

# WORKSAFE

## APP203660

## WORKSAFE ADVICE

WorkSafe advice on the application to reassess methyl bromide

14 November 2019

Updated 16 July 2020

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# 1 INTRODUCTION

Every year 750-900 people die prematurely as a result of work-related ill-health, much of which is from chemical exposure. As the regulator of workplace health and safety, WorkSafe has a role in leading, influencing and leveraging the health and safety system to improve health and safety outcomes, and has firm targets and priorities to transform New Zealand's workplace health and safety performance.

WorkSafe's role in the wider health and safety system involves reviewing applications for new substance approvals and reassessments of existing substances and providing advice to the Environmental Protection Authority (EPA) to ensure that the risks associated with the use, handling, manufacture and storage of any new substances approved in New Zealand can be managed adequately.

The following report is based on the information provided with the application and submissions received by the EPA for this application.

## 2 APPROVAL PROCESS

The controls for hazardous substances and duties to mitigate the risks that hazardous substances pose sit under two regimes:

- the *Hazardous Substances and New Organisms Act 1996* (HSNO) for non-work, public health and environmental risks, and
- The *Health and Safety at Work Act 2015* (HSWA) for work-related risks, including the *Health and Safety at Work (Hazardous Substances) Regulations 2017* (the HS Regulations) and other regulations.

HSWA gives WorkSafe responsibility for enforcing controls to mitigate the health and safety risks of using, handling, storing or manufacturing hazardous substances in the workplace. Since December 2017, the workplace controls for hazardous substances have been set in the HS Regulations and relevant safe work instruments (SWI) under HSWA.

Under HSNO, the EPA is responsible for approving and classifying hazardous substances.

This division of roles requires the EPA and WorkSafe to work together to assess hazardous substances applications, to ensure the appropriate controls from each regime are applied to safeguard people (both at work and outside the workplace) and the environment.

The objectives of WorkSafe's participation in the hazardous substance applications process are to ensure that:

- hazardous substances at work are treated in a way that protects workers and other persons against harm to their health, safety, and welfare by eliminating or minimising risks arising from work, contributing to reduced incidence of work-related ill-health
- WorkSafe maintains a constructive and collaborative relationship with the EPA in assessing hazardous substance applications.

Consistent with the purpose of HSWA, regard must be had to the principle that workers and other persons should be given the highest level of protection against harm to their health, safety and welfare from hazards or risks arising from work, so far as is reasonably practicable.

Where existing controls under HSWA are not considered adequate, and if the relevant regulations contain provisions for a SWI, additional or varied controls may be imposed only by way of a SWI.

## 3 RELEVANT REGULATIONS

In reviewing this application WorkSafe has considered the PCBU's obligations under:

- HSWA
- the *Health and Safety at Work (General Risk and Workplace Management) Regulations 2016* (the GRWM Regulations), and
- the HS Regulations.

In assessing the adequacy of the default hazardous substances controls, WorkSafe also takes account of other relevant requirements under the health and safety legislative framework, for example duties:

- to manage risks associated with substances hazardous to health by applying the hierarchy of controls (regulations 5 to 8 and 28 of the GRWM Regulations)
- to provide information, supervision, training and instruction (regulation 9 of the GRWM Regulations)
- to provide workplace facilities (regulations 10-11 of the GRWM Regulations), including ventilation and facilities to control airborne contaminants
- to provide personal protective equipment (regulation 15 of the GRWM Regulations)
- to carry out exposure monitoring and health monitoring (regulations 32-42 of the GRWM Regulations).

'Upstream duties' may also apply (sections 39-42 of HSWA) i.e. the duty of a PCBU who designs, manufactures, imports or supplies a hazardous substance to ensure that a substance is without risks to the health and safety of persons so far as reasonable practicable.

WorkSafe's advice to the EPA may refer to any of the above duties.

### 3.1 Upstream Duties

Upstream duties are relevant if a new substance has properties that make it more hazardous than existing similar products, for example, if it has a non-active ingredient (such as a surfactant) that is more hazardous than similar ingredients in similar products. The similar products demonstrate that it is possible to avoid the hazard.

