions between methyl bromide and a cellular detoxification component called glutathione in the test tube.
- 7.2.6. Professor Shaw states: "MND is thought to be associated with free radical insult, however, to date, there has been no epidemiological evidence of exposure to free radical-generating chemicals being linked to the development of the disease."²
- 7.2.7. Professor Shaw goes on to say: "It is likely but not proven that the MND cases in Nelson port workers were exposed to CH₃Br [methyl bromide]".
- 7.2.8. The Agency notes that it has been known for some time that methyl bromide reacts with glutathione. This was discussed in the toxicology review in the reassessment application (see Appendix D, paragraphs 3.1 and 4.3). It was indicated in Appendix D (Paragraph 3.1) of the reassessment application that there appears to be individual variability of toxicological response to methyl bromide in humans depending on genetic differences in glutathione from person to person.
- 7.2.9. We are aware that Professor Shaw is at an early stage in testing his hypothesis linking exposure to methyl bromide to MND. Currently there is no additional information available from Professor Shaw's work which warrants alteration of the original conclusion in the reassessment application.
- 7.2.10. The Authority will have the opportunity to seek clarification from Professor Shaw on his research.

7.3. Cancer

Review of Submissions

- 7.3.1. A few submissions expressed concern that methyl bromide causes cancer, in particular prostate cancer. The Agency also is aware of news media reports relating to a recent cancer case (not prostate cancer) that may be associated with methyl bromide exposure which has been referred to the coroner.

Agency response

- 7.3.2. The Agency notes that no association between methyl bromide exposure and cancer was identified in animal testing data (see Appendix D, Section 13 reassessment application). The reassessment application referred to the association between methyl bromide exposure and prostate cancer made in the USA (in Appendix E) and noted that causation has not been established.

² Shaw I (March 2010) "Motor neurone disease – a methyl bromide exposure cluster points to a causal mechanism" Human and Experimental Toxicology, Vol 29 (3), p241 – 242.

7.4. Unloading of shipping containers

Review of Submissions

- 7.4.1. Several submitters, such as Nordiko Quarantine systems Pty Ltd (Nordiko) (101797) expressed concern about the exposure of people to methyl bromide when unloading shipping containers which have previously been fumigated.

Agency response

- 7.4.2. Exposure of people unloading fumigated containers was discussed in the application (paragraphs 5.2.43ff). It is the responsibility of employers to protect their employees and this applies whether the container is being unloaded immediately after completion of the ventilation or at a different site. It is important to realise that the risk may be higher after the container has been moved. This is due to “off gassing” of adsorbed methyl bromide which can cause gas levels to climb to unacceptable values (possibly above the WES TWA) during transportation (when the container door will again be closed).
- 7.4.3. Discussions with the Department of Labour (DOL) indicate that signage is placed on the container identifying that it has been fumigated, but such signage may only be reliable if the fumigation has been carried out inside New Zealand. On receipt of a container with such signage, a further period of ventilation (four hours) is recommended.
- 7.4.4. The Agency recommends that the receiving company should contract a local fumigation company to test for gas concentrations before permitting employees to begin unloading. If the container is being unloaded in stages at different sites, the signage should be left on the container until all fumigated goods have been unloaded.

7.5. Health benefits: Human disease vector control

Review of Submissions

- 7.5.1. Several submitters claimed the health benefits from biosecurity protection (for control of human vector carrying mosquitoes and spiders etc) were overlooked and not taken into account in the application.

Agency response

- 7.5.2. The Agency is aware of the importance of such biosecurity risks, but does not have evidence to show that methyl bromide is essential to control such possible incursions. The Agency notes that, since the goods are being controlled inside New Zealand, the means used to control the pests are under the local agencies’ control.
- 7.5.3. The Agency believes alternative pesticides could be used, in association with surveillance to determine whether the pest is present, but recognises this may not be as convenient as fumigation of all biosecurity “risk” goods.
- 7.5.4. In some cases, e.g. used tyre imports, the need for the “risk” goods may also be of questionable national significance in relation to the incursion response necessary.

- 7.5.5. Most importantly, the Agency notes that in the event of a significant health biosecurity threat (Malaria/Yellow fever etc), the Act provides for an emergency approval process following the declaration of a biosecurity emergency by the Minister of Biosecurity.

8. The Environment

8.1. *Review of submissions*

- 8.1.1. The NZCTU (101774) and other submitters claim that the Agency has ignored the impact on human health, plants and terrestrial and aquatic organisms of a reduced ozone layer.

8.2. *Agency response*

- 8.2.1. In Section one of the reassessment application, the Agency stated that the direct ozone-depleting effects of methyl bromide on human health or the environment are not evaluated in detail in this reassessment as they are considered to be adequately addressed under the Montreal Protocol.
- 8.2.2. Although the Agency did not perform a quantitative risk assessment, it did note that methyl bromide is a powerful ozone-depleting substance and that the adverse effects on the environment and human health are significant (section 5 of the reassessment application).
- 8.2.3. The effects of methyl bromide on human health and environment because of its being an ozone depleting substance layer are addressed under Ozone Layer Protection Act (OLPA) 1996 and its associated regulations.

9. Relationship of Māori to the Environment

9.1. Review of submissions

- 9.1.1. A number of submissions were received from iwi/Māori many of which noted a cautious approach and signalled concern about unknown or unmeasured cultural effects; e.g. Te Rūnanga o Te Rarawa (101811). However, others also acknowledged the role of the substance in opening up or maintaining opportunities for economic growth and enhancement of assets either already managed or to be returned through the treaty settlements process; e.g. Te Rūnanga o Ngāi Tahu (101762). These views mirrored those raised by iwi/Māori consultees confirming the existence of a spectrum of opinion amongst iwi/Māori with an interest in the use of this substance.
- 9.1.2. Two main culturally specific considerations raised in iwi/Māori submissions are discussed below. Other considerations raised in these submissions (e.g. research on alternatives, recapture and Montreal Protocol) are addressed elsewhere in this update report.

9.2. Kaitiakitanga & Manaakitanga³

- 9.2.1. Submitters noted the role of methyl bromide in supporting their role as kaitiaki in the protection of taonga koiora (native species) and taonga tuku iho (other valued species). However many also expressed concern about the unknown and/or unmeasured effects of the substance. One submitter expressed concern about the effect the substance may pose on the various stages or layers of the heavens and their associated guardians as the fumes rise through them. They considered iwi/Māori needed more time to consider this issue and felt it important that iwi/Māori in the immediate vicinity of fumigation activities be notified directly of any intended fumigation work.
- 9.2.2. The submission from Whareroa Marae, which is located adjacent to the port in Tauranga, expressed concern that cultural impacts posed by fumigation activities were not adequately accounted for. They considered it important that the marae, associated kohanga reo and kaumātua flats should be advised directly of any fumigation work so that they can take precautionary measures to ensure adverse cultural effects are minimised. In addition the submission suggested that monitoring stations or equipment might be positioned on or near the Marae, kohanga and associated kaumātua flats enabling them to participate in the regular monitoring of air quality.
- 9.2.3. The Agency in considering these issues agrees with the concerns raised about the ability of iwi/Māori in close proximity to fumigation areas to ensure cultural effects are minimised. This is of particular relevance in Tauranga where a marae is directly adjacent to the port in terms of their role in hosting manuhiri (visitors) and providing manaakitanga (providing a safe and hospitable environment). We, therefore, recommend the inclusion of a control requiring port authorities to notify neighbouring iwi/Māori groups of intended fumigation activities.

³ *Custodianship & Hospitality*

9.3. *Taha Ohanga*⁴

- 9.3.1. Although the reassessment application provided an assessment of the impact of scenarios on the market economy generally, the Agency also sought views from iwi/Māori specifically on economic impacts given the growing size and nature of their asset and commercial base. As noted in the application the Authority is required by the HSNO Act to take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi). Although there are a number of Treaty principles, two principles are of particular relevance to this application and more specifically to the consideration of economic effects. They are the principle of redress and active protection.
- 9.3.2. A number of iwi/Māori and other submitters noted the importance of the continued availability of methyl bromide in terms of maintaining the sustainability of economic opportunities relating to forestry assets. Te Rūnanga o Ngāi Tahu noted that an immediate ban would have a significant adverse effect on the forestry sector and urges, along with several other submitters, the need for more prioritised research into alternatives. Carter Holt Harvey and MAF also noted that Māori interests in forestry assets are increasing and that methyl bromide provides a useful tool in maintaining the value of those assets. They also noted its importance in border control to ensuring the protection of native and valued species.
- 9.3.3. A report commissioned by ERMA New Zealand to provide some context and discussion around the potential socio-economic impacts for Māori of removing methyl bromide notes that Māori interests in the forestry sector are significant. They are large forestry owners and significant forestry managers as well as having a proportionately significant percentage of constituents employed within the forestry industry and or other service related industries. The report indicates the impact in terms of value to Māori forestry interests would be significant if methyl bromide (in the absence of a viable alternative) were removed.
- 9.3.4. A further key consideration discussed in the report builds on an issue raised during consultation identifying that in many cases the iwi/Māori groups benefiting from the use of methyl bromide (e.g. forestry owners) are not necessarily the ones carrying any cultural or other risks (e.g. iwi/Māori groups associated with ports).
- 9.3.5. Given that Māori forestry interests have increased significantly in recent years due to the return of assets through the Treaty settlements process, the Agency agrees that the economic benefits of retaining methyl bromide in the short to medium term are significant for iwi/Māori associated with those interests. This is partly due to the fact that Māori interests in this sector are relatively new and therefore very developmental in nature.

9.4. *Overall Evaluation*

- 9.4.1. On reviewing the submissions received with specific relevance to the relationship of Māori to the environment the Agency considers its original evaluation identified in the reassessment application to be appropriate.

⁴ *Opportunities*

10. Market economy

10.1. Review of submissions

Economic aspects of recapture technology

- 10.1.1. The Sustainability Council (101802) and other submitters raised concerns about the Agency's evaluation of the economic aspects of introducing recapture technology. These are discussed in paragraph 13.3 of this document.

Benefits to the market economy

- 10.1.2. MAF (101783) supports the importance of the benefits to the market economy and submitted that New Zealand's economic and social prosperity to a great extent depends on its international trade and access to key agricultural and forestry export markets. MAF also agreed that the economic benefits of the continued use of methyl bromide for QPS purposes until technical and economically viable alternatives are available are significant to New Zealand's economy.
- 10.1.3. STIMBR (100088) and other industry submitters expressed the view that a ban or phase-out of methyl bromide over 5 years fails to recognise the magnitude of the task of developing alternatives and having them accepted by trading partners. MAF notes that they have already been working with India over the possibility of using phosphine as an alternative to methyl bromide for four years and that the matter has not been resolved. The industry submitters argue that the economic and ecological consequences of not having access to methyl bromide for the next 10 years are unacceptable.
- 10.1.4. Motueka Lumber presented the case of a small business and states that "the continued ability to efficiently meet Australian import requirements is essential to business viability".
- 10.1.5. The Sustainability Council (101802) referred to "Cost Benefit Analysis" and expresses concern that "The selection of a 10 year time frame for the analysis of benefits is completely arbitrary and unjustified."
- 10.1.6. Melanie Miller and Tom Batchelor (101818) are of the view that the Agency's economic assessment is incomplete. They point out, correctly, that the beneficial effects on the economy referred to in the application are in fact benefits of the function of methyl bromide as a pest control method, rather than benefits of methyl bromide *per se*.

Agency response

- 10.1.7. The reason for the ten year time frame (applied to both adverse and beneficial effects) is discussed in Section 2 of the reassessment application. The intention is to recognise that methyl bromide use is being phased out and replaced wherever possible by alternative fumigants, and that use of recapture technology may be implemented to minimise the emission of methyl bromide.

- 10.1.8. The Agency acknowledges the limitations of its economic assessment. In the evaluation provided in the reassessment application, we sought to recognise this by concentrating on areas where alternatives were not available (e.g. where other countries require fumigation by methyl bromide). The Agency acknowledges that without detailed costing of alternatives it is not possible to provide a definitive analysis of the costs and benefits and for this reason we concentrated on using a case study type approach.
- 10.1.9. Nevertheless, the decision making process under the Act is based on weighing of the positive and adverse effects of the substance and we consider that the Authority has sufficient information to make a decision.

11. Society and Community

11.1. The reassessment application

- 11.1.1. From a national perspective, the Agency concluded that, where best practice use of methyl bromide is undertaken, along with monitoring and reporting, the social effects can be sufficiently ameliorated so as to be considered negligible.
- 11.1.2. The Agency invited comments from submitters on this aspect.

11.2. Review of submissions

- 11.2.1. The NZCTU (101774) and associated submitters state that while community concerns are specific to local communities, those are the very ones where fumigation occurs and the fact that there is widespread concern in those particular communities should be recognised as being significant.
- 11.2.2. Paula Allen (101769) asks the Authority to cut out local anxiety by ensuring that proper precautions are taken when wood is being fumigated.

11.3. Agency response

- 11.3.1. The conclusion in the application that these effects are not significant reflects a national perspective. However, the Agency recognises the community concerns and acknowledges that, for the affected communities, the effects of the use of methyl bromide may well be significant. Thus, given the localised use of methyl bromide, the Authority may wish to conclude that the adverse effects are locally significant.

12. Alternatives

12.1. *The reassessment application*

- 12.1.1. The Agency discussed most of the potential alternatives in Section 7 of the reassessment application. In addition, an overview of the most promising potential alternatives to methyl bromide per commodity is provided in the Appendices M and N of the reassessment application.
- 12.1.2. There is no single alternative fumigant or method of treatment to replace methyl bromide for all intended uses or overseas markets. However, phosphine is being used in some situations where there is significant methyl bromide use and further research into its use is being carried out.
- 12.1.3. The Agency notes that the use of phosphine (or other fumigants) is not without its own health and/or environmental risks and these have not been fully assessed in the Agency's assessment. For example, the Agency notes that phosphine presents a flammability hazard not associated with most fumigants and it is more acutely toxic than methyl bromide.
- 12.1.4. The introduction of a number of other alternatives depends on further research into their efficacy, granting of regulatory approvals and subsequent acceptance of them by trading partners. In this regard, the Government position on QPS use of methyl bromide while recommending the introduction of alternative methods of treatment where feasible, acknowledges that further research should be supported (refer Appendix R of the reassessment application).
- 12.1.5. The Agency concluded that it is likely to be several years before the use of any alternative treatments will have any effect on the amount of methyl bromide being used. However, acceptance of phosphine by India and the acceptance of reduced methyl bromide fumigation rates by China could eventually lead to a reduction in the amount of methyl bromide used by New Zealand. The amount of reduction cannot be estimated because of the fluctuation in the demand from China for logs.

12.2. *Review of submissions*

- 12.2.1. Many submitters support research into alternatives and some consider that ERMA New Zealand should actively support non-chemical approaches. Many submitters mentioned possible alternatives to methyl bromide and two submitters provided overviews of possible alternatives. However, only limited additional information on uses and costs was provided.
- 12.2.2. An overview of the alternatives mentioned and the additional information provided is given in Table 1.

Table 1 Alternative treatments mentioned in submissions

Alternatives	Additional Information
Heat treatment	The Port of Auckland uses heat treatment for used cars, trucks, caravans and farm machinery instead of methyl

	<p>bromide.</p> <p>One submitter stated that heat treatment methods are well proven, clean and effective.</p> <p>A company that can provide heat treatment equipment provided additional information. Heat treatment has been used in place of methyl bromide for imported used vehicles and machinery, ISO shipping containers and ISPM-15 wood treatments. The system is fully mobile and self contained.</p> <p>So far the numbers of containers treated with heat has been reasonably small. Therefore the pricing used has been to match the equivalent cost for fumigation of the same container size. If the numbers of containers requiring heat treatment increases then the expectation is that the treatment cost will reduce so that it should, in theory, result in a lower cost than the equivalent fumigation cost.</p>
Kiln drying	No further information provided as part of the submissions
Chemical pressure impregnation	
Irradiation	
Controlled atmosphere	
Water soaking	
Debarking	
Microwave treatment	
Cold treatment	
Phosphine	<p>Fumigation of logs with phosphine is accepted for export to China (excluded above deck), Japan, Malaysia and Korea. Negotiations with India over possible use of phosphine have taken four years so far.</p> <p>Phosphine is a possible alternative but it takes 7-10 days for the treatment and some insects are not controlled by phosphine. For quarantine purposes the treatment has to be fast (24 h).</p> <p>Phosphine can be used for the treatment of import and export of fruit and vegetables.</p>
Pyrethroids/permethrin	A submitter mentioned that pyrethroids/permethrin can be used for knockdown and residual effects but this is not a long term effective method.

