Methyl Bromide

Consideration of environmental fate and ecotoxicity data available since NZ EPA reassessment of methyl bromide in 2009.

Report Submitted To:

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The EPA (ERMA at the time of the 2009 assessment) published their assessment report with respect to the reassessment of methyl bromide under Section 63 of the Hazardous Substances and New Organisms Act 1996.[1] The appendices from this report are not readily available publicly and end-points applied in any risk assessment component are not transparent in the assessment with respect to environment. However, the EPA clearly considered direct exposure to the environment to be negligible and hence, quantitative risk assessments to different environmental organisms did not have much relevance. The following numbered components are as per the 2009 assessment report and that report should be consulted for relevant reference details. Comments relating to additional information available since that assessment and their relevance for a further re-assessment, along with decisions from the 2010 Environmental Risk Management Authority Decision are provided.

5.3 Environment

Identification of adverse environmental effects

5.3.1 At all steps in the lifecycle there is potential for methyl bromide to impact on the natural environment.

5.3.2 However, the use of methyl bromide as a space fumigant will not result in direct exposure of plants, terrestrial or aquatic organisms. Only indirect effects resulting from accidents may occur. For instance, terrestrial vertebrates and invertebrates may be at risk from leaks during use or through venting of methyl bromide from treated spaces in the same way as bystanders. However, there is little or no information on direct effects resulting from incidents/spills of methyl bromide in New Zealand and no data on the effects of any incidents on the environment.

Comment for reassessment: The committee in their 2010 Decision agreed with the EPA's assessment in this regard and concluded that, due to a lack of direct exposure, significant ecotoxicological effects to plants, terrestrial or aquatic organisms are not expected. Therefore, there is limited (no) value in considering any further ecotoxicity data related to plants, terrestrial (above ground) or aquatic organisms that have become available since the 2009 assessment as the direct exposure is considered negligible.

In their scientific conclusion, EFSA (2011)[2] identified a data gap for an assessment of the indirect exposure of soil, surface water and groundwater via leakage from containers to the atmosphere during fumigation and subsequent deposition. A data gap was also identified for estimated concentrations in air of methyl bromide around the treated containers at specified distances during fumigation and aeration.

This issue appears to have been considered by the EPA in point 5.3.2 above, and the risk accepted. There is no further information available since the 2009 assessment that would result in this conclusion being amended.

5.3.3 Methyl bromide used as a soil fumigant in the appropriate concentrations will, as intended, eradicate all organisms in the soil environment. However, this reassessment does not address the risks associated with soil fumigation but is restricted to the QPS use of methyl bromide.

[1] https://www.epa.govt.nz/assets/FileAPI/hsno-ar/HRC08002/HRC08002-Methyl-Bromide-Reassessment-Application.pdf

[2] EFSA (2011). Conclusion on the peer review of the pesticide risk assessment of the active substance methyl bromide. EFSA Journal 2011;9(1):1893. [32 pp.]. doi:10.2903/j.efsa.2011.1893

Comment for reassessment: Non-QPS uses are no longer supported in New Zealand. As there is no direct soil fumigation application, there is limited (no) value in considering any further ecotoxicity data related to soil organisms that have become available since the 2009 assessment due to negligible exposure to this environmental compartment.

5.3.4 Methyl bromide is a powerful ozone-depleting substance. Concerns about the depletion of the ozone layer exist, because the ozone layer reduces the amount of harmful ultraviolet (UV) radiation that reaches the Earth. Any significant change to this layer can have consequences for human health and the environment and will have further impacts on agriculture. Effects for terrestrial ecosystems include possible damaging effects for plants and microbes, but these organisms also have protective and repair processes. Terrestrial ecosystem responses to increases in UV are primarily in interactions among species rather than in the performance of individual species. Effects on aquatic ecosystems include possible adverse effects on the growth, photosynthesis and reproduction of phytoplankton, thus affecting the food web.

Comment for reassessment: There are no new environmental fate data for methyl bromide that would change this conclusion.

5.3.5 The Agency has also identified and assessed the risk to the environment posed by the disposal to landfill of saturated activated carbon following recapture of methyl bromide as at Port of Nelson.

Assessment of adverse environmental effects

5.3.6 Valued terrestrial vertebrates and invertebrates are unlikely to be found in the surroundings of a treated building/container where methyl bromide will be vented. Furthermore, methyl bromide will quickly volatilise and dissipate in the atmosphere. Because the likelihood of exposure is so low, the direct risks to terrestrial vertebrates and invertebrates are considered to be ***negligible***.

Comment for reassessment: There are no further studies or information available since the 2009 assessment and 2010 decision that would change this conclusion.

5.3.7 Similarly, due to a lack of direct exposure to aquatic organisms or direct contamination of surface water the direct risks to aquatic organisms are considered to be ***negligible***.

Comment for reassessment: There are no further studies or information available since the 2009 assessment and 2010 decision that would change this conclusion.

5.3.8 The adverse effect of methyl bromide on the environment as an ozone- depleting substance is significant. A thinner ozone layer results immediately in an increase of UV radiation at ground level, which can lead to a variety of adverse effects on aquatic and terrestrial ecosystems and the food chain. Under the baseline scenario

of continued but reducing use over the medium term the marginal (additional) effect of the limited amount of methyl bromide use in New Zealand on the environment is not considered to be significant.

Comment for reassessment: There are no further studies or information available since the 2009 assessment and 2010 decision that would change this conclusion.

5.3.9 If there were an immediate ban on the use of methyl bromide there would be ***potentially significant*** risks to the New Zealand agricultural sector and natural ecosystems from an increased probability of biosecurity incursion and consequential loss of production value.

Disposal to landfill

5.3.10 After recapture of residual methyl bromide from specially fitted containers at Port Nelson, the saturated activated carbon is disposed of by burial in a registered landfill site. The saturated activated carbon is put in hessian sacks, which are placed in a prepared bed in the landfill site and overlaid with soil.

5.3.11 From consideration of data on the environmental fate and behaviour of methyl bromide (set out in **Appendix F**), activated carbon saturated with methyl bromide is only stable when it is kept at low temperature and under dry conditions. Under landfill conditions, the primary mechanism for degradation of methyl bromide in the saturated activated carbon into methanol and bromide is hydrolysis. The rate of hydrolysis is higher at higher temperatures.

Comment for reassessment: There are no new environmental fate data for methyl bromide since the 2009 assessment and 2010 decision that would change this conclusion.

5.3.12 Methanol is readily and rapidly degraded in a wide variety of environmental media and has low bioconcentration and low toxicity (World Health Organisation). Although methanol has the potential to leach into groundwater, significant contamination is unlikely given the rapid rate of biodegradation (Environmental Health & Safety). The ecotoxicity of the degradation products is less than the ecotoxicity of the parent compound methyl bromide.

Comment for reassessment: There are no further studies or information available since the 2009 assessment and 2010 decision that would change this conclusion.

5.3.13 Alternative pathways of degradation of methyl bromide in soil are a reaction with soil organic matter and microbial degradation. In organic-matter-rich soils degradation is more rapid than in organic-matter-poor soils.

Comment for reassessment: There are no further studies or information available since the 2009 assessment and 2010 decision that would change this conclusion.

5.3.14 Overall, given the rapid degradation of methyl bromide absorbed onto activated

carbon, the Agency considers the risks to the environment from disposal to a properly engineered and approved landfill site to be ***negligible***.

Comment for reassessment: There are no further studies or information available since the 2009 assessment and 2010 decision that would change this conclusion.