### 3.2 Hierarchy of Controls

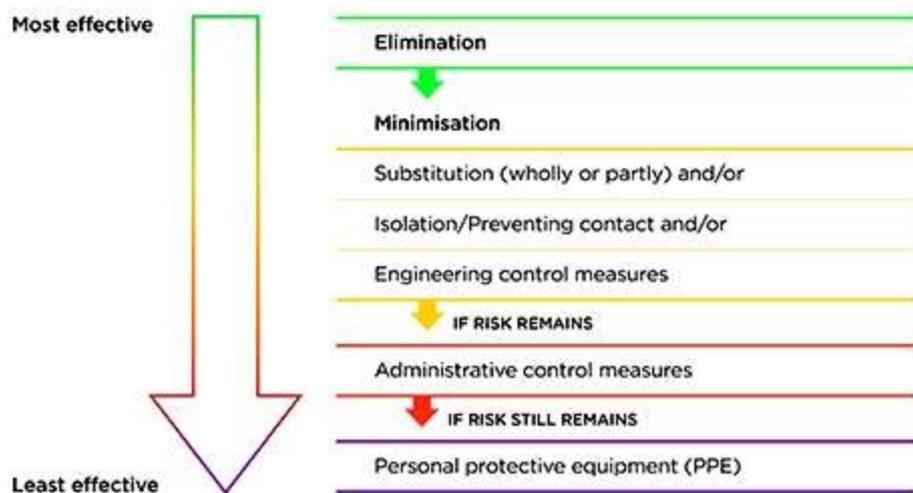
Under section 30(1)(a) of HSWA the PCBU must eliminate risks to health

and safety so far as reasonably practicable. If this is not reasonably practicable, the PCBU must minimise the risks so far as is reasonably practicable following the hierarchy of controls.

The hierarchy of controls is set out in regulation 6 of the GRWM Regulations.

If elimination is not possible, a PCBU must consider (in this order):

- substitution, isolation, engineering control measures
- administrative controls
- personal protective equipment (PPE): If risk remains after all other measures have been applied, the PCBU must supply and ensure the use of personal protective equipment.



PPE may need to be used or worn to minimise health risks, but should only be used as an exposure control measure to minimise or eliminate risk when other control measures alone can't adequately do so.

The decision to choose PPE in the absence of control measures higher up the hierarchy must be based on the principles of reasonable practicability. Considerations of cost alone is not sufficient to determine 'so far as is reasonably practicable'.

PPE should not be the first or only risk management method considered, and WorkSafe expects PCBUs to give preference to other controls that protect multiple at-risk workers at once. Regard must also be given to providing the highest level of protection for workers and others, so far as is reasonably practicable.

## 4 ADVICE

The EPA have asked WorkSafe to respond to the following questions regarding application APP203660:

*What is WorkSafe's current thinking regarding your interpretation of the HSW(HS)Regs given the recapture definition proposed by the applicant, especially given the concerns raised by BOPRC? And is there a desire to create/amend a SWI, and/or the regulations?*

Recapture is not specifically defined in the HS Regulations. However, the HS Regulations include a definition for recapture technology: "recapture technology, in relation to methyl bromide, means a system that mitigates methyl bromide emissions from fumigation enclosures."

The applicant has proposed revising the definition of recapture technology in the HSNO approval to reflect what they consider to be the highest practicable level of recapture, to state "Recapture technology is a system that mitigates methyl bromide emissions from fumigation enclosures such that the residual level of methyl bromide in the enclosed space is at least 80% less than that at the end of the fumigation period."

If this proposed definition is approved, we believe this would fit the definition of recapture technology for methyl bromide in the HS Regulations.

The application does not provide clarity on how much methyl bromide would be released to the environment if only 80% is recaptured. For log stacks we believe this may be up to 3000pm or more. A shift from recapture achieving 5ppm in the fumigated space, to 20% of the remaining gas would mean a considerable increase in the amount of methyl bromide released to the environment following recapture.

Specific requirements for methyl bromide exist in Part 14 of the HS Regulations. There are a number of references to recapture included in the requirements. For a number of regulations the requirements are modified if recapture technology is used, namely:

- The minimum buffer zones distances set in regulation 14.38 do not apply to fumigation where recapture technology is used
- The annual monitoring report threshold excludes methyl bromide that is recaptured using recapture technology
- The following record keeping requirements do not apply if recapture technology is used;
  - wind speed and direction every 3 minutes at the location during

- ventilation;
- for each monitoring location, exposure levels;
- for each monitoring location, the type and location of the monitoring equipment used to record the exposure levels.

Regardless of whether recapture is used, the PCBU must meet the requirements of regulation 14.39.

*A PCBU with management or control of quarantine or pre-shipment fumigation using methyl bromide must ensure that it is not used in a manner that results in a concentration of the substance in the air at the boundary of the buffer zone that exceeds the tolerable exposure limit (TEL) set for methyl bromide.*

Where no minimum buffer zone is set by regulations the duty holder would need to put a buffer zone in place to ensure that this requirement is met based on their own measurements of the TEL.