- 12.2.3. Horticulture New Zealand (101787) provided an overview of the required fumigation per horticultural product and country. Only a small proportion of New Zealand's horticultural exports is fumigated with methyl bromide and its use is restricted to circumstances where an importing country requires methyl bromide fumigation or where no other treatment is available.
- 12.2.4. Several countries require pre-export fumigation of New Zealand produce with methyl bromide (for example: Australia–capsicum, Japan-apple).
- 12.2.5. One submitter stated that used tyres have to be fumigated with methyl bromide to prevent exotic mosquitoes entering the New Zealand.
- 12.2.6. The New Zealand Comb Honey Producers (101888) indicated that methyl bromide fumigation is necessary to protect comb from wax moth. Such fumigation is required for export purposes and alternative procedures are not available.

12.3. Agency response

- 12.3.1. The Agency agrees that research into alternatives and negotiations with trade partners to use alternatives should have the highest priority. The Agency notes however, that it is not appropriate for ERMA New Zealand to devote resources to support research. ERMA New Zealand's role is to impartially assess applications for the approval to use new hazardous substances and to reassess existing substances in accordance with the HSNO Act. If ERMA were to fund research into alternatives, then the decision-making role could be called into question should ERMA be asked to approve the alternative substance.
- 12.3.2. However, as discussed above, the Agency is also aware that the parties to the Montreal Protocol are investigating potential incentives to promote the transition to alternatives such as deposit/rebate schemes or other financial measures.
- 12.3.3. The Agency acknowledges that the most suitable alternative for fruit and vegetables will differ according to the target pest and the importing country. Therefore, it encourages the industry and other parties to stimulate research and to negotiate with trading partners in order to reduce the use of methyl bromide.
- 12.3.4. The Agency considers that methyl bromide may not be the only option to control mosquitoes in used tyres. Therefore, the Agency considers that the appropriate parties should be urged to search for alternatives.
- 12.3.5. The Agency acknowledges that it is not possible to replace methyl bromide with a single fumigant or a single treatment. However, for certain uses it appears that it is possible to replace methyl bromide. Accordingly, the Agency recommends the replacement of methyl bromide where possible, particularly in areas where alternatives and uses are already viable (See Table 2).

Table 2 Viable alternative treatments to methyl bromide

Alternative	Commodity
Heat treatment	<ul style="list-style-type: none">- Used cars, machinery- ISO shipping containers- ISPM-15 wood treatments
Phosphine	<ul style="list-style-type: none">- Logs to China (in hold cargo), Japan, Korea, Malaysia

13. Emission control (recapture)

13.1. The reassessment application

- 13.1.1. In Section 8 of the reassessment application, the Agency evaluated the practicality and affordability of recapture technology based on the report prepared by Aurecon New Zealand for STIMBR (see Appendix Q of the reassessment application).
- 13.1.2. The reassessment application concludes (paragraph 8.2.1) that “further research is needed into the logistics and cost structure before recapture could be considered ‘practical and affordable’ and thus be considered as a mandatory requirement in New Zealand”.

13.2. Review of submissions

- 13.2.1. The New Zealand Green Party (101761) and other submitters support the use of recapture technology for methyl bromide. The general view of the submitters is that there is little incentive for recapture without any regulatory requirement.
- 13.2.2. The Nelson City Council (101751) suggests that the technique should be mandatory for all containers and other fumigations using less than 300 kg of fumigant.

Practicality

- 13.2.3. Port Marlborough (101768) claims that capture of small scale fumigations involving less than 30 kg of methyl bromide is viable and that this would cover 20% of the current fumigations in New Zealand.
- 13.2.4. Zindia (101784) notes that implementation and or mandate for fumigant recapture would introduce unnecessary and significant financial and operational restrictions on the forest industry.
- 13.2.5. The Sustainability Council (101802) claims that “ERMA has no basis for claiming that the technology is not practical and thus not suitable for economic assessment”.
- 13.2.6. The Marlborough Forestry Industry Association (101749) claims that it is impractical to apply current recapture technology to large scale fumigations such as logs under tarpaulins or in ship holds.
- 13.2.7. The Nelson City Council (101751) indicates that, under the Nelson Air Quality Plan, methyl bromide capture is now mandatory (see Section 5 above) except for fumigations involving less than 3 kg of fumigant (i.e. 20 foot containers). The Code of Practice put in place by the Port Company requires recapture for all fumigations at the port.

Potential recapture systems

- 13.2.8. Value Recovery (101134) claims that it can provide a system for destroying methyl bromide from fumigation vent streams which is approved in California. The system adsorbs methyl bromide on a carbon bed, desorbs it by using warm air and destroys methyl bromide using a scrubber containing sodium thiosulphate. The

company states that they will provide a 90% process guarantee for chemical destruction of methyl bromide. The submitter estimates the costs as less than 25% of the cost of fumigation.

- 13.2.9. Another supplier of recapture technology, Nordiko (101797) indicated that the technology is used in log stack fumigation overseas. Both hard wood and soft wood logs are fumigated although more methyl bromide is required to fumigate hard wood logs. The volume of log stacks fumigated can be 1800 m³ or more. Nordiko has recently supplied an 8000 m³ recapture system to the West Australian Government used for the fumigation of a large house. The system is not available for ship hold fumigation yet.
- 13.2.10. In appendix K of their submission, Nordiko also provided information of the efficiency of recapture technology. They have subsequently referred to a report of the Technology and Economic Assessment Panel of the United Nations Environment Programme (UNEP) of September 2006⁵. In this report, figures of efficiency of greater than 99.8% of the available methyl bromide are mentioned. It is estimated that around 70% of the initial dosage is available for recapture due to losses during fumigations including sorption and leakage. There is little difference in efficiency between recapture of containers and under covers.
- 13.2.11. Nordiko also indicate that their recapture systems can be used for fumigants (for example, phosphine) other than methyl bromide. Sulfuryl fluoride (currently not approved for use as a fumigant) cannot be recaptured at this stage by any company.

Affordability

- 13.2.12. A summary of the information provided by submitters on the costs of introducing recapture technology is summarised as follows:
- 13.2.13. Port Marlborough (101768) indicates that the costs will increase by 5-25% dependant on the size of the fumigation. The greater the volume of methyl bromide that needs to be captured the greater the costs involved.
- 13.2.14. Melanie Miller and Tom Batchelor (101818) refer to the TEAP (2009)⁶ report that states that the costs of recapture are highly situation dependent but may typically add 50-100% to the costs of a fumigation.
- 13.2.15. Genera (101804) provided the following information regarding the costs of recapture technology:

“In essence container fumigation costs comprise three principal elements: labour, equipment, and consumed materials. Similar overall times are taken to fumigate containers with and without capture. But while ordinary fumigation is readily done by a single operator, handling the capture consoles requires two at both gassing and ventilation stages. Thus, labour input is essentially doubled. For

⁵ UNEP Report of the technology and economic assessment panel, September 2006, final report http://ozone.unep.org/teap/Reports/TEAP_Reports/Teap-CUN-final-report-Sept-2006.pdf

⁶ UNEP Report of the technology and economic assessment panel, October 2009, final report http://ozone.unep.org/teap/Reports/TEAP_Reports/teap-qpstf-october2009.pdf

container volumes as at Port Nelson, lease costs of the capture equipment are appreciably higher than the costs of normal fumigation plant, which is still needed. The cost of filter carbon, including disposal, is similar to the cost of the equivalent methyl bromide and sachets. Overall, therefore, a conservative assessment is that, for the circumstances applicable to Nelson, capture doubles the cost of container fumigation. This assessment does not, of course, include environmental benefits of capture”.

- 13.2.16. Nordiko (101797) can provide systems to recapture methyl bromide. The company provided estimated costs per container for fumigation using recapture techniques and disposal to the landfill. Nordiko has based its costs on operations at the Port Nelson and the costs are about NZ\$68 per container. The major differences between this estimation and the estimation in the current application form (NZ\$388 per container) are caused by differences in the capital costs of the equipment and the costs to replace and manage waste carbon.
- 13.2.17. Nordiko indicate that the total annual costs for the equipment at the Port Nelson are about \$6,400 by using a tarpaulin and \$10,000 for container fumigations and that the costs of recapture technology will decrease when it is used more in New Zealand.
- 13.2.18. The expected life of the units is at least 5 years (= lease period) but depending on maintenance and use the unit can be used for 10 years.

13.3. Agency's response

- 13.3.1. The Agency considers that recapture may be a practical option; however, the information that was available at the time of the preparation of the application was not sufficient to support an analysis of the costs of recapture for the large scale application to whole log fumigation on a national basis. The information provided by submitters regarding large scale fumigation of logs under tarpaulins has not changed this situation.
- 13.3.2. In preparing the application, the Agency used the report of Aurecon New Zealand for the evaluation of capture techniques, destruction and recycle options for methyl bromide. The report provided an overview of several systems.
- 13.3.3. The recapture and destruction system described by Value Recovery (101134) is one of the systems reviewed. It is understood that no commercial installations with this system are operational. New commercial systems often have teething problems and on occasion can prove to be unfeasible. Therefore, the Agency considers it could be premature to recommend this system become mandatory.
- 13.3.4. The experience at Port Nelson shows that the use of recapture technology for small-scale fumigations is practical.
- 13.3.5. In the Aurecon New Zealand report the costs for fumigation per container using recapture technology are estimated to be \$388. However, according to Nordiko the costs are estimated to be \$68 per container. The major differences between those estimations are caused by differences in the capital costs of the equipment and the costs to replace and manage waste carbon. Other submitters estimate an increase

in costs between 5 and 100% dependant on the size of fumigation but they did not provide figures or calculations.

- 13.3.6. Thus, based on the submissions, the costs for small-scale fumigations seem to be lower than was estimated in the reassessment application.
- 13.3.7. Because of the reduction in exposure to people and the environment that can be achieved through recapture, the Agency now recommends requiring the use of recapture technology for shipping container (20 foot and 40 foot) fumigations.
- 13.3.8. However, the practicality and cost of recapture for large-scale fumigations (for example, logs under covers) which account for 80% of the methyl bromide used in New Zealand, is uncertain.
- 13.3.9. The Agency does not consider that the technology can be made mandatory for large-scale fumigations at this time. However, it may be helpful for the Authority to seek advice from the submitters on this matter.

14. Minimum buffer zones

14.1. *The reassessment application*

- 14.1.1. In the reassessment application, the Agency proposed the minimum buffer zones shown in Table 3 to be applicable in the downwind direction. The purpose of these buffer zones is to provide sufficient distance between the fumigation and any fugitive or deliberate ventilation release of gas and non-occupational bystanders (members of the public) to ensure that they would be unlikely to be exposed to concentrations greater than the proposed 1 hour Tolerable Exposure Limit (TEL). These minimum buffer zone distances were based on the monitoring data outlined in Appendix I of the reassessment application. The distances outlined in Table 3 relate to the minimum distances from the fumigation area where the proposed 1 hour TEL is not exceeded. Fumigations with recapture technologies were specifically excluded from these minimum buffer zones.

Table 3 Minimum buffer zones for methyl bromide fumigation recommended by the Agency in the reassessment application

Use	Minimum Buffer Zone (m)
Ship's hold (greater than 1000 kg methyl bromide used)	100
Ship's hold (less than 1000 kg)	50
Logs/timber under covers outdoors and indoors (without recapture technology)	50
Shipping containers	25

14.2. *Review of submissions*

- 14.2.1. Many submitters, such as Northport Ltd (101767) consider the minimum buffer zones to be excessive and not reflective of the results of environmental monitoring data. Genera (101804) proposed an alternative set of minimum buffer zone values based on monitoring information that they had available to them. Other submitters pointed to the fact that for many fumigations, particularly shipping containers, these minimum buffer zones may be impractical and have serious financial impacts. There were also requests for different minimum buffer zone categories to better represent the actual risks.
- 14.2.2. On the other hand, there were also submissions from those concerned about the health impacts of methyl bromide. These submitters suggest that, because of concerns about the quality of the monitoring data used to set the minimum buffer zones, all buffer zones should be increased, with some suggesting that all buffer zones should be a minimum of 100 m as a precautionary measure.
- 14.2.3. Concerns were also raised about the proposal that the minimum buffer zones would only apply in a downwind direction, because of the fact that wind direction could change quite frequently at locations where methyl bromide is likely to be used particularly bearing in mind the length of time between the beginning of the

fumigation and the time at which it is ventilated.

- 14.2.4. The Nelson City Council (101751) included the results of atmospheric dispersion modelling which was part of the evidence submitted to the Environment Court when the Nelson Air Quality Plan was appealed by Genera Ltd. This modelling predicts that, on occasions, concentrations of methyl bromide following the fumigation of 1 container could exceed the proposed 1 hour TEL by a factor of 3 up to 100 m away from the location of the fumigation. This suggests that on occasions the proposed 1-hour TEL would be exceeded if the Agency's recommended minimum buffer zones were to be applied.
- 14.2.5. Other submitters criticised the Agency's "one size fits all" approach for minimum buffer zones. Site specific characteristics, for example, local topography and weather conditions would mean that the appropriate minimum buffer zones would vary from site to site.
- 14.2.6. Many submitters also sought clarification about when the minimum buffer zones would apply (for example, with recapture technology) and what the Agency meant by a "non occupational bystander".
- 14.2.7. A non-occupational bystander is a member of the public who may be legally present in the area (see note 1, page 14 of the reassessment application).
- 14.2.8. In addition, other submitters pointed out that applying the minimum buffer zones in the seaward direction would be impractical as fumigators would not be able to control whether vessels move into the minimum buffer zone area. This is currently the case at Port Nelson where buffer zones do not apply in the seaward direction, other than for ferries and cruise ships at berth.

14.3. Additional data

- 14.3.1. The Agency proposed the minimum buffer zones in the reassessment application based on the results of the ambient air quality monitoring in Appendix I of the reassessment application. In proposing these buffer zones the Agency accepted that these were based on data not collected for this purpose and welcomed submissions with more information which showed that alternative controls or different buffer zone sizes would provide the same level of protection.

Environmental monitoring data

- 14.3.2. The Agency has received further monitoring data from Genera Ltd as part of the submissions to support their call for reduced minimum buffer zones (this information was referred to by several other submitters).

Containers

- 14.3.3. Some submitters requested that the buffer zones for containers be reduced from 25 m to either 10 m or zero. The data provided by Genera Ltd for single container fumigations (refer Table 1 of Appendix 1 of their submission) shows that, over a range of weather conditions at a number of different sites, instantaneous concentrations of methyl bromide varied between 0.0 and 2.3 ppm at a distance of 4 m away from the container, and were nearly always zero (0.0 ppm, which should

be more appropriately reported as less than 0.1ppm) at 12 m away.

- 14.3.4. The data provided by Genera Ltd cannot be directly assessed against the proposed one hour TEL of 1 ppm because they are spot measurements rather than time-averaged values. However, they do suggest that one-hour exposures at 12 m from a container should be well below the proposed 1- hour TEL and in most cases close to zero. On the basis of this monitoring data a minimum 10 m buffer zone for ventilating containers should mean that non-occupational bystanders would be very unlikely to be exposed to concentrations in exceedence of the 1 hour TEL.

Fumigation under covers

- 14.3.5. Some submitters requested that the minimum buffer zone for fumigation under covers be reduced from 50 m to 25 m.
- 14.3.6. Genera Ltd (101804- supplementary information) provided some data to support their submission and their recommendations for reduced buffer zones. The data are, however, largely the same as the information reviewed in Appendix I of the reassessment application. There is an extra set of results for a fumigation in Port Marlborough during March 2010. The additional data are not significantly different from the original data. As a consequence, the Agency considers that there is no new evidence that warrants a change to its original recommendation. While the Agency accepts that other control measures (such as limiting the volume of methyl bromide used over a given time period) may be as effective as buffer zones, the Agency currently has limited evidence to suggest just what these measures should be or how effective they may be.

Log fumigation in ship holds

- 14.3.7. Some submitters also want the minimum buffer zone for log fumigation of ship holds to be reduced from 100 m to 50 m. Genera Ltd provided the Agency with some additional data to support their submission and their recommendations for reduced buffer zones. The data are, however, largely the same as the information reviewed in Appendix I of the reassessment application. The one addition is a single set of results for the “Young Spirit” vessel on the 17th February 2010. Again, the Agency considers that the additional monitoring result is not significantly different from the original data. Even if the monitoring result on the occasion where there were communication and technical problems is excluded, 3 out of 11 measurements were found to be between 0.6 – 1.0 ppm at distances greater than 50 m.
- 14.3.8. Given the small number of samples and the number of measurements that were either very close to or above the TEL (as outlined in Appendix I of the reassessment application), the Agency does not consider that there is a case for changing its earlier recommendation.
- 14.3.9. The Agency accepts that there may be other control measures which could be as effective as buffer zones (for example, limiting the number of holds that could be opened over given time periods, or limiting the amount of methyl bromide used), the Agency currently has limited evidence to suggest what these measures should be or their effectiveness.

Nelson atmospheric dispersion modelling and buffer zones

- 14.3.10. The Nelson City Council (101751) included evidence presented at the Environment Court. Part of this evidence was atmospheric dispersion modelling conducted on behalf of Genera Ltd. This modelling predicted the 1 hour concentration of methyl bromide released from one 40 foot container which had been fumigated using 5.4 kg of methyl bromide at Port Nelson. It was assumed that all the methyl bromide would be released over one hour. Meteorological data used in the dispersion modelling came from Nelson Airport.
- 14.3.11. The results of the atmospheric dispersion modelling predicted average one hour concentrations up to 10 mg/m³ at locations over 100 m away (approximately 3 times higher than the Agency's proposed 1 hour TEL). This was predicted to occur during the most stable atmospheric conditions. As a consequence of this modelling, the Nelson Air Plan requires the use of a maximum of 3 kg of methyl bromide, the application of a minimum buffer zone of 100 m, no ventilation during stable atmospheric conditions and ventilation of no more than one container per hour.
- 14.3.12. Nelson City Council point out that the fact that the modelling carried out on behalf of Genera Ltd only considered one container (containing a relatively small amount of methyl bromide) meant that it is possible that the minimum buffer zones the Agency recommended would not always be sufficient to achieve the 1 hour TEL off site.
- 14.3.13. The Agency, however, notes Dr Graham's comment in Appendix I of the reassessment application which states that the atmospheric dispersion modelling is thought to be highly conservative because:
- 1) only a portion of the gas is likely to be released during the first hour, and
 - 2) the modelling assumes unvarying weather conditions throughout that hour.
- 14.3.14. The Agency also notes that the atmospheric dispersion modelling used worst case scenarios as a basis for the controls at Port Nelson (i.e. the controls were based on the absolute worst case meteorological conditions). This approach differs significantly from that used by the Agency to determine control measures for other approvals. When using environmental modelling for exposure assessment the Agency typically base controls using percentiles of exposure. That is the concentrations of a particular pollutant are expected to be below a certain value for a certain percentage of the time (for example, 95th percentile).
- 14.3.15. The monitoring data in both the reassessment application and as submitted by Genera Ltd as part of the submission process, shows very low concentrations of methyl bromide around containers, especially greater than 10 m away from the containers.
- 14.3.16. The Agency notes that some of the monitoring on which the minimum buffer zones were based was carried out in unfavourable meteorological conditions. Thus, based on the available data, the proposed minimum buffer zones should be adequate for the vast majority of meteorological situations. However, it may be

possible that during extremely unfavourable meteorological conditions the proposed minimum buffer zones on their own may not always mean that the 1 hour TEL would be achieved.

- 14.3.17. The Agency notes that the primary control is the TEL. It is the responsibility to ensure that the TEL is not exceeded where a member of the public may be present. The Agency has recommended minimum buffer zones as a means of ensuring that this requirement is met on the majority of occasions.
- 14.3.18. The Agency's recommended controls in the reassessment application also require the fumigator to monitor ambient air concentrations of methyl bromide and comply with the proposed TEL values. As such it will be the fumigator's responsibility to take additional control measures, such as adopting larger buffer zones, carrying out staged ventilation or considering limiting ventilation during unfavourable meteorological conditions to ensure that monitored concentrations do not exceed the proposed TEL values. It is also important to stress that regional or unitary councils may set more stringent controls (e.g. larger buffer zones) under their air quality plans, if they deem it necessary because of local site specific conditions.

14.4. Agency's revised proposed minimum buffer zones

- 14.4.1. The Agency's proposed new minimum buffer zones are set out in Table 4. The reasoning behind the changes is set out in the previous paragraphs.

Table 4 Recommended revised minimum buffer zones for methyl bromide fumigation (without recapture)

Use	Minimum Buffer Zone (m)
Ship's hold (greater than 1000 kg methyl bromide used)	100
Ship's hold (less than 1000 kg)	50
Logs/timber under covers outdoors and indoors (without recapture technology)	50
More than 1 shipping container (77 m ³) per hour*	25
1 shipping container (77 m ³) per hour*	10

*Although the Agency notes from the Genera Ltd monitoring data (see second supplement to Genera submission) that concentrations were always below the limit of detection within 21 minutes after the start of the ventilation of shipping containers, the monitoring data on which the above minimum buffer zones are based has only been collected for one container at a time. Therefore, the Agency proposes that no more than one container (with a volume of no more than 77 m³) should be opened per hour to avoid cumulative effects. If more than one container is to be opened per hour then a minimum buffer zone of 25 m should apply for all containers.

Minimum buffer zone direction

- 14.4.2. The Agency accepts that minimum buffer zones should apply in all directions to account for changing wind direction.

Seaward direction

- 14.4.3. The Agency received several submissions about the practicality of implementing a minimum buffer zone which applied in the seaward direction as the fumigator will

have limited ability to control those who pass through the seaward side. The Agency also notes that the Environment Court decided that the Port Nelson buffer zone did not apply in the seaward direction other than for ferries and cruise ships at berth because those exposed on a moving boat would be unlikely to be present for a sufficient period of time to cause a significant health hazard. Because of these practicalities, the Agency accepts that minimum buffer zones should not apply in the seaward direction, provided there is not a ferry or cruise ship at berth. However, the Agency considers that fumigators should be required to notify all vessels which are moored within 100 m of the location of the ventilation release.

Removing the need for buffer zones if ambient air quality monitoring is taking place

- 14.4.4. Some submitters suggested that the requirements for buffer zones for containers should be removed if the fumigator carries out ambient air quality monitoring demonstrating that the TEL can be met. However, this would mean that containers could be opened very close to where non-occupational bystanders might be present.
- 14.4.5. Monitoring could only detect exceedances of the 1 hour TEL after the release had occurred (due to the fact that the monitoring data must be averaged over one hour). While this might provide useful information to inform future fumigation practice, it would not provide any protection during the actual fumigation. The Agency accepts that buffer zones will cause some disturbance for the fumigation industry; however, they will provide an additional degree of safety for non-occupational bystanders given the significant uncertainties that exist regarding the dispersion of methyl bromide.

Site specific buffer zones

- 14.4.6. Many submitters such as the Nelson Marlborough DHB (101781) criticised the Agency's uniform approach to controls, in particular buffer zones. The Agency agrees that local conditions such as meteorology and topography are likely to make a significant difference to the exposure of the general public. As such the Agency agrees that it would be a significant advantage to have site-specific control measures such as buffer zones.
- 14.4.7. A requirement to have site specific buffer zones would however, require every site to have different buffer zones for each type of fumigation. The Agency notes that the monitoring data used to determine minimum buffer zones included some conservative dispersion situations. Therefore, the Agency is confident that the proposed minimum buffer zones should be adequate. However, should that not be the case, for example where air quality monitoring or site specific modelling data show exceedances of the TEL values, then the operator will need to adopt a larger buffer zone to avoid breaching the TEL.
- 14.4.8. It should be emphasised that the current Agency recommendations or a decision of the Authority do not preclude Regional and Unitary Councils or Port authorities from setting more stringent controls (e.g. larger buffer zones) if they deem them necessary because of local conditions.

Recapture

- 14.4.9. The Agency recommends that any minimum buffer zones should not apply when recapture technology is used. While the Agency accepts that recapture technology may not always be 100% efficient, we consider that recapture along with good practice will be sufficient to manage any risks.

15. Ambient air quality monitoring

15.1. *The reassessment application*

15.1.1. The Agency proposed that appropriate monitoring be carried out for all fumigations and that monitoring of shipping containers, outdoor tarpaulin enclosure and ship hold fumigations adhere to STIMBR methyl bromide – *Ambient Air Monitoring Protocol* in Appendix P of the reassessment application. Monitoring devices were required to be located downwind at locations where non occupational bystanders might be present. The Agency noted that:

- for sites with complicated geography and weather conditions, the Protocol recommends that specialist help should be obtained in selecting appropriate monitoring sites.
- monitoring needs to be maintained until methyl bromide gas is no longer detectable.
- the results of such monitoring should be kept by those conducting the fumigation and should be available upon request to appropriate regulatory agencies.

15.2. *Review of submissions*

15.2.1. The Agency received many comments about the proposed ambient air quality monitoring controls. Many submitters, such as Catherine de Monchy (101770) expressed concerns about the validity and independence of such monitoring. They were concerned about the regulatory and audit procedures that would be put in place to ensure that such monitoring is meaningful and that the results would be put to a practical use. The New Zealand Green Party (101752) and other submitters concerned about the potential health effects from methyl bromide expressed a desire to see the results of the monitoring made available to members of the public.

15.2.2. Submitters who are involved in the fumigation of containers, for example Genera (101804) were also concerned that there might be considerable financial costs associated with monitoring all fumigations including those where there would only be a relatively small amount of methyl bromide used. In addition, submitters such as Nelson Marlborough DHB (101781) had concerns about some of the technical issues related to the monitoring, such as the chronic TEL being below the limit of detection, the length of time that the monitoring should occur for and the appropriate averaging times. The DHB (101781) and other submitters were also concerned that the monitoring requirements would apply to fumigations using recapture technology.

Concerns about the validity of ambient air quality monitoring

15.2.3. Nelson Marlborough DHB (101781) raised concerns about the validity of air quality monitoring results given the practical difficulties associated with monitoring. There are limitations associated with using ambient air quality data to assess exposure to methyl bromide. However, after careful consideration, this is considered to be the most practical way that compliance with the proposed TEL

values can be demonstrated or the effectiveness of the controls assessed.

- 15.2.4. The Agency does not accept the view that ambient air quality monitoring has little or no merit. The monitoring outlined in Appendix I of the reassessment application clearly demonstrates that ambient air quality monitoring has in the past detected concentrations of methyl bromide in exceedance of the TEL at significant distances away from the site of the release. The Agency agrees that, on occasions, monitoring may not always represent the highest concentrations of methyl bromide. However, repeated monitoring programmes of fumigations will give a good indication of the range of concentrations around each site. The ultimate aim of the monitoring is ensure that controls are in place at each fumigation site to ensure that the TELs are not exceeded.
- 15.2.5. In addition, the Agency notes that ambient air quality monitoring of methyl bromide has been widely carried out in the USA around a wide range of different sources of methyl bromide and that this information has been used by regulators to inform both risk assessments and appropriate control measures (California Environment Protection Agency, 2002)⁷. This monitoring has included complex sources of methyl bromide including fumigation of buildings, containers and fumigated fields.

Atmospheric dispersion modelling versus air quality monitoring

- 15.2.6. Submitters, such as the Guardians of the Sounds (101799) were concerned about the limitations of air quality monitoring and felt that air quality modelling would be a better way of assessing exposure. While the Agency acknowledges the uncertainties associated with air quality monitoring, there are also significant uncertainties associated with atmospheric dispersion modelling. In particular, there are issues involved with characterising discharge rates and other physical parameters of non-stack releases. Assumptions must be also be made on the proportion of the gas emitted and over what period which can significantly affect the predicted concentrations.
- 15.2.7. The monitoring protocol in Appendix P of the reassessment application stipulates that, for sites with complicated geography and weather conditions, specialist help should be obtained in selecting monitoring locations. In such cases, the Agency supports the use of atmospheric dispersion modelling to determine the locations for monitoring under different meteorological conditions.

Responsibilities for monitoring

- 15.2.8. It is the responsibility of the persons carrying out the fumigation to ensure that the appropriate air quality monitoring is carried out for all fumigations. The Agency considers that all monitoring must be carried out by adhering to the *STIMBR methyl bromide – ambient air monitoring protocol in Appendix P of the reassessment application*. It is the Agency's view that records of all monitoring

⁷ California Environment Protection Agency, 2002, Methyl bromide risk characterisation application, Volume 1 Inhalation exposure. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California, 14 February, 2002. Available online at http://www.cdpr.ca.gov/docs/emon/methbrom/rafnl/mebr_rcd.pdf

during the fumigation as included in Appendix A of the STIMBR monitoring protocol must be kept for a period of 7 years. The Agency considers that these data must be available upon request to the Department of Labour, regional public health units, regional or unitary councils or ERMA New Zealand. In addition the Agency considers that the fumigator must be required to report all exceedances of the TEL to the local Department of Labour, regional or unitary council and regional public health service offices.

- 15.2.9. While the Agency accepts that members of the public may have more confidence in monitoring results if they are undertaken by an independent third party, we note that the monitoring is usually carried out on contract by independent environmental consultants. As the consultants are highly trained and have professional reputations to uphold, the Agency does not consider that requiring independent monitoring to be warranted.
- 15.2.10. To help reassure local communities, the Authority may consider requiring that all persons carrying out fumigations that require air quality monitoring and use more than 50 kg of methyl bromide per year report regularly on their monitoring results. Such a report would describe the number of fumigations, the volumes used and the type of fumigation. In addition, the report would outline the air quality monitoring sampling strategy and summarise all the ambient air quality monitoring results and, in particular, note any breaches of the applicable acute and chronic TELs. If breaches of the TELs have been found to occur, the report would outline what appropriate risk mitigation measures have been put in place to address this. Any accidents or issues related to non-compliance with any controls or the relevant code of practice could also be outlined in the report.
- 15.2.11. The report should be supplied to the local enforcement agencies and be made publicly available. The Agency would strongly recommend that those responsible for the production of a report get it produced or peer reviewed by an independent person with expertise in air quality monitoring before publication.

Exclusion of smaller fumigations from the monitoring requirement

- 15.2.12. The Agency received submissions, for example from the Forest Owners Association (101808) requesting that smaller fumigations be excluded from monitoring requirements due to the lower risks and the cost implications of monitoring “every single fumigation”. From the information available, the Agency agrees that the risks associated with smaller fumigations (those using less than 7 kg methyl bromide per hour) appear to be low; however, the Agency only has a limited amount of information on which to base this preliminary conclusion.
- 15.2.13. An option could be to limit ambient monitoring for smaller volumes of methyl bromide (less than 7 kg/hour) to spot testing. The Agency notes that environmental monitoring should already be occurring to fulfil employers’ responsibilities under the Health and Safety in Employment Act 1992.
- 15.2.14. The Agency considers that this monitoring could be extended to monitoring against the TELs in the following manner:
- 15.2.15. During ventilation, environmental monitoring is limited to spot sampling taken 10

m away from the release location in the downwind direction. This monitoring begins at the start of the release and continues for 3 minute intervals until the gas is not detectable.

- 15.2.16. The concentration is then averaged and compared to the TEL values. This information is recorded with the same requirements for storing and reporting as outlined above in section 15.2.11 above.
- 15.2.17. Again all exceedances of the TEL must be reported to the Department of Labour, regional councils and regional public health service along with the measures that will be put in place to ensure that future exceedances will not occur. This information should also be included in the monitoring report, if one is required for the facility. In addition, monitoring of future fumigations should be modified to determine what concentrations might be at the site boundary. This information will also be helpful in determining the appropriateness of the minimum buffer zones for smaller fumigations.

Exclusion for fumigations with recapture technology

- 15.2.18. The Agency considers that fumigations involving recapture technology should not be required to be the subject of ambient air quality monitoring. While the Agency accepts that recapture technology may not always be 100 % efficient, recapture along with good practice as outlined in the PMANZ code will be sufficient to manage any risks. However, monitoring for leaks during the fumigation should be continued.