There are no relevant safe work instrument provisions in Part 14 that would allow WorkSafe to modify the buffer zone requirements mentioned above. Therefore, our current view is that a safe work instrument is not an option either to set new minimum buffer zone distances or maintain the current minimum buffer zone distances in the HS Regulations, or to modify the provisions that make reference to recapture technology.

Since receiving the request from the EPA to provide advice on redefining the methyl bromide recapture definition, WorkSafe has received a report commissioned by the EPA which conducted independent air dispersion modelling of methyl bromide use at the Port of Tauranga (TAS report 2019).

If the predicted exposure values in the TAS report 2019 (as referenced in the paragraph above) were correct it would be expected that the monitoring currently required by the HS Regulations would have shown exceedances of the TEL at the edge of the buffer zone.

This report also supports the conclusions of the independent consultant engaged by Bay of Plenty Regional Council (BOPRC), presented in support of the BOPRC submission for this application, which suggested that the modelling commissioned by the applicant may have under-represented the predicted concentrations.

#### **4.1 Controls for methyl bromide**

We consider that as there is very little worker exposure data available, a conservative approach should be taken regarding the controls that apply

to methyl bromide if recapture is used.

Due to the uncertainty in the modelling data we would not recommend a reduction in the current minimum buffer zone distances even when recapture is used. It is recommended that the predicted exposures from modelling be verified by air monitoring and if necessary the buffer zones should be reassessed.

WorkSafe would also recommend that the current reporting and record keeping requirements provided for methyl bromide by the HS Regulations remain in place as if recapture is not used.

While WorkSafe may support changes to regulations and provide advice on how regulations are working operationally, MBIE is the responsible policy agency for the HS Regulations.

Finally, we note that one of the submitters is suggesting that recapture down to 200ppm is economically feasible. WorkSafe supports requiring recapture to the lowest level that is reasonably practicable.

## **4.2 Update July 2020**

Since the initial WorkSafe advice for the methyl bromide reassessment provided to the EPA in November 2019, further monitoring and modelling has been undertaken by various parties in relation to this application.

We are providing this updated advice following WorkSafe's review of the following documentation:

- SEC - Modelling Report for Methyl Bromide Exposures for Timber Fumigation at the Port of Tauranga, New Zealand
- TAS – Air Quality Review - Dispersion Modelling Assessment of Methyl Bromide
- Air Matters – Monitoring reports
- PDP – Methyl Bromide Modelling Study – Port of Tauranga

### **4.2.1 SEC and TAS Reports**

The EPA decision making committee requested the applicant (STIMBR) to carry out further air dispersion modelling. STIMBR engaged Sullivan Environmental Consulting (SEC) to carry out this modelling. The EPA then commissioned Todoroski Air Science (TAS) to review the modelling report.

WorkSafe has reviewed both reports. As TAS concluded that there was an error in the calculations undertaken in the SEC modelling, WorkSafe is unable to draw any conclusions from this additional modelling.

#### 4.2.2 Monitoring and Modelling

Validation of modelling data with monitoring data was identified as a key gap in the information available for this application.

In order to validate the modelling results, in November 2019 WorkSafe engaged Air Matters to carry out monitoring over a period of weeks in order to gather data on methyl bromide dispersion at the Port of Tauranga.

In order to obtain a sufficient sampling strategy a number of factors needed to be considered, including:

- The different times that fumigation may occur, including at night.
- The possibility of overlapping ventilations, at different parts of the port and different times.
- Shipping schedules, to ensure that ship hold fumigations are included in monitoring.

WorkSafe's sampling strategies included:

- Measurement of 1 hour and 24 hour concentrations
- Sub-hourly measurements
- Measurements at, and within the buffer zone boundary
- A range of measurement methodologies.

The monitoring undertaken included log fumigations under sheets and ship hold fumigations to obtain a full range of samples.

Various positions were sampled downwind of release to measure levels in the gas plume and measure peak concentrations.

WorkSafe also engaged Pattle Delamore Partners (PDP) to undertake dispersion modelling using data from the monitoring events to enable comparison of the monitoring results and modelling predictions.