Duration of monitoring and the limit of detection in relation to the chronic TEL

- 15.2.19. Many submitters, such as C3 Ltd (101793) were concerned about monitoring being required until methyl bromide was not detectable; and also that the chronic TEL is below the limit of detection. The Agency notes that the purpose of the ambient air quality monitoring is to ensure that none of the proposed TEL values are being exceeded. It is therefore essential that monitoring occurs over the entire duration of the release of methyl bromide. The Agency accepts that the limit of detection will vary depending on the method of monitoring; therefore the Agency proposes that environmental monitoring continue until the concentration of methyl bromide is below 0.05 ppm (which is effectively equivalent to a reading of 0.0 ppm on most Photo Ionisation Detectors (PID) instruments) for at least 15 minutes.
- 15.2.20. The chronic TEL of 0.0013 ppm is not monitored directly. The annual average exposure would be determined by calculation from the available hourly monitoring data, coupled with the assumption that methyl bromide concentrations were zero at all other times.
- 15.2.21. It should also be recognised that compliance with the acute TEL does not ensure compliance with the chronic TEL. In fact, average methyl bromide levels will need to be well below the 1-hour TEL to ensure compliance with the chronic TEL. It is possible to illustrate this with an example: If there are 12 fumigations in a year with a maximum 1-hour result of 0.95 ppm (i.e. just below the acute 1 hour TEL) and the concentrations for all of the other 8748 hours in the year are assumed to be zero; the annual average result would be 0.0013 ppm – which is the chronic TEL. Therefore, although the chronic TEL is below the limit of detection, it is still

possible to check the compliance with it by monitoring during periods when the gas is likely to be present. This also confirms the need to carry out monitoring until the gas concentration falls to below 0.05 ppm if comparison against the chronic TEL is to be meaningful.

Ambient air quality monitoring to occur at the source of release not at the site boundary

- 15.2.22. Because of the difficulties associated with monitoring, some submitters suggested that monitoring should not occur at the boundary but close to the site of the release, which would reduce the possibility of “missing the plume”. The Agency accepts that for smaller fumigations (less than 7 kg methyl bromide/hour) monitoring closer to the source may be more appropriate. However, for larger fumigations the Agency still considers that monitoring at the boundary is appropriate. The purpose of the air quality monitoring that was proposed by the Agency is to ensure that concentrations of methyl bromide that non-occupational bystanders would be exposed to would be below the acute and chronic TELs. As such monitoring should occur where non-occupational bystanders could be present. Monitoring close to the location of ventilation release should already be being carried out for the purposes of the Health and Safety in Employment Act 1992.
- 15.2.23. The Agency also suggests that operators give consideration to determining whether there is any place for use of smoke generators in identifying the direction of the plume for portable monitoring.

Monitoring of weather conditions

- 15.2.24. Some submitters pointed out that, when air quality monitoring is being carried out, local weather conditions should also be recorded. The monitoring protocol application outlined in Appendix P of the reassessment application does require that, during air quality monitoring, weather conditions should be recorded. The Agency proposes that the weather conditions as outlined in the monitoring protocol be recorded for all fumigations. The Agency also proposes that monitoring equipment for wind speed and direction should be installed at all locations where fumigations are to be carried out (and air quality monitoring is required) in accordance with the Ministry for the Environment guidance application “*Good practice guide for air quality monitoring and data management*” (Ministry for the Environment, 2009)⁸. This weather information would need to be kept for a period of 7 years along with the other monitoring data so that it may be inspected by the appropriate enforcement officer.

Running averages

- 15.2.25. Some submitters felt that both the 1 hour and the 24 hour average TELs should be applied as running averages. This practice applies to continuous monitoring data which is usually logged at 1-minute intervals. The 1-hour averages are then calculated for each and every 60-minute interval within the dataset, (e.g. 0800 to 0859h, 0801 to 0900h, 0802 to 0901h, etc). This ensures that the worst 1 hour period is taken into account wherever it occurs within the monitoring period.

⁸ Ministry for the Environment, Good practice guide for air quality monitoring and data management 2009, Available online at <http://www.mfe.govt.nz/publications/air/good-practice-guide-air-quality-2009/html/page6.html>

- 15.2.26. The need for 24-hour running averages only arises if the ventilation period extends beyond 24 hours. This could be relevant for large fumigations or multiple fumigations occurring on consecutive days. In this case, the averages would be calculated at hourly intervals (eg. 0800 to 0759 on the next day, then 0900 to 0859, 1000 to 0959, etc)
- 15.2.27. The Agency agrees that the 1-hr and 24-hour TELs should be applied as running averages as this presents a more precautionary interpretation of the data than working to fixed hourly or 24-hourly periods.

16. Notification

16.1. Review of submissions

- 16.1.1. The New Zealand Green Party (101761) and other submitters sought a notification requirement from fumigation companies to neighbours. Environment BOP (101754) called for this to extend to anyone occupying land within 150 m from the fumigation site. Other submitters requested notifications on radio.

16.2. Agency response

- 16.2.1. The Agency agrees that notification of major fumigations (eg logs under tarpaulins and ship fumigations) to affected parties should be required. The rationale for applying this only to major fumigations would relate to the quantity of gas involved and the period over which the operation (including ventilation) may occur. The notification would address the public's interest in being aware when major fumigations are to take place. In addition, liaison between the company requiring the fumigation and the relevant district or city council should occur to ensure that any major public events are taken into account in timing of fumigations.

17. Tolerable Exposure Limits (TELs)

17.1. Review of submissions

- 17.1.1. The majority of submissions were supportive of the proposed TELs while a few submissions claimed that the proposed TELs are insufficiently precautionary.
- 17.1.2. Port Marlborough NZ Ltd (101768) requested the establishment of a TEL-Ceiling value which was proposed as a value that would not be permitted to be exceeded at any time (as an instantaneous reading).

17.2. Agency response

- 17.2.1. The Agency notes that the TELs are consistent with overseas regulatory approaches and international best practice.
- 17.2.2. The acute TEL is derived by dividing the Human Equivalent Concentration (HEC) equivalent to the relevant no observable adverse effect level (NOAEL), the concentration estimated to cause no adverse effect in animals, by safety factors. The safety factors allow for differences between humans and animals (on which the studies were done), and variability in human susceptibility (differences in age and health status for example).
- 17.2.3. In the case of the acute 1 hour and 24 hour TELs, the total safety factor was 30. This consists of a factor of 3 to allow for differences between humans and animals, and a factor of 10 to allow for variability in human susceptibility.
- 17.2.4. In the case of the chronic TEL, the animal data did not establish a no observed adverse effect level (NOAEL), so it is necessary to use a lowest observed adverse effect level (LOAEL), and an additional factor of 3 was used to take that into account. The other uncertainty factors for the chronic TEL were as for the acute TELs, so the combined uncertainty factor for the chronic TEL was 100 (see page 90, Appendix D of the reassessment application).
- 17.2.5. The resulting TELs are all concentrations that are not expected to be associated with any adverse health effects on members of the public.
- 17.2.6. The Agency does not support the establishment of a TEL-Ceiling value. The OSHA and NIOSH value is not relevant as it is a workplace standard, equivalent to a Workplace Exposure Standard (WES). The TEL is a value set to protect members of the public and the Agency does not consider the setting of a TEL-Ceiling to be warranted.
- 17.2.7. The Agency considers that the proposed 1 hour TEL will address the shorter term peak concentrations which were of concern to Port Marlborough.
- 17.2.8. Accordingly, the Agency considers that the TELs proposed in the reassessment application should be applied.

18. Reliance on Personal Protective Equipment

- 18.1.1. Two submitters pointed out that personal protective equipment (PPE) including respiratory protective equipment (RPE) does not always provide sufficient protection and can fail.
- 18.1.2. The Agency agrees that reliance on PPE (including RPE) is not without risk. Use of PPE/RPE requires good training, supervision and maintenance of the equipment. The Agency notes that, when elimination and isolation of a significant hazard is impracticable under the Health and Safety in Employment Act 1992, section 10 requires the employer to take the steps provided for in sub-section (2). The steps set out in sub-section (2) include ensuring the use of suitable clothing and equipment, and monitoring of the employee's exposure to the hazard. For the RPE equipment to be suitable, an assessment is needed of the expected concentration of gas present and whether or not the equipment to be used will provide the sufficient degree of protection for the worker.
- 18.1.3. As recorded in the reassessment application (see paragraph C1.2, 12 of Appendix C) there have been few health and safety related incidents or complaints recorded against methyl bromide. This level of reporting suggests that the fumigator's use of PPE/RPE has generally been appropriate. The Agency considers that this reflects the recognition that the substance is highly toxic and the knowledge that there is a clear need for careful attention to best practice when handling poisonous fumigants like methyl bromide.
- 18.1.4. Thus, the Agency considers that best practice in relation to RPE is satisfactory and that no additional need to prescribed.

19. Restriction on site of shipping container fumigations

19.1. Review of submissions

19.1.1. The New Zealand Green Party (101761) and other submitters sought a restriction on where the fumigation of a shipping container can be carried out.

19.2. Agency response

- 19.2.1. The Agency notes that restrictions are already in place for methyl bromide containing formulations likely to be used for shipping container fumigations. Unfortunately some of these restrictions were omitted from the table of controls (Appendix G) in the reassessment application.
- 19.2.2. These restrictions are found in the Transfer Notice giving approval for fumigants⁹ (including methyl bromide) under the HSNO Act. Clauses 3 and 4 in Schedule 3 of the notice require that:
- (1) fumigation may only be carried out in a place that is secured against ready access by unauthorised persons; and
 - (2) must not be carried out in an area where the public may lawfully be present.
 - (3) no person may release methyl bromide in a shipping container unless, at the time the substance is released,—
 - (a) the container is in good repair and capable of being securely closed; and
 - (b) the container—
 - (i) retains the substance without leakage; or
 - (ii) if the container does leak, it is able to be modified immediately so that it does not leak, for example by covering and sealing with one or more gas-proof sheets.
- 19.2.3. The Agency is satisfied that these restrictions and application of the proposed buffer zones will ensure that the public are not exposed to levels of methyl bromide that exceed the proposed TELs.

⁹ See: http://www.ermanz.govt.nz/hs/transfer/Summaries/Fumigants%20-%20Summary%20of%20Approvals%20_2007.11.30_.pdf

20. Stenching agents

20.1. The reassessment application

20.1.1. In the reassessment application, the Agency did not recommend the use of chloropicrin as a stenching agent as methyl bromide is more rapidly dispersed than chloropicrin. This means that, as far as the methyl bromide component is concerned, the warning will not only arrive late but the danger it suggests may well be long gone (see paragraphs 6.2.57 to 6.2.64 of the reassessment application).

20.2. Review of submissions

20.2.1. Some submitters sought the mandating of the addition of an appropriate stenching agent to methyl bromide in order to warn members of the public of its presence.

20.3. Agency response

20.3.1. The Agency did not receive any new information on suitable stenching agents. Thus the Agency does not propose that chloropicrin be used as a stenching agent but should an appropriate stenching agent be identified which overcomes the issues raised by the use of chloropicrin, we would recommend its immediate use.

21. Soil use

21.1. The reassessment application

- 21.1.1. In the reassessment application, the Agency recommended that the two HSNO approvals (HSR001637 and HSR001638) for importation of methyl bromide formulations for soil fumigation purposes should be revoked with immediate effect from the date of the Authority's decision on this reassessment. This was intended to give formal effect to the prohibition already in place under the Montreal Protocol on further importation of these substances for non-QPS purposes.
- 21.1.2. The Agency also recommended that the Authority should also issue a direction, by notice in the *Gazette*, under section 66 of the Act, prohibiting further use of the substances for non-QPS use and requiring disposal at the owners' expense by 31 December 2010.

21.2. Review of submissions

- 21.2.1. Hort NZ (101787) supports the continued availability of methyl bromide for QPS use in the medium term. However, the proposed phase out of the soil fumigant formulations of methyl bromide is opposed. They are needed for the eradication of potato wart disease.

21.3. Agency response

- 21.3.1. MAF Biosecurity New Zealand Post - Border who deal with management of *Synchytrium endobioticum* (Potato wart) have advised the Agency that they regard methyl bromide as an essential tool in managing / eradicating this organism and its use is consistent with the quarantine use exemption under the Montreal Protocol as it is part of an official control programme. Hence this is a QPS use of methyl bromide.
- 21.3.2. Accordingly, the Agency considers that the approvals should not be revoked but their use should be limited to official QPS purposes.
- 21.3.3. The Agency also notes that the best way of eliminating stocks of methyl bromide is to use it up and does not consider a direction under section 66 of the Act to be warranted.

22. Hazardous Property Classifications

22.1. *The reassessment application*

22.1.1. In the reassessment application, the Agency proposed changing the soil ecotoxicity classification from 9.2A (very ecotoxic in soil) to 9.2D (slightly harmful in soil).

22.2. *Review of submissions*

22.2.1. A few submitters agreed with the proposed classification changes. However, two submitters disagreed with the proposal to change the soil ecotoxicity classification from 9.2A (very ecotoxic in soil) to 9.2D (slightly harmful in soil) on the basis that methyl bromide has been found to be 'highly toxic' and 'very toxic' to earthworms and the fact that methyl bromide is used as a soil fumigant to eradicate all organisms in the soil environment.

22.3. *Agency response*

22.3.1. The Agency is aware that methyl bromide is highly toxic to organisms in soil. Unfortunately, the Hazardous Substances (Classification) Regulations 2001 clearly indicate that substances must be classified on the basis of available valid toxicity data. Where no data are available on a substance, the Agency is not able to classify it.

22.3.2. For methyl bromide the only valid data available is that on nematodes and this is the basis of the 9.2D classification. There is no valid study available to assess its toxicity to earthworms. Therefore the Agency proposes to change the soil ecotoxicity classification from 9.2A (very ecotoxic in soil) to 9.2D (slightly harmful in soil).

22.3.3. Notwithstanding the official classification, the Authority should consider methyl bromide as being highly ecotoxic in the soil environment.

23. Conclusions and Recommendations

Table 5 comprises a summary of the Agency's proposals following a review of the submissions and additional information received. It should be noted that these controls are in addition to the current controls that apply to methyl bromide.

Table 5 Summary of Agency's revised proposals

Matters raised in submissions	Agency Proposals	
Classification	The following changes are made to the HSNO classifications of methyl bromide: <ul style="list-style-type: none"> • change from 6.3A (skin irritancy) to 8.2C (skin corrosive); • change from 6.4A (eye irritancy) to 8.3A (eye corrosive); and • change from 9.2A (very ecotoxic in soil) to 9.2D (slightly harmful in soil). 	
Soil fumigation use	Approvals (HSR001637 and HSR001638) are not revoked but are restricted to import for use for quarantine and pre-shipment (QPS) purposes only.	
	A direction under section 66 of the Act that stocks of methyl bromide are disposed of is not required.	
Recapture technology	The use of recapture technology is required for all shipping container fumigations.	
Buffer zones	The following minimum buffer zones apply:	
	Use	Minimum Buffer Zone (m)
	Ship's hold (greater than 1000 kg methyl bromide used)	100
	Ship's hold (less than 1000 kg used)	50
	Logs/timber under covers outdoors and indoors (without recapture technology)	50
	More than 1 shipping container (77 m ³) per hour	25
	1 shipping container (77 m ³) per hour	10
	Minimum buffer zones apply in all directions (except in the seaward direction as set out below) to account for changing wind direction.	
	Minimum buffer zones do not apply in the seaward direction unless there is a ferry or cruise ship at berth. In any case, fumigators are required to notify all vessels which are moored within 100 m of the location of the ventilation release.	
Minimum buffer zones do not apply when recapture technology is used.		
Monitoring	Air quality monitoring is carried out for all types of fumigations in adherence with the Appendix A of the <i>STIMBR methyl bromide – ambient air monitoring protocol</i> as shown in Appendix P of the reassessment application.	
	Monitoring for smaller volumes of methyl bromide (less than 7 kg/hour) is limited to spot testing against the TEL. This monitoring is to be extended to monitoring against the TELs.	
	Ambient air quality monitoring is not required for fumigations where recapture technology is used.	
	Monitoring shall continue until the concentration of methyl bromide is below 0.05 ppm for at least 15 minutes.	

Matters raised in submissions	Agency Proposals
	For larger fumigations monitoring shall occur where non-occupational bystanders could be present.
TELs	The TELs proposed in the reassessment application are applied. The 1-hr and 24-hour TELs are applied as running averages.
Notification	Notification of major fumigations (eg logs under tarpaulins and ship fumigations) to affected parties is required.