PDP made the following conclusions;

*"The monitoring undertaken by Air Matters has shown that the 1-hour TEL for methyl bromide has the potential to be exceeded at the boundary of the Port. Furthermore, for each of the monitoring events there were measured concentrations of methyl bromide at the boundary monitoring*

*locations that were well above background levels. It is likely therefore that the 1-hour TEL may be exceeded at some locations during normal operations. Undertaking additional monitoring events will help inform the likelihood of exceedances over a range of meteorological and fumigation conditions.*

*It is considered highly unlikely based on the monitoring data collected to date that the TEL for 24-hour averages will be exceeded under normal fumigation practices.*

*Comparison of PID and SUMMA Canister sampling has shown that TVOCs measured by PIDs are generally higher, and often significantly higher, than the SUMMA Canister results for samples collected at the same location and time period. This is most likely due to the presence other VOCs, in particular high levels of pinenes and other terpenes in the vicinity of the log stacks. Care is therefore needed when interpreting PID monitoring data in regard to methyl bromide. Methods that specifically monitor methyl bromide should be preferentially used for determining methyl bromide concentrations.*

*The results of the 1-hour model results have shown general good agreement with the monitoring results (i.e. within order of magnitude), and the differences between observed and predicted concentrations can be explained by minor shifts in plume width and/or direction. For the majority of the modelling cases, the predicted concentrations of methyl bromide agree with the monitored concentrations within a few degrees of the plume centreline.*

*The 1-minute modelling has consistently under predicted the PID and SUMMA canister measurements at the monitoring sites. The 1-minute model has, however, shown good agreement on a temporal scale with the monitoring data when the timing of the ventilation events is incorporated into the model on a minute by minute basis.*

*The 1-minute modelling introduces significant, but real variability into the model which is very sensitive to the accuracy of the monitoring stations. The expectation of the modelling is that if the emission rates were accurate the comparatively coarse 1-hour modelling would mostly over predict (as it would not include information about the highly variable environment) and therefore produce a relatively straight unaltered plume."*

PDP recommended that:

*"additional monitoring events be modelled to provide more case studies for the comparing monitoring data to modelling results, and to allow for more fine tuning of the model."*

WorkSafe intends to continue with the methyl bromide monitoring and modelling project to gain a more detailed picture of emissions and to refine the model predictions so they align with measured values.

While we acknowledge that further work is required it is clear that the current 50m prescribed minimum buffer zone may not always be large enough for compliance with the 1 hour TEL. This provides support for WorkSafe's original recommendation that the current minimum buffer zone requirements should not be reduced.

Ten Air Matters monitoring reports and the PDP modelling report have been provided to the EPA in support of this application.

## 5 SAFE WORK INSTRUMENT

SWI are essentially rules that WorkSafe can develop to allow for greater flexibility and timelier updates to the regulatory framework and to reflect changes in technology, standards and health and safety practice. Under HSWA, SWI may be made for the purposes of prescribing rules, standards and methods for managing workplace risk.

HSWA defines the purposes of SWI as:

- *to define terms, prescribe matters, or make other provision in relation to any activity or thing, including (without limitation) listing standards, control of substances, and competency requirements.*

Before they come into effect, new SWI and amendments to existing SWI must be considered by the Minister for Workplace Relations and Safety (the Minister). Before approving a SWI, the Minister must be satisfied that all appropriate persons and organisations have been adequately consulted in its development.

SWI must be developed and made in accordance with their enabling legislation. The SWI development process must be rigorous and transparent, so all proposed SWI requirements must go through a public consultation.

SWI have legal effect only to the extent that they are referred to in regulations. WorkSafe will only develop SWI where they have legal effect.

### 5.1 Criteria for developing safe work instruments

WorkSafe can develop SWI to target health and safety risk and to advance the purpose of HSWA, that 'workers and other persons should be given the highest level of protection against harm to their health, safety and welfare from hazards and risks arising from work as is reasonably practicable'.

If WorkSafe considers it is necessary to add to or modify requirements in regulations to ensure workers and others are provided the highest level of protection against harm to their health and safety, we may develop SWI to do so, but only to the extent that this is provided for by regulations.

This means that there must be a provision in the relevant regulation(s) that enables a SWI to be developed. The scope of any additional or modified requirements in the SWI will be limited by this enabling provision.

## **5.2 SWI to modify methyl bromide requirements**

Part 14 of the HS Regulations sets requirements for fumigants, while Subpart 6 of Part 14 sets specific requirements for methyl bromide. The requirements for methyl bromide are largely based on the EPA's previous approvals and reassessments of the substance.

While there are a number of SWI provisions in Part 14, their scope is limited to matters such as notification, signage, record-keeping and ventilation requirements, and requirements for specific types of fumigation or fumigants.

In the specific requirements for methyl bromide in Subpart 6, there are no relevant SWI provisions in Part 14 that would allow WorkSafe to add to or modify the requirements for methyl bromide currently set out in the HS Regulations, particularly those that make reference to the use of recapture technology and to minimum buffer zones.