Signed _____ Rob Forlong _____
Chief Executive, ERMA New Zealand

Dated _____ 3 May 2010 _____

Appendix: Summary of Submissions

This summary is intended to provide a synopsis of the types of issues raised in submissions but is not intended to replace thoroughly reading all submissions. The full text of all submissions is available on the ERMA New Zealand website

<http://www.ermanz.govt.nz/hs/methyl%20bromide/index.html>

All the submissions have been considered by the Agency and the key issues addressed in the Update Paper.

Overall Recommendation (refer to Section 3 of the Update Paper)

General support for Scenario 1	100088 STIMBR; 101006 Westco Lagan Ltd; 100499 CHH Pulp & Paper; 100321 Red Stag Timber; 100163 Wood Processors Assn; 101636 WPI Timber; 101791 Pest Management Assn; 101837 Kiwi Lumber	A ban or phase-out over 5 years fails to recognise the magnitude of the task of developing alternatives and having them accepted by trading partners. The economic and ecological consequences of not having access to methyl bromide for the next 10 years are unacceptable. Need for urgency in seeking alternative strategies is critical (100088, 100163) PMANZ suggests the ten year period should be subject to review of data ahead of that time (101791).
	101011 Carter Holt Harvey	Essential decision – support continued use for QPS purposes Carter Holt Harvey supports the conditions on use proposed by ERMA.
	101001 Scion	Only viable course of action – support scenario 1 but need to look for alternatives <u>now</u>
	100090 NZ Pine Manufacturers Assn	Supports recommendation – fair assessment of risks, costs and benefits
	101630 Lyall Mortimer	Fully supports recommendations
	101635 Greater Wellington Regional Council (Leonard);	Any action to inhibit the present controlled use of methyl bromide would place at risk the high percentage of logs from GWRC's forests.
	101749 Marlborough Forest Industry Association	Supports ERMA's findings and conclusions and the overall evaluation of the risks, costs and benefits. Immediate ban will harm the economy and there is currently a lack of an alternative fumigant. MFIA considers it is impractical to apply current recapture technology to large scale fumigation.
	101750 Motueka Lumber	The continued ability to efficiently meet Australian import requirements is essential to business viability.
	101762 Te Rūnanga o Ngāi Tahu	Use should be continued if the benefits of use in strictly controlled circumstances are substantial and further research on alternatives and mitigation measures are commenced. An immediate ban would have significant adverse effects on the market economy, especially in the forestry sector, in which Maori have considerable economic interests.
	101764 Agricultural Fumigations Ltd	The present supply of methyl bromide should be continued. It is an economical global all purpose fumigant with no evidence health wise to operators when reasonable care is taken in its use. It is acceptable worldwide for general and efficient fumigation on a very wide basis. With no alternative it would be disastrous for this country in terms of imports and exports if it were unavailable.
	101767 Northport Ltd	Findings and conclusions are supported. The lack of an effective replacement for certain applications, in particular the fumigation of logs.
	101768 Port Marlborough NZ Ltd	Preliminary recommendations should be adopted with the addition of a ceiling limit.
	101769 Paula Allen	Cut out local anxiety; take proper precautions when fumigating wood.
	101773 Port of Tauranga Ltd	Accept scenario 1. Review monitoring requirement/responsibilities. Reduce buffer zones wherever possible.
	101783 MAF	MAF strongly supports the recommendation that the use of methyl bromide continues until economically viable alternatives that are technically accepted on a domestic and international scene are available. MAF recommends variations to the proposed controls. Any future reassessment of methyl bromide should be on an actual and a scientific basis rather than setting a fixed time period.
101784 Zindia	Zindia supports the recommendations that methyl bromide use be continued but	

		<p>with additional controls.</p> <ul style="list-style-type: none"> • Biosecurity depends on good border management; • New Zealand's earnings are dominated by primary industry goods – need to protect primary sector from biosecurity incursions; • Major trading partners require methyl bromide fumigation – ban or short term phase out – serious negative impact on the forest industry and New Zealand economy; • No suitable alternative fumigation or treatment; • Proposed TELs are achievable.
	101786 NZ Fresh Produce Importers Assn	The ongoing use of methyl bromide for quarantine use in New Zealand. In an imported fresh produce context, the relative volumes of methyl bromide use are very small (circa 5-6% of total use). However, the need for ongoing contingency use is very important.
	101787 Hort NZ	<p>Hort NZ supports the continued availability of methyl bromide for QPS use in the medium term. However, the proposed phase out of the soil fumigant formulations of methyl bromide is opposed. They are needed for the eradication of potato wart disease. Hort NZ seeks clarification of the Authority's process and intentions post 2020 should the baseline scenario be adopted.</p> <p>The use of methyl bromide to eradicate (prevent the establishment and/or spread of) potato wart disease as part of an official control programme clearly meet the criteria of a QPS treatment.</p> <p>The existing approvals should be retained.</p>
	101788 Rayonier	Supports scenario 1 as there is no suitable replacement technology at present.
	101789 M and T Greenlaw	ERMA should move to regulate and eventually ban the use of methyl bromide.
	101790 Greater Wellington Regional Council (Denton)	If scenario 1 is adopted, a contingency plan should be developed before the term expires.
	101792 TPT Forests	<p>Supports Scenario 1 with modifications.</p> <p>Requests that in approx. 10 years, a similar reassessment is undertaken. Provide clear definition of the difference between a "non-occupational" and an "occupational" bystander.</p>
	101793 C3 Ltd	Scenario 1 supported with modifications.
	101795 Port of Napier	<p>Supports scenario 1 subject to modification of TEL proposals.</p> <p>Reason: Curtailing the use of methyl bromide without an acceptable alternative would have severe effects on the forestry industry and the NZ economy.</p>
	101796 NZ Institute of Forestry	Supports preliminary recommendation.
	101804 Genera Ltd	Supports acceptance of scenario 1 with modifications to controls. Considers 10 year period referred to be unnecessarily restrictive.
	101805 Brustics Ltd	Supports scenario 1 – opposes the 25m buffer zone for containers.
	101806 CentrePort Ltd	<p>If use continues, buffer zones</p> <ul style="list-style-type: none"> • for venting of ships holds should be no more than 50m; • for venting containers should be no more than 20m; <p>Monitoring not required for smaller fumigations.</p>
	101807 Rentokil PC	Accepts Scenario 1 with modifications.
	101808 Forest Owners Assn	Supports scenario 1 – with ongoing use with recapture after 10 years and some changes to buffer zones and monitoring requirements.
	101809 Northland Regional Council	Supports scenario 1
	101810 Fonterra Kauri Ltd	Supports continued use until acceptable alternatives are available.
	101812 BioVapor Ltd	Heat treatment to be given equal consideration as an equivalent alternative to methyl bromide.
	101815 Ecolab Ltd	Supports scenario 1 with modifications to controls.

	101818 Melanie Miller & Tom Batchelor	Submit that ERMA, or other relevant body, should identify clearly which alternatives can be use at present for each specific use of methyl bromide, followed by annual reviews. All uses of methyl bromide for which alternatives are viable and can be used should be de-registered (not permitted).
	1018888 NZ Comb Honey Producers	Methyl bromide is required to protect comb honey from wax moth.
Support for scenario 1 with recapture	101771 Grant & Shona Currie	Use of methyl bromide should be banned or a foolproof recapture facility should be built at Shakespeare Bay, Picton.
	101778 National Air Quality Working Group	If the continued use (and increasing use) of methyl bromide for the next 10 years is allowed with no requirements on capturing emissions and with the buffer distances proposed, there is a risk of adverse health effects occurring as well as the contribution to depletion of the ozone-layer.
	101780 Israel Chemicals Ltd	Supports the introduction of emission control technologies as per a timetable that allows for a cost-effective evaluation.
	101781 Nelson Marlborough DHB;	Supports the introduction recapture technology
	101765 Federated Farmers of NZ	Supports scenario 1 with the modifications recommended in the Forest Owners Association submission
	101797 Nordiko	Supports continued use with mandatory recapture for all fumigations.
	101798 Friends of the Earth	Supports continued use with the use of a stenching agent and recapture.
	101799 Guardians of the Sounds	The Guardians consider that every region that has an export port and is fumigating logs must have a robust air plan that demands recapture, filtering recycling or destruction of fumigant.
	101800 Takutai Beech	Methyl bromide should not be used unless it is recaptured and either recycled or destroyed.
	101801 Andrew Pettit	If continued use is adopted a suitable catchment structure must be a mandatory requirement to recapture or neutralize the gas.
	101802 Sustainability Council of NZ	Recapture of methyl bromide should be compulsory for forest product exports.
	101803 Soil & Health Association of NZ	Submits that methyl bromide must be urgently phased out. During transition to alternatives recapture conditions of consent should be implemented.
	101892 Colin Lowe	The best safety outcome for port workers would be to adopt recapture technology. The filter material must also be processed to render the methyl bromide harmless by a centrally located industrial facility.
General support for Scenario 2	101754 Environment BOP	Allow use of methyl bromide for another 5 years; or 10 years with recapture
	101757 Noeline Gannaway	Fumigation using methyl bromide to take place only at controlled port facilities and to be phased out within 5 years. Reason: Besides being a potent ozone-depleting gas, methyl bromide is also a neurotoxin. The medical evidence points to a link between methyl bromide and motor neurone disease that is not yet understood.
	101763 Anna Chinn	Adopt scenario 2 to speedup transition away from QPS use. Reason: ozone depleting gases such as methyl bromide should not be used even in a QPS context.
	101761 Green Party of NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	Phase out all use of methyl bromide within 5 years All fumigations to take place at controlled facilities located at ports, no fumigations in residential areas

	101770 Catherine de Monchy	The use of methyl bromide should be phased out as soon as possible and definitely within 5 years. Reasons: There is no safe level of exposure. Controls are not always “in place”.
	101772 Susan Washington	Supports the immediate halt of agricultural use and a 5 year phase out of all use. Reasons: <ul style="list-style-type: none"> prohibited under the Montreal Protocol clearly not necessary contributes to depletion of ozone layer
	101817 Lyttleton Port of Christchurch	Supports scenario 2- phase out of methyl bromide over 5 years
	101875 Te Rangihouhiri Marae	If methyl bromide is not banned immediately, then its use should be restricted with a 5 year phase out.
General support for Scenario 3	101766 Sue Lindsay	The continued use of methyl bromide is unacceptable. Reasons: has caused motor neurone disease. The 2009 Environment Court decision should be respected by ERMA. Montreal protocol should be enforced.
	101774 New Zealand Council of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	Recommends an immediate ban of all use of methyl bromide. Reasons: <ul style="list-style-type: none"> scientific uncertainty regarding the effects on human health Banned under the Montreal Protocol ERMA’s assessment gave too much weight to the financial implications of stopping use of methyl bromide and inadequate weight to the environmental and human health effects of the gas. The Agency avoided an assessment of human and environmental effects of ozone depletion despite its obligation to take account of international obligations.
	101779 Pesticide Action Network	Seeks an immediate halt to all use of methyl bromide, including in strawberry beds, and for fumigation, with disposal of existing stocks within 1 year. Reasons: <ul style="list-style-type: none"> International responsibilities; There are safer alternatives; Unacceptable risk to human health; Unacceptable risk to the environment; ERMA’s duty – to protect the environment and the health and safety of people and communities.
	101785 Kaipupu Point Mainland Island Society	Completely ban the use of methyl bromide for the use of fumigating logs at the Waimahara Wharf facility. The substance is so dangerous that its use must be prohibited. Creating a wildlife reserve adjacent to the fumigation site – concerned for the health of people.
	101813 WWF- New Zealand	Supports a rapid phase-out of the use of methyl bromide over 12-18 month period, during which time tighter controls should be implemented on its use as a fumigant.
	101814 Royal Forest & Bird (Nelson)	Supports Scenario 3 – the adoption of an immediate ban.
	101811Te Rūnanga o Te Rarawa	Supports recommendations to revoke the use of methyl bromide.
	101875 Te Rangihouhiri Marae	Not to accept the continued use of methyl bromide and to search for an alternative to be used.
	101629 Ngati Kahu	The existing approvals should be revoked.
	101756 Brent Barrett	On grounds of adverse impacts on human health and the environment, and on our international reputation it is requested that the authority decline the re-certification of methyl bromide for QPS and CUE and also ban every other use. Recommend to follow EU
International Considerations (refer to Section 4 of the Update Paper)		
International trends	101774 New Zealand Council	Continued use of methyl bromide is effectively an increase in its use. This is flying in the face of international trends. New Zealand should follow the EU lead and ban

	of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union; 101803 Soil & Health Association of NZ; 101814 Royal Forest & Bird (Nelson)	the use of methyl bromide.
	101787 Hort NZ	The level of protection established by the EU is lower than that established in New Zealand. Detection of pests not listed in EU regulations usually does not result in treatment or rejection, so the change has had a lower impact than would a similar policy change in NZ.
	101813 WWF-NZ	The EU ban shows that there is no technical or financial impediment to implementing this policy.
	101818 Melanie Miller & Tom Batchelor	Global consumption of methyl bromide for QPS uses has fallen over recent years.
Montreal Protocol	101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	Any use at all contributes to the destruction of the ozone layer. Use in strawberry beds is prohibited under the Montreal Protocol, is clearly not necessary, and is simply adding to ozone destruction.
	101757 Noeline Gannaway	ERMA has disregarded the Montreal Protocol.
	101779 Pesticide Action Network	ERMA's proposals are in breach of its obligations under the Montreal Protocol, are contrary to international trends and risks significantly undermining New Zealand's reputation. 4 of the 5 major importers of logs do not require them to be methyl bromide fumigated.
	101781 Nelson Marlborough DHB	The submitter believes that the effect on the ozone layer should not be considered insignificant and given the purpose of the Ozone Layer Protection Act, the submitter supports actions that will lead to decreased release of methyl bromide into the atmosphere. Recommends the use of recapture technology and the signalling of an end point (5 years) for phasing out the release of methyl bromide into the atmosphere. Full consideration needs to be given to the indirect health effects resulting from damage that methyl bromide does to the ozone layer.
	101783 MAF	MAF suggests that the adverse effect of QPS methyl bromide use upon the ozone layer is not as significant as previously reported. Reports indicate QPS emissions account for 1% of ozone change in 2007. Even if complete phase out in 2015 of QPS methyl bromide use, due to the short life of methyl bromide in the atmosphere, the time for the ozone layer to recover to 1980 levels would remain the same - there would be no lessening of the time due to methyl bromide not being used. MAF agrees that New Zealand is operating in a manner consistent with the Montreal Protocol. The Montreal Protocol does not require the phase-out or the minimisation of use or emissions of QPS methyl bromide. It urges parties to consider minimising these things only.
	101813 WWF- NZ	NZ should honour the spirit of the Montreal Protocol in stopping the use of methyl bromide.

The Agency's risk assessment (refer to Section 6 of the Update Paper)		
The Agency's risk assessment	101774 New Zealand Council of Trade Unions;	ERMA's assessment gave too much weight to the financial implications of stopping use of methyl bromide and inadequate weight to the environmental and human health effects of the gas.
	101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	The Agency avoided an assessment of human and environmental effects of ozone depletion despite its obligation to take account of international obligations
		Concerned about the disproportionate consultation by the Agency with financially interested stakeholders. These financial interests are likely to override the interests outlined in the purpose of the Act.
	101818 Melanie Miller & Tom Batchelor	The Agency's assessment of risks to human health and the environment is incomplete. The economic assessment is also incomplete.
Legal Framework	101774 New Zealand Council of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	There is significant scientific and technical uncertainty relating to the adverse effects of methyl bromide. 4 of the 5 characteristics in clause 31 of the Methodology are present: <ul style="list-style-type: none"> • Exposure is involuntary • Risk will persist over time • Potential adverse effects are irreversible and risk is not known or understood by the public • There is little experience or understanding of possible measures for managing effects
	101779 Pesticide Action Network	It is unacceptable that ERMA's decision is driven by economic concerns to the extent that risks to the environment, human health and international obligations are minimised and misrepresented in the assessment.
	101781 Nelson Marlborough DHB	The Authority needs to adopt a more precautionary approach.
	101783 MAF	MAF acknowledges that ERMA is required to take a precautionary approach in the face of uncertainty. MAF also notes that the risk to health, if current controls are adhered to, to non-occupational bystanders is assessed as negligible. MAF considers this indicates little uncertainty for this situation and therefore limited need for introduction of buffer zones and monitoring to address this risk.
	101803 Soil & Health Association of NZ	Agrees with NZCTU that the Agency gave too much weight to the financial implications of stopping the use of methyl bromide and inadequate weight to other criteria of the Act.
Human health assessment (refer to Section 7 of the Update Paper)		
Human health effects	101818 Melanie Miller & Tom Batchelor	Information provided on: <ul style="list-style-type: none"> • Toxicity • Non-lethal poisonings; • Fatal incidents; • Human poisoning; • Dermal exposure; • Reproductive toxicity; • Prostate cancer and other cancers; • Skin corrosion; • Neurotoxicity and motor neurone disease; • Toxicity to cardiac system; • Residues
	101799 Guardians of the Sounds	Looking at studies done in the USA on men involved in fumigations over a 5 yr period showed they have a much higher than average incidence of throat, lung heart and respiratory problems, rashes and a much higher incidence of prostate cancer and neurological illness.
Motor neurone disease (MND)	101638 Ministry of Health	Studies have not demonstrated any evidence of a scientific basis to link methyl bromide use with adverse health events. These studies included a Cluster Investigation into MND published in May 2005
	101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux;	anecdotal evidence that it is implicated in various diseases such as motor neurone disease; therefore a precautionary approach must be implemented and people's exposure to the fumigant avoided to the greatest extent possible

	101755 Nigel Bartlett; 101759 Green Party NE Province	
	101757 Noeline Gannaway	While an official 2005 investigation found no links, in the medical literature, between methyl bromide and motor neurone disease, ample evidence points to a link, not yet understood.
	101779 Pesticide Action Network	There is uncertainty about whether methyl bromide is a causative factor in motor neurone disease. However, such causation is scientifically plausible. ERMA has failed to adequately assess the possibility of motor neurone disease resulting from exposure to methyl bromide and failed to properly apply a precautionary approach to the scientific uncertainty.
	101766 Sue Lindsay	The continued use of this product is totally unacceptable, on all counts, and I strongly oppose your current proposal to continue its use. This is based on MND and methyl bromide exposure. Submitter would like ERMA to at least follow the advice of the Environment Court Decision if not a total ban of the substance
Risks to operators	101638 Ministry of Health	Only one recorded workplace incident involving methyl bromide. No human health consequences were reported.
	101774 New Zealand Council of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	The health risk to operators is potentially significant and is understated by the Agency. Reasons: <ul style="list-style-type: none"> • PPE may not be adequate to minimise risk to operators • Toxicological mechanism by which methyl bromide affects the nervous system is unknown. However, research suggests that it is people with a certain genetic predisposition that may develop the disease after exposure
Risks to public health	101638 Ministry of Health	The ERMA assessment says: <i>“given the lack of direct benefits to human health, the adverse effects outweigh the positive effects”</i> MoH strongly refutes this view and believes there is ample evidence that methyl bromide is an essential tool in the Ministry’s strategy to exclude organisms of public health significance from NZ. Arthropods and, in particular, certain species of mosquitoes are competent vectors of viruses and parasites that have a significant impact on human health. Tyres pose the greatest risk in terms of providing a pathway for the introduction of exotic mosquitoes into NZ. Methyl bromide fumigation has been mandated by New Zealand for all consignments of used tyre imports
	101760 Paul Elwell-Sutton	Use of methyl bromide into the atmosphere will result in an increased health burden on New Zealand Society and consequently the New Zealand health and tax systems. Recommend phasing out of all uses by 2011.
	101774 New Zealand Council of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	The ozone depleting effects of methyl bromide on human health are not adequately evaluated by the Agency.
	101777 Darryl Marriner	The people working in the adjacent environment to methyl bromide fumigation need better protection.
	101779 Pesticide Action Network	ERMA has failed to consider the adverse effects on human health of ozone destruction.
	101781 Nelson Marlborough DHB	It is not apparent that the Agency has fully considered the health effects resulting from damage that methyl bromide does to the ozone layer.
	101783 MAF	MAF agrees that overall risk to non-occupational bystanders during methyl bromide use may be described as negligible.

		MAF submits that many pests eradicated from imported goods are of significant risk to human health and there are significant health benefits.
	101791 Pest Management Assn	Agrees that overall risk to non-occupational bystanders is negligible.
	101792 TPT Forests	Supports the requirement to provide assurances via monitoring and buffer zones that the risks of exposure based on TEL measures can be managed safely.
	101793 C3 Ltd	Education of the public and parties working in close proximity to the fumigators.
	101875 Te Rangihouhiri Marae	Unforeseen winds could be potentially life threatening due to inhalation
	101799 Guardians of the Sounds	Looking at studies done in the USA on men involved in fumigations over a 5 yr period showed they have a much higher than average incidence of throat, lung heart and respiratory problems, rashes and a much higher incidence of prostate cancer and neurological illness.
	101800 Takutai Beech	Recent research by Dr Ian Shaw should promote precautionary principle and ensure that every district or Regional Council around NZ has a robust Air Plan.
	101892 Colin Lowe	The best practice for disposal employed to minimise potential harm to workers and the public.
	101770 Catherine de Monchy	Current controls do not ensure safety for workers or bystanders and the Agency's proposed controls don't indicate any likely improvement.
Environmental assessment (refer to Section 8 of the Update Paper)		
Risks to the environment	101774 New Zealand Council of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	The Agency has ignored the impact on plants and terrestrial and aquatic organisms of a reduced ozone layer.
	101781 Nelson Marlborough DHB	The submitter believes that the effect on the ozone layer should not be considered insignificant and given the purpose of the Ozone Layer Protection Act, the submitter supports actions that will lead to decreased release of methyl bromide into the atmosphere. Recommends the use of recapture technology and the signalling of an end point (5 years) for phasing out the release of methyl bromide into the atmosphere.
	101779 Pesticide Action Network	ERMA has failed to consider the adverse effects on the environment of ozone destruction.
	101783 MAF	Risks to the ozone layer are not as significant as reported – depletion of the ozone layer is outside the mandate of the HSNO Act
	101814 Forest & Bird	Risks to the environment are significant
	101803 Soil & Health Association of NZ	Agrees with the NZCTU that the agency has ignored the impact on the environment of a reduced ozone layer.
	101875 Te Rangihouhiri Marae	The irreversible ozone damage from the continued use of methyl bromide is unacceptable
	101796 NZ Institute of Forestry	Absence of effective alternatives – strong environmental justification for the continued insistence that a range of imports to NZ are treated with methyl bromide for QPS purposes.
	101892 Colin Lowe	Adopt best practice for disposal so that environmental damage is minimised. Use an industrial process to destroy methyl bromide in saturated filter material to minimise environmental damage such as ozone depletion.
	Benefits to the environment	101796 NZ Institute of

	Forestry	
Natural v anthropogenic methyl bromide sources	101011 Carter Holt Harvey	A brief analysis of the comparative discharges of methyl bromide to the atmosphere from natural and anthropogenic sources required
Māori Assessment (refer to Section 9 of the Update Paper)		
Māori Perspectives	101011 Carter Holt Harvey	Iwi/ Māori have an interest in the undisturbed possession of land and forests. Treaty partners should make reasonable efforts to avoid or mitigate risk of phytosanitary incursions causing damage to lands and forests. Effective border security utilizing methyl bromide or similarly efficacious fumigants is part of that responsibility. A failure to protect iwi/Māori interests in forestry through adequate border/phytosanitary protection and a consequential financially significant liability under the Emissions Trading Scheme could give rise to a claim of a breach of the Crown's responsibility to Iwi/ Māori. Iwi/ Māori have significant interests in the exotic forest industry. Iwi/Maori will have an interest in maintaining and expanding NZ's domestic and export oriented wood processing capacity in order to derive economic benefit.
	101783 MAF	MAF commented: <ul style="list-style-type: none"> Maori interests in forest land are increasing. Methyl bromide will become an increasingly useful tool to iwi/ Māori; There is a need to protect the traditional uses of indigenous plants; There should be better communication between users of methyl bromide and iwi/ Māori – particularly face to face meetings.
	101811Te Rūnanga o Te Rarawa	Risks to Maori from continued use of methyl bromide are potentially significant rather than negligible.
	101875 Te Rangihouhiri Marae	Would like to support Ngati Kuku in their opposition to the use of methyl bromide. Although a Settlements Process is currently in progress, Te Rangihouhiri does not see the short term economic benefits of methyl bromide to outweigh the long term environmental and cultural benefits for future generations. Whareroa Kohanga Reo and Kaumatua flats are to be advised of when spraying and lifting of tarpaulins occur. Spray drift should be monitored around Whareroa.
	101816 Joseph Stafford	A report around the socio-economic impacts of Maori surrounding the possible prohibition of methyl bromide in New Zealand.
Market Economy (refer to Section 10 of the Update Paper)		
Benefits to the Market Economy	101783 MAF	New Zealand's economic and social prosperity to a great extent depends on its international trade and access to key agricultural and forestry export markets. Agricultural and forestry exports constituted 57.7% (#42.8 billion) of total \$43 billion of New Zealand merchandise exported in 2008/09. MAF notes the length of time it takes to get countries to accept alternatives – there has been four years work to date with India over phosphine MAF agrees that the economic benefits of the continued use of QPS methyl bromide until technical and economically viable alternatives are available are significant to New Zealand's economy. Many countries officially require mandatory fumigation prior to export – trade cannot occur without a treatment that is officially recognised by the importing country. MAF notes that between 72-80% of New Zealand's total methyl bromide use is for fumigation of export forestry products. The volume of methyl bromide used is directly linked to trade volumes and overseas regulations.
	101011 Carter Holt Harvey	Highlights the prevention of environmental harm from biosecurity incursions. Clearly supports continued availability of methyl bromide for the foreseeable future
	101638 Ministry of Health	Methyl bromide important in managing risks of exotic organisms of public health significance. Required to manage biosecurity risks
	101787 Hort NZ	Methyl bromide is an important biosecurity tool to prevent pest incursions. In relation to the treatment of imports it is an important risk management option. For many consignments the options would be reshipment or destruction as there is no available treatment that is equally fast or efficacious, particularly for fresh produce imports.

	101818 Melanie Miller & Tom Batchelor	The Agency's economic assessment is also incomplete.
	101635 Greater Wellington Regional Council (Leonard);	Any action to inhibit the present controlled use of methyl bromide would place at risk the high percentage of logs from GWRC's forests.
	100088 STIMBR; 101006 Westco Lagan Ltd; 100499 CHHPulp & Paper; 100321 Red Stag Timber; 100163 Wood Processors Assn; 101636 WPI Timber; 101791 Pest Management Assn; 101837 Kiwi Lumber	A ban or phase-out over 5 years fails to recognise the magnitude of the task of developing alternatives and having them accepted by trading partners. The economic and ecological consequences of not having access to methyl bromide for the next 10 years are unacceptable. Need for urgency in seeking alternative strategies is critical (100163) Without methyl bromide and in absence of commercially viable alternatives there is a substantial risk to the New Zealand economy (101791).
	101750 Motueka Lumber	The continued ability to efficiently meet Australian import requirements is essential to business viability.
	101786 NZ Fresh Produce Importers Assn	NZ FPIA considers that if methyl bromide use was prohibited, the adverse effects on the New Zealand market economy would exceed the benefits because of the potential for damaging pests to be introduced into New Zealand and the negative impact on trade.
	101784 Zindia	Zindia considers a ban or phase out of methyl bromide so pivotal to import border protection and maintenance of export trade routes would be environmentally, socially and economically irresponsible.
	101788 Rayonier New Zealand Ltd	Export is and will continue to be an essential and significant component of New Zealand's forestry business.
Society and Community (refer to Section 11 of the Update Paper)		
Risks to Society and Community	101774 New Zealand Council of Trade Unions; 101775 Maritime Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	While community concerns are 'specific local communities', those are the communities where fumigation occurs and the fact that there is widespread community concerns in those particular communities is significant.
	101769 Paula Allen	Cut out local anxiety; take proper precautions when fumigating wood.
	101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	All fumigations to take place at controlled facilities located at ports, no fumigations in residential areas. All imported containers that have been fumigated to be vented at port facilities, no venting in residential areas.
Alternatives (refer to Section 12 of the Update Paper)		
Alternatives	100088 STIMBR; 101006 Westco Lagan Ltd;	Urgency required. Significant commitment needs to be made to the biological and ecological research needed to underpin alternative fumigants and methods

100499 CHH Pulp & Paper; 100321 Red Stag Timber; 100163 Wood Processors Assn; 101636 WPI Timber; 101791 Pest Management Assn; 101807 Rentokil PC; 101815 Ecolab Ltd; 101837 Kiwi Lumber	Methyl bromide should continue to be available for QPS treatments until there are efficacious, approved and commercially viable alternatives (101791).
101001 Scion	Working with STIMBR to research alternative fumigants and treatments A short-term alternative unlikely to be available in less than 5 years. Producing efficacy data to satisfy trading partners is a lengthy process ERMA should actively support research into non-chemical approaches.
100089 ARPHS	Heat treatment methods are well proven, clean and effective
101011 Carter Holt Harvey	Unaware of any alternative phytosanitary control/fumigation method demonstrating similar or better efficacy. Loss of methyl bromide without identification of an alternative and similarly effective method of fumigation would have significant negative consequences to the forestry and wood products industry in New Zealand. Carter Holt Harvey's exports of wood products exceed \$190 m per annum
101629 Ngati Kahu	More money should be spent on research into alternatives. This research should be given "Top Priority". Research costs should be borne by the users.
101631 NZ Nurses Organisation	Investment into research for alternatives such as methyl iodide and physical treatments such as heat treatment
101632 Pamela Simpson	ERMA needs to encourage ongoing research into alternative methods of fumigation
101764 Agricultural Fumigations Ltd	Alternative treatments are very expensive to establish with regulations worldwide. There is a danger that might use products that are worse environmentally and to human health.
101635 Greater Wellington Regional Council (Leonard)	GWRC fully supports research
101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	Alternative needed to reduce use of ozone depleting substances (Montreal Protocol). Should be immediate ban for agricultural use and 5 year phase out of other uses
101754 Environment BOP	Fully supports research into alternatives. Recognises need for this for successful implementation of the phase out timetable
101763 Anna Chinn	Notes urgency is needed on finding safe alternatives
101762 Te Rūnanga o Ngāi Tahu	Strongly recommends further research into alternative methods of treatment (chemical and physical) and potential recovery and recycling methodologies with a view to begin phasing out the ongoing use of methyl bromide within the next 5 years.
101774 New Zealand Council of Trade Unions; 101775 Maritime	There are much safer alternatives to methyl bromide. Heat treatment – MAF recognises that heat treatment for some items is comparable to methyl bromide and is used at Auckland Port where heat treatment of infested cars has replaced fumigation.

	Union; 101776 EPMU; 101782 Rail and Maritime Transport Union	MAF has advised that “heat treatment of export logs is not likely to be viable due to size and volume”. However, financial viability considerations are not the only criteria in assessing the continued use of methyl bromide.
		5 major importers of whole logs – China, Japan, Malaysia and Korea will officially accept logs fumigated with phosphine.
		New Zealand appears to be fumigating logs with methyl bromide where it is not an official requirement of the importing country.
		Phosphine could be used if logs transported in ship’s holds only and fumigate logs on the port with phosphine before shipping.
	101779 Pesticide Action Network	Safer alternatives include heat and cold treatment and debarking.
	101783 MAF	MAF submits that insects are building up resistance to phosphine. MAF has recently increased the time required for fumigation with phosphine by several days.
		MAF submits that it is unknown how many years it will take before acceptance of alternative treatments for all trading partners.
		MAF submits that no time period can be set for replacing methyl bromide with an economically viable, technically and operationally alternative acceptable for a wide range of pests and commodities required for QPS purposes. Obtaining agreement with an overseas trading partner to replace a methyl bromide treatment usually takes many years of negotiation.
	101784 Zindia	No reliable or economically feasible alternatives have been identified.
	101787 Hort NZ	It is unlikely that alternatives will become available for fresh produce. The maintenance of current approvals for methyl bromide for the longer term is needed to ensure that NZ export markets access is not compromised as compared to the situation in competitor countries.
	101790 Greater Wellington Regional Council (Denton)	No solution has been found for “above deck” cargo. Further research supported.
	101803 Soil & Health Association of NZ	Consider that some of the options are also very toxic and should also be subject to recapture conditions.
	101804 Genera Ltd	Not appropriate to monitor until methyl bromide is not detectable as this will vary dependent on the method of detection.
	101812 BioVapor Ltd	Heat treatment is an internationally recognised and proven alternative to methyl bromide fumigation and a commercial heat treatment system has been in operation on the Port of Auckland for over 2 years successfully treating imported vehicles, machinery, timber to ISPM-15 and contaminated empty shipping containers.
	101814 Royal Forest & Bird (Nelson)	Phosphine is a viable alternative
101818 Melanie Miller & Tom Batchelor	Technically feasible alternatives exist for a large percentage of QPS uses. Details given.	
101631 NZ Nurses Organisation	Imports be subject to offshore Sea Container Hygiene programmes such as the ones initiated in partnership with the Solomon Islands, Papua New Guinea and Samoa	
101799 Guardians of the Sounds	The Guardians submit that it is possible to fumigate at the port of arrival	
101783 MAF	MAF agrees that a HSNO control requiring ventilation of ship holds offshore is not warranted.	
101796 NZ Institute of Forestry	Supports further research on alternatives.	
Emission Control (Recapture) (refer to Section 13 of the Update Paper)		
Emission Control Systems (Recapture)	101134 Value Recovery	Emissions control – the instantaneous chemical destruction of methyl bromide at the point of use (replaces the term “recapture”). Systems already approved in California (grape fumigations) and emission controls

		should be considered seriously.
	100089 ARPHS	Enclose in a pit structure that would enable product to be moved, fumigated and moved out again for ventilation without losing all fumigant in the process
	101631 NZ Nurses Organisation	Mandatory recapture
	101632 Pamela Simpson	Set deadline by which all users must recapture the fumigant; e.g. within 3 years
	101637 Graham Elwell	Put through a condenser and re-use gas
	101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	All fumigations to be subject to recapture/reuse, within 1 year
	101754 Environment BOP	Supports further investigation into the use of recapture for logs under tarpaulins. Notes that activated charcoal treatment possibly transfers the issue to another environmental issue
	101768 Port Marlborough NZ Ltd	Capture of small scale fumigations is viable and in New Zealand 20% of current fumigations could potentially use this technology increasing costs by 5-25% dependant on the size of the fumigation. Port Nelson is not a valid comparison as the greater the volume of methyl bromide involved the greater the costs involved. Capture for fumigations involving less than 30kg of methyl bromide may be viable. Without any regulatory requirement there is little incentive for capture to be used.
	101771 Grant & Shona Currie	Use of methyl bromide should be banned or a foolproof recapture facility should be built at Shakespeare Bay, Picton. Reasons: <ul style="list-style-type: none"> • Picton is in an enclosed valley situation – at times with an inversion layer. • Shakespeare Bay is too close to Picton for this high risk operation. • Picton doctors are concerned about the situation. • In May 2009 covers blew off the stacks releasing gas and causing a re-gas the next day. • No public notification is given. • October 2009 – tarpaulin covers over deck cargo shredded. • Fumigator appears to have little regard for the conditions. • Using substandard tarpaulins • No hazard notices that can be seen from seaward entrance to the bay. • Gas only monitored at the perimeter fence line. • Professor Shaw has demonstrated a reaction between methyl bromide with a protective chemical found in human cells.
	101778 National Air Quality Working Group	It is appreciated that capture is not currently practicable for larger outdoor log fumigations or ship fumigations, but where it is technologically feasible it should be used.
	101781 Nelson Marlborough DHB	Recapture technology should be introduced where practical (as a minimum for all container fumigations). Where recapture is not used restrictions on the number of fumigation could be imposed to ensure that the chronic TEL is not exceeded. An end date (5 years) for methyl bromide discharges to the atmosphere should be signalled. Technology available for containers and is used on sawn timber in enclosed sheds in Nelson.
	101783 MAF	MAF agrees that further research is needed before recapture of methyl bromide can be considered as a mandatory requirement in New Zealand. <ul style="list-style-type: none"> • Recapture has doubled the cost of fumigating timber at Nelson; • There is no unit available to recover the residual gases of several thousand tonne log fumigations; • The time, volume of carbon that needs regeneration or disposal will be considerable and costly.

	101784 Zindia	Zindia submits that prior to any consideration of recapture technology – the achievable outcomes, operational issues, cost effectiveness and cost/benefit analysis is thoroughly researched.
	101790 Greater Wellington Regional Council (Denton)	GWRC supports any investigation by the Agency into methyl bromide recapture. It is noted that the practice at Port Nelson is mandatory recapture for fumigation of less than 3 kgs.
	101792 TPT Forests	Further analysis is required for larger scale operational fumigations.
	101797 Nordiko	Nordiko recommends the mandating of recapture of methyl bromide for all fumigations.
	101798 Friends of the earth	Supports the mandating of recapture for all fumigations.
	101801 Andrew Pettit	Supports the mandating of recapture for all fumigations.
	101802 Sustainability Council of NZ	A cost-benefit analysis of recapture should be reviewed. Recapture should be compulsory. The Council proposes a mechanism that would incentivise reductions in net emissions. The following control should be applied (In association with the Ministry for Economic Development) “Import licences be granted only to those companies that either use recovery technology themselves with respect to treatment of forest products for export, or else warrant that they will only onsell to fumigators making use of it”
	101804 Genera Ltd	Buffer zones and monitoring not required where capture technology is used.
	101809 Northland Regional Council	Supports investigation into technologies for the capture and destruction of methyl bromide from tarpaulin-based operations.
	101817 Lyttleton Port of Christchurch	Supports recapturing of methyl bromide being a required as a condition of use.
	101751 Nelson City Council	Capture is a good immediately implementable technology to reduce methyl bromide discharges to air while alternative fumigants are worked on. Require mandatory capture and destruction where it is practicable to do so (all container fumigations and for fumigations where less than 300 kg of methyl bromide is used).
	101757 Noeline Gannaway	All fumigation facilities to implement recapture and reuse of methyl bromide, within one year.
	101793 C3 Ltd	Appreciates barriers faced with larger fumigations and recapture. Supports recommendations that issues around recapture are further investigated.
	101892 Colin Lowe	Adoption of recapture technology
Buffer zones/Monitoring (refer to Sections 14 and 15 of the Update Paper)		
Buffer Zones	101632 Pamela Simpson	Increase minimum distances between fumigation sites and unprotected workers or members of the public
	100089 ARPHS	Control access and patrol areas, outdoors and indoors, adjacent to the facility
	101754 Environment BOP	Supports adopting minimum buffer zones however consider these should be urgently reviewed if at any time the TELs for non-occupational bystanders are exceeded. Also recommend minimum buffer zone is in place in all directions to consider changes in wind direction etc.
	101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	At least a 100m buffer zone between fumigation and ‘non-occupational bystanders, i.e. residents and passers-by. 25m buffer zone for non-occupational bystanders is far too small. Reason: methyl bromide is highly neurotoxic gas. Has other significant acute effects. Anecdotal evidence that is implicated in diseases such as motor neurone disease.
	101767 Northport Ltd;	Need to clarify differences between “non-occupational” and “occupational bystanders”

		Reasoning behind 100m, 50m and 25m buffer zones – under what conditions do they apply?
		Proposed zones are excessive and unworkable in some conditions – it should be possible to reduce these with controlled release programme for ventilation.
		Support requirement for buffer zones if there is potential for “non-occupational” bystanders to be present (101792).
		Fumigation contractor should be responsible for identifying the buffer zone during fumigation and venting operations
		Clarify reasoning behind “ship’s hold” buffer zone
		On-water buffer zones are impracticable and unworkable. Buffer zones should not include areas to seaward of vessels.
	101792 TPT Forests;	Need to clarify differences between “non-occupational” and “occupational bystanders”
		Supports recommended buffer zone distances outlined by Genera – these have taken into account controlled release management.
		TPT Forests support the requirement for buffer zones and supports buffer zones if there is potential of “non-occupational” bystanders being present.
		TPT Forests disagrees with the proposed distances being based on the levels of use rather than the level of methyl bromide released over time.
		TPT Forests requests that the Agency provides a clear description regarding the reason for having a buffer zone for “non-occupational” bystanders (for example a zone to ensure management of a “non-controlled are” i.e. outside of port boundaries where there is public access and risk of exposure) and also clearly outlines that the buffer zones have been recommended with respect to the dual TEL measure.
	101770 Catherine de Monchy	The Agency suggests that buffer zones should only apply if there are potential non-occupational bystanders in the downwind direction. Winds in coastal areas are gusty and changeable. Minimum buffer zones should apply at all times.
	101773 Port of Tauranga Ltd	It is the responsibility of the fumigation contractor to clearly identify the buffer zone during fumigation and venting operations. Buffer zones should not include areas seaward of vessels Operational areas in ports are under pressure. Ports should not be required to assign buffer zones which are in excess of those deemed to be actually required.
	101778 National Air Quality Working Group	The reliance on monitoring results to estimate methyl bromide levels is opposed. Dispersion modelling is a better method to estimate public exposure and hence to estimate buffer zones. The proposed buffer zone distances are opposed. As they rely on monitoring data, they are likely to underestimate the methyl bromide levels the public could be exposed to. The buffer zones must be enforceable – and this could prove too difficult to manage in a port that is already short of space. Access on the seaward side of a ship would be extremely difficult to control. The proposal for the buffer zones to only apply downwind of fumigation is opposed. Reason: • Weather conditions changeable
	101781 Nelson Marlborough DHB	Recommends the use of site specific buffer zones as a control to prevent bystanders being exposed to levels of methyl bromide that exceed the acute TELs. Proposed buffer zones inadequate. Zones will vary not only with the amount of methyl bromide used but also with the location of the fumigation site, surrounding buildings, topography and variation in weather conditions. Recommends the use of buffer zones based on scientific assessment of the specific site. This was the approach accepted by the Environment Court for the NCC Air Quality Plan.
	101783 MAF	Buffer zones of 25m as proposed by the Agency for container fumigations would be difficult or impossible to achieve at many facilities. The distances for buffer zones should be reviewed with more data required. MAF submits that, if the proposed buffer zones are adopted, commercial operations will be adversely affected. 60% of transitional facilities cannot comply with a 25m buffer zone. 2% cannot comply with a 10m buffer zone.

		<p>At 89% of the transitional facilities the TEL (Chronic) would never be achieved with one container per month.</p> <p>A 25m buffer zone would cause an impact on the importing community for such a low frequency event but with important implications for biosecurity. A 10m buffer zone could be accommodated by 98% of the facilities and still meet the thresholds proposed by the Agency.</p> <p>MAF submits that there may be effective mitigation methods that can be used to minimise the risk to non-occupational bystanders and may reduce the size of buffer zones – slow staged and controlled opening of doors or covers; use of flues with fans, real-time monitoring and recapture technology.</p>
	101786 NZ Fresh Produce Importers Assn	In principle accepts buffer zones. However, these should fit with business-as-usual as far as practical. They should not result in significant increases in cost.
	101787 Hort NZ	Buffer zones should be the smallest necessary for protection of human health. Fumigations of most horticultural consignments are performed in containers and small volumes of methyl bromide are used.
	101790 Greater Wellington Regional Council (Denton)	The CentrePort monitoring protocol recommends a buffer of 100 m for most situations. GWRC considers that only 2 buffer distances are required. That is 25 m buffer zones for shipping containers and for all other vessels, a 100 m buffer zone. The amount of methyl bromide that can be used in a shipping container should be stipulated.
	101791 Pest Management Assn	<p>Current risk zones and precautionary measures as per the code of practice <i>The Control and Safe Use of Fumigants</i> are sufficient to ensure safety.</p> <p>PMANZ contends that the buffer zones are excessive where effective mitigation measures are used.</p> <ul style="list-style-type: none"> • Timing of ventilation • Use of concentration monitoring instrumentation • Excluding non-occupational bystanders from risk zone. <p>Proposed buffer zones would preclude fumigation in most of the facilities currently approved.</p>
	101793 C3 Ltd	<p>Support buffer zone distances outlined by Genera.</p> <p>Define “non-occupational bystanders”</p> <p>Does not support “downwind”. Wind directions have the potential to change throughout the fumigation or venting process.</p>
	101794 Ports of Auckland	Buffer zone distance used should be recorded against all fumigations.
		<p>Shipping container buffer zone should be reduced to 10-11 m.</p> <ul style="list-style-type: none"> • Studies have indicated complete clearance of methyl bromide within 4-5 m • A 25 m zone would affect port operations negatively
	101795 Port of Napier	<p>Buffer zones:</p> <ul style="list-style-type: none"> • Ships holds (>1000kg methyl bromide used/<1000kg used): 50 m/20m; • Logs : 20m • Containers under fumigation: 5m; • Containers under venting: 20m. <p>Minimum standards proposed –</p> <ul style="list-style-type: none"> • Container fumigation; • Log stack and sip hold fumigation.
	101798 Friends of the Earth 101803 Soil and Health Association of NZ	Buffer zones should apply at all times methyl bromide is in use not just when the gas is being vented.
	101804 Genera Ltd	<p>The four categories are not adequately defined to determine the appropriate buffer.</p> <p>In some cases the buffer zones are in excess of those needed.</p> <p>It is impracticable to provide buffer zones of the size proposed at some ports.</p> <p>Propose:</p> <ul style="list-style-type: none"> • Small fumigation – downwind buffer of 10m with no monitoring; • Fumigations of groups of containers or under covers – landward downwind buffer of 25m with monitoring to STIMBR Protocol. • Ships holds – 50 m buffer from hold opening in all landward directions and monitoring to STIMBR Protocol.

		In the second supplement, Genera provides details of monitoring of the ventilation stages of fumigations of containers, enclosures under covers and log-ships respectively, supporting Genera's proposals for modified buffer distances. They include descriptions of the methods used, tabulated results, and conclusions reached.
	101805 Brustics Ltd	Opposes a mandatory 25m buffer zone for transitional facilities. <ul style="list-style-type: none"> • Risks to bystanders negligible; • Significant impact on transitional facilities.
	101806 CentrePort Ltd	Buffer zones for containers and ships holds are excessive. Ships holds – 50 m; Containers – 20 m.
	101807 Rentokil PC	Proposed levels would pose significant problems for transitional facilities. Suggest: <ul style="list-style-type: none"> • Ships holds – 50m landward; • Logs/large fumigations - >100 kg methyl bromide – 25 m; • Logs/medium fumigations - <100 kg methyl bromide – 10 m; • Containers – 10m
	101808 Forest Owners Assn	Buffer zones are not suitable. Small fumigations (<8 kg/hr) – 12 m; Logs under covers – 25 m; Ships holds (>1 tonne) – 60 m; No buffer zone on seaward side
	101809 Northland Regional Council	Buffer zones will be difficult to enforce, particularly on the seaward side. Discussions on enforcement are required with regard to the practicality of controls and possible enforcement instruments such as prohibited areas being declared through bylaws.
	101815 Ecolab Ltd	The current risk zones as per the code of practice, "The Controls and Safe Use of Fumigants" are sufficient to ensure safety.
	101817 Lyttleton Port of Christchurch	Buffer zones should be based on scientific criteria and stipulated as a distance per 100 kg of methyl bromide used. The proposed buffer zones would effectively prevent fumigation being able to be carried out in Lyttleton Port.
	101818 Melanie Miller & Tom Batchelor	Buffer zones need to be improved: <ul style="list-style-type: none"> • Should be applied 360°; • Should be maintained for a longer period; • Should be established for all methyl bromide fumigations.
	101751 Nelson City Council	The recommended buffer zones are grossly inadequate because ambient air monitoring tends to underestimate peak methyl bromide levels. There is a need to substantially increase the buffer zones and for these to apply in all directions not only downwind.
	101757 Noeline Gannaway	A buffer zone of at least 100m between fumigation and bystanders or residents.
Monitoring	100088 STIMBR; 101006 Westco Lagan Ltd; 100499 CHH Pulp & Paper; 100321 Red Stag Timber; 100163 Wood Processors Assn; 101636 WPI Timber; 101791 Pest Management Assn; 101807 Rentokil PC; 101815 Ecolab Ltd; 101837 Kiwi Lumber;	Supported but consideration should be given to exempting small fumigations (e.g. containers) at normal fumigation rates, and a move to sample monitoring where compliance can be demonstrated A lower limit of methyl bromide concentration should be set

100553 Port Nelson	The proposed ambient monitoring requirements will be both impractical and costly and will not provide any additional safety to non-occupational bystanders. Monitoring at source offers a more pragmatic and effective regime that protects both port workers and provides security for non-occupational bystanders. Fumigators using recapture installations should not be required to adhere to the STIMBR Protocol
100089 ARPHS	Monitoring should occur throughout the fumigation process.
101632 Pamela Simpson	Improved monitoring of fumigant concentrations in and around sites where it is used, by a company or public agency than the company carrying out the fumigation or an associated party. Regular independent audits need to be carried out, and infringements of use attract a penalty such as suspension of methyl bromide use and/or a significant fine.
101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	All fumigations to be subject to air quality monitoring. All emission monitoring data must be made available to the public through an electronic database maintained by ERMA
101754 Environment BOP	Supports production of ambient air monitoring protocol. Considers should be finalised after this reassessment and SKM's protocol may need to be amended. Evt BOP seeks clarification of the status of STIMBR's Ambient Air Monitoring Protocol – assessment refers to it inconsistently. Evt BOP would like to see an overall system for effectively managing fumigation activities as part of a mandatory site specific fumigation management plan requirement. Meteorological monitoring – recommend the inclusion of continuous site specific monitoring to at least minimum requirement of MfE Good Practice Guide for Air Quality Monitoring and data management 2009. Supports use of specialist help in selecting appropriate monitoring sites. Also questioned whether air dispersion modelling would assist? Supports requirement for air quality monitoring but would like to see a more formalised reporting regime – recommendations given in submission. SKM report – Evt BOP requests requirement for methyl bromide specific real time analyses to be included in Ambient Air Monitoring programmes. Supports combined monitoring approach where several methodologies are implemented for each fumigation event.
101767 Northport Ltd	Fully supports STIMBR proposed Ambient Air Monitoring Protocol
101768 Port Marlborough NZ Ltd	Consideration should be given to independent monitoring of the fumigation process. Objective monitoring requires knowledgeable personnel who are not involved with the fumigation.
101770 Catherine de Monchy	Monitoring must be independent and meaningful in the local context. At the Port of Tauranga, the contractor, Genera, is responsible for collecting their own data. How can a sound assessment of risk to human health be made on the basis of data provided by a company with a clear conflict of interest and a known flawed data set? The Agency's recommendation that monitoring equipment should be present in downwind locations and only if there is a possibility of bystanders. Due to the unpredictability of coastal winds and bystanders, monitoring equipment should be permanently placed around the entire perimeter of the fumigation site and data should be collected for the duration of a fumigation and ventilation event.
101773 Port of Tauranga Ltd	It is the responsibility of the fumigation contractor to monitor gas release levels around their activities.
101781 Nelson Marlborough DHB	Need to clarify the purpose of air quality monitoring and the monitoring data is to be used. Associated with this is the need to also clarify responsibilities of statutory authorities regarding compliance and enforcement where monitoring results

		<p>exceed TELs.</p> <p>Recommends the use of a range of monitoring/modelling options rather than reliance on boundary monitoring alone. This approach allows for the individual site variation.</p> <p>There should be no requirement for site boundary monitoring where recapture technology is used.</p> <p>Monitoring for methyl bromide at the site boundary has a number of scientific and compliance/enforcement limitations. Scientific limitations include sensitivity and calibration of the instruments, location and the number of monitors required, length of monitoring period, site topography and weather effects. Used in isolation as proposed, site boundary monitoring it is very much a “hit and miss” approach.</p> <p>Compliance and enforcement is problematic:</p> <ul style="list-style-type: none"> • Designation of site boundary; • Access to real time data; • Response to the breach; • Responsibility for monitoring; • Compliance and enforcement <p>Conflict with RMA which focuses on managing adverse effects on a location basis.</p> <p>Alternatives:</p> <ul style="list-style-type: none"> • No boundary monitoring where recapture is used; • Dispersion modelling; • Monitoring at source; • Restriction on the number of fumigations at a site.
	101783 MAF	MAF submits that scientifically set buffer zones negate the need to monitor each fumigation.
	101786 NZ Fresh Produce Importers Assn	In principle accepts monitoring. However, these should fit with business-as-usual as far as practical. They should not result in significant increases in cost.
	101787 Hort NZ	<p>Small consignments (containers) should be exempt from monitoring requirements on the basis that these are vented very quickly and monitoring may serve little useful purpose.</p> <p>It is not clear what the collected data is to be used for (or when), but this monitoring will add to the costs to exporters for little apparent value in terms of risk management.</p>
	101790 Greater Wellington Regional Council (Denton)	<p>CentrePort has been operating under the <i>Methyl Bromide Boundary Monitoring Protocol CentrePort Wellington</i> for monitoring concentrations of methyl bromide at Wellington ports over past two years. The protocol has provisions that better the proposed recommendations from the Agency.</p> <p>GWRC recommends the wording on downwind monitoring be changed to allow other monitoring locations to be used that are not just downwind – based on information to hand at the various ports or from modelling of plume movements.</p>
	101792 TPT Forests	<p>Supports the requirement to provide assurances via monitoring</p> <ul style="list-style-type: none"> • Sampling methodologies should be used; • Completion of sampling should be when the concentration of methyl bromide has reached acceptable levels; • Methyl bromide readings should be accurate.
	101793 C3 Ltd	<p>Should be carried out by independent parties.</p> <p>Current equipment inaccurate as measures methyl bromide and a number of other gases.</p> <p>Do not agree with ‘until no longer detectable’.</p>
	101794 Ports of Auckland	POAL supports the closer monitoring of containers undergoing fumigation.
	101804 Genera Ltd	<p>For smaller fumigations should not require buffer zones and monitoring.</p> <p>Monitoring of container fumigations would increase costs to a level that is likely to jeopardise biosecurity.</p> <p>For larger fumigations it is excessive to monitor every ventilation.</p>
	101807 Rentokil PC	Monitoring not required for shipping containers
	101808 Forest Owners Assn	<p>Monitoring in compliance with STIMBR Protocol should apply.</p> <p>Small fumigations (e.g. containers) at normal fumigation rates should be exempted</p>

		and monitored on a sample basis.
		Small fumigations (<20kg) – not required; Larger fumigations: (>20kg) <ul style="list-style-type: none"> • Monitor until concentration of methyl bromide has reached acceptable levels; • Representative sampling should be allowed.
	101809 Northland Regional Council	Supports the implementation of monitoring
	101818 Melanie Miller & Tom Batchelor	The STIMBR Monitoring Protocol needs to be improved: <ul style="list-style-type: none"> • Air quality monitoring protocols should be mandatory; • Specific protocols should be drawn up for each type of methyl bromide site/situation; • Continuous monitoring should commence before fumigation starts and continue after ventilation has ceased until detectable concentrations of methyl bromide gas have not occurred for at least 30 mins; • Monitoring should be done in all directions.
	101751 Nelson City Council	The use of ambient (boundary) monitoring for compliance should be removed
	101757 Noeline Gannaway	All fumigations to be subject to air quality monitoring
	101767 Northport	To review the monitoring requirements to reflect what is necessary and practical
Modelling See Paragraph 15.2.6 of Update Paper	100089 ARPHS	Fumigation planning should include modelling the concentrations of methyl bromide throughout the structure and the creation of emergency action plans (e.g. evacuation; increased monitoring) in the event that monitoring reveals higher gas concentrations than were calculated by modelling.
	101790 Greater Wellington Regional Council (Denton)	The CentrePort monitoring protocol has yielded useful information that could be built onto a modeling programme for methyl bromide discharges. Further work should be undertaken using existing monitoring information to establish a plume model for port authorities to use.
	101797 Nordiko	Plume modeling should be carried out to assess impact of emissions and resulting plumes.
	101799 Guardians of the Sounds	Modelling should be carried out for Picton.
	101801 Andrew Pettit	The same computer modelling that was carried out for Nelson should be done for Picton.
	100089 ARPHS	Fumigation planning should include a health risk assessment which includes a review of potential risks associated with the decision not to evacuate nearby residences and businesses and their mitigation.
	101799 Guardians of the Sounds	Every port should have a risk assessment and a Code of Practice that is site specific taking into account the topography, climate prevailing wind, cold inversion layer, proximity to other businesses or residential areas. The local council needs to have a clean air plan that addresses the issue of spray drift. The fumigations need to be subject to resource consent with strict conditions.
Notification (refer to Section 16 of the Update Paper)		
Notification	100089 ARPHS	Prior to fumigation, applicators or facility management should notify public works and emergency response employees, and individuals working or living near the facility
	101632 Pamela Simpson	Mandatory public notification of date, site and time of methyl bromide treatments is vital
		Mandatory notification of landowners within the [potential gas plume needs to be a requirement of methyl bromide use.
101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE	all fumigation facilities to be publicly notified	

	Province	
	101770 Catherine de Monchy	Each off-site fumigation should be communicated to the local community and neighbouring properties within the buffer zone should all be visited and notified of the proposed activity.
	101783 MAF	MAF is satisfied that the current notification requirements for intention to conduct methyl bromide fumigation are effective and further notification requirements are not needed.
	101793 C3 Ltd	Education of the public and parties working in close proximity to the fumigators.
	101801 Andrew Pettit	Submits that it should be mandatory that local port authority must broadcast on the 3 local radio stations the exact times that fumigation is scheduled to take place.
	101754 Environment Bay of Plenty Regional Council	Comments in j1.1.25 dismissed by Env't BOP. Recommends suitable signage and notification requirements to all properties within 150m of fumigations Overall supports the principle of the adoption of TELs. Submitter makes further comments and recommendations on both acute and chronic TELs.
Exposure Limits (refer to Section 17 of the Update Paper)		
Exposure Limits	101792 TPT Forests	WES values should be maintained at 5 ppm
	101793 C3 Ltd	Evidence does not suggest the need to drop the WES value from 5ppm to 1ppm
	101778 National Air Quality Working Group	Proposed TELs are supported. TELs are comparable with US exposure levels which are based on good science. These were the levels supported by the Environment Court and the values do not seem unreasonable when compared to other workplace toxins.
	101781 Nelson Marlborough DHB	TELs as proposed.
	101786 NZ Fresh Produce Importers Assn	In principle accepts changes to exposure limits. However, these should fit with business-as-usual as far as practical. They should not result in significant increases in cost.
	101790 Greater Wellington Regional Council (Denton);	Proposed TELS are supported.
	101792 TPT Forests;	Proposed TELS are supported.
	101793 C3 Ltd	Proposed TELS are supported.
	101794 Ports of Auckland	TEL of 1 ppm too low- 3 ppm would be more effective in measuring exposure.
	101795 Port of Napier	TELs should be an instantaneous exposure level of 5 ppm (WES-GEL) or 1.7ppm (WES-TWA).
	101797 Nordiko	Supports proposed TELs
	101804 Genera Ltd	Evidence provided to the Environment Court supports the proposed chronic TEL and the 1-hour TEL. Genera also accepts the proposed 24-hour TEL. TELs should not apply to seaward boundaries of ports or highways adjoining fumigation areas.
	101807 Rentokil PC	Further research required for TELS for fumigated goods and contained spaces.
	101808 Forest Owners Assn	Supports TELS.
	101818 Melanie Miller & Tom Batchelor	The proposed TELs do not appear to provide a sufficient safety margin.
	101754 Environment Bay of Plenty Regional Council	Comments in j1.1.25 dismissed by Env't BOP. Recommends suitable signage and notification requirements to all properties within 150m of fumigations Overall supports the principle of the adoption of TELs. Submitter makes further comments and recommendations on both acute and chronic TELs.
	101768 Port Marlborough NZ Ltd	A ceiling limit (TEL-C) should be prescribed. Easier to monitor and would demand an immediate response.
	101751 Nelson City Council	Proposed TEL's supported as are consistent with the decision of the Environment Court in Genera v Nelson City Council.

RPE (see section 18 of the Update Paper)		
	101631 NZ Nurses Organisation	As encapsulated in Australian Fumigation Accreditation Scheme
	101781 Nelson Marlborough DHB	Supports adoption of best practice RPE
	101794 Ports of Auckland	POAL supports the recommendation that best practice in relation to RPE be adopted.
	101809 Northland Regional Council	Supports the increase in legislative requirements for the issue of best-practice PPE to workers that use methyl bromide.
	101818 Melanie Miller & Tom Batchelor	Traditional RPE does provide sufficient protection. But SCBA does not protect from dermal exposure.
	101762 Te Rūnanga o Ngāi Tahu	Would like to see a recommendation on best practice to ensure that the substance is used in a safe manner in order to mitigate any impact on human health
	101768 Port Marlborough NZ Ltd	Controls are needed on how fumigations are carried out. Both in terms of methods used and notification of possible affected persons.
	100089 ARPHS	Fumigators should acquire a thorough understanding of site characteristics including: Existence of pipes or tunnels connecting the fumigated building to other structures; Normal air movement in the area and around air intakes of adjacent buildings; and Factors in the site area that might increase risk during fumigation (e.g utility or construction work; proximity to schools, day care centers and portside residences/apartments and hotels).
	101892 Colin Lowe	An effective COP must be adopted to minimize exposure to methyl bromide to workers and the public.
Stenching Agent (refer to Section 20 of the Update Paper)		
Stenching Agent	100089 ARPHS	Should be considered
	101632 Pamela Simpson	Should be mandatory requirement in order to improve risk awareness.
	101754 Environment Bay of Plenty Regional Council	Supports use of stenching agent to protect public health if it is an imperfect one. Recommends urgent investigation to more suitable stenching agent. Recommends within two years – no venting of methyl bromide to atmosphere may be performed without it first having stenching agent added
	101777 Darryl Marriner	Why was chloropicrin been removed from methyl bromide?
	101783 MAF	MAF agrees that the use of chloropicrin as a stenching agent is inappropriate for QPS use. MAF is not aware of any other substance suitable as a stenching agent.
	101794 Ports of Auckland	Recommends that the Authority considers requiring the use of a stenching agent.
	101798 Friends of the Earth	Mandate use of a stenching agent.
	101808 Forest Owners Assn	Agrees that the use of chloropicrin as a stenching agent is not required.
Soil use (refer to Section 21 of the Update Paper)		
Soil use	101761 Green Party, NZ; 101752 Mark Jones; 101753 Jenny Lux; 101755 Nigel Bartlett; 101759 Green Party NE Province	Immediate halt to use in strawberry beds, with disposal of existing stocks within 1 year and to phase out all further use of methyl bromide within 5 years
	101754 Environment	Supports existing stocks to be used up for non-QPS use, but a date set when existing approvals for non-QPS uses are revoked.

	BOP	
	101781 Nelson Marlborough DHB	Revocation of approvals for non-QPS
	101783 MAF	MAF submits that the mandated destruction of stocks of non-QPS methyl bromide by 31 December 2010 is not warranted. Stocks will be minimal by this date.
	101787 Hort NZ	Hort NZ opposes the proposed revocation of the approvals of the soil fumigation formulations as they are needed for the eradication of potato wart disease.
	101818 Melanie Miller & Tom Batchelor	The HSNO approvals for non-QPS purposes should be revoked and remaining stocks disposed of by the end of 2010.
Classification (refer to Section 22 of the Update Paper)		
Classification	101763 Anna Chinn	Disagrees with 9.2A to 9.2D change Reason: how can something that sterilizes soil not be considered very ecotoxic? Basing change on not having data on earth worms is a lousy rationale. Changes in classification from 6.3A to 8.2C and 6.4A to 8.3A should occur.
	101781 Nelson Marlborough DHB; 101794 Ports of Auckland	Agrees with classification changes as proposed.
	101818 Melanie Miller & Tom Batchelor	Supports 6.3A to 8.2C and 6.4A to 8.3A. Opposes 9.2A o 9.2D – methyl bromide is highly toxic to virtually all soil-dwelling organisms.
Auditing		
Auditing	101754 Environment BOP	Envt BOP recommends quarterly audit of implementation of the site specific Ambient Air Monitoring Protocol. Should be undertaken by ERMA and regional council rep
	101817 Lyttleton Port of Christchurch	The Department of Labour should undertake best-practice audits of operators who us methyl bromide.
ACVM		
ACVM Act	101758 NZFSA	The outcome of the ERMA reassessment is likely to require that the 6 registrations under the ACVM Act are reassessed.