

Methyl bromide presentation and recommendations

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Methyl Bromide (MB) has been a contentious fumigation chemical for well over 10 years now. Control of MB has been delayed even after it was known to cause harm. It's pretty clear "Unless people are dropping like flies in an acute way, the EPA ticks things through." This makes the EPA part of the problem instead of part of the solution.

The forestry industry has a "lousy" environmental record and log exporters have simply moved further north as southern ports have "cleaned up their act" around methyl bromide. MB is more tightly controlled in Nelson than anywhere else in New Zealand. What did industry do? Move to other ports..... Tauranga is now responsible for 2.5% of world MB fumigation emissions.

Steffan Browning predicted that The EPA and industry group, STMBR (Stakeholders in Methyl Bromide Reduction) would attempt to extend the 2020 deadline for recapture. And here we are....in 2023....

The EPA's general manager of hazardous substances, said ten years ago, "the 2020 target is a "hard deadline". EPA needs to enforce this commitment.

Community groups are outraged that the Government has waived a deadline for log exporters to recapture emissions of the toxic fumigant methyl bromide. TONY WALL reports.

Two years ago, the [Environmental Protection Authority told Stuff](#) that after October 28, 2020, anyone using the ozone-depleting gas methyl bromide for pest fumigations would have to recapture and destroy all emissions.

It was a "hard deadline" set in 2010, said Dr Fiona Thomson-Carter, the EPA's then-general manager of hazardous substances. If industries such as forestry couldn't show they were using recapture technology for all fumigations, "you're not going to be able to use [methyl bromide] in New Zealand".

They were hollow words.

In July, an EPA decision-making committee [agreed to waive the deadline](#) for six months, until April 28, 2021, just as community groups feared would happen.

So now, Genera finally stating that they will recapture 90% of MB compound. How meaningful is that? The short answer is "not very". In 2019 NZ imported 673 metric tonnes of MB. If Genera or other fumigating company, fully recaptures 90% then that is still 67.3 tonnes going into the environment and atmosphere. If each row of logs uses ave 40kg of MB, that is 4kg of MB that is being released for each log row. And if it can recapture 90% now, why didn't it do that ten years ago, because that was absolutely possible.

What is the cost to our community?

Methyl Bromide is one thing, but essentially it's the BROMINE element that is toxic, bromine is an element that doesn't 'break down, go away' as EPA and Genera seem to believe/promote. This is a problem because it will build up in the environment one way or the other and cause harm that no one is testing for. The toxic effects of bromide alone are widely studied, and it is appropriate to use bromine studies to discuss MB toxicity and symptoms to watch out for because that's what MB is at its essence.

Bromine effects: Neurological and psychiatric symptoms are widely varied and may include the symptoms of restlessness, irritability, ataxia, confusion, hallucinations, psychosis, weakness, stupor and, in severe cases, coma. Bromism is caused by a neurotoxic effect on the brain which results in somnolence, psychosis, seizures and delirium.

Gastrointestinal effects include nausea and vomiting as acute adverse effects and anorexia and constipation with chronic use. Dermatological effects include cherry angiomas, acneiform, pustular and erythematous rashes.

High levels of bromide chronically impair the membrane of neurons, which progressively impairs neuronal transmission. Bromide has an elimination half-life of 9 to 12 days, which can lead to excessive accumulation.

Granted this is looking at ingested doses of 0.5 to 1 gram per day of bromide but bromide is accumulative and as MB is a heavier than air gas with no odour or flavour, and since there is no testing, it's hard to know what dose people are receiving.

What happens to MB (aka Bromomethane)

Bromomethane is readily photolyzed in the atmosphere to release bromine radicals, which are far more destructive to stratospheric ozone than chlorine. As such, it is subject to phase-out requirements of the 1987 Montreal Protocol on Ozone Depleting Substances.

MB breaks down to Hydrogen bromide

Basis for original (SCP) IDLH: Hydrogen bromide is an extremely irritating and corrosive gas. The chosen IDLH is based on an analogy with bromine. According to ILO [1971], however, bromine produces a more marked toxic action. AIHA [1958] reported that for humans, 40 to 60 ppm bromine is dangerous for short exposure [Henderson and Haggard 1943]. Because hydrogen bromide is considered less irritating than bromine, an IDLH of 50 ppm is chosen.

Ref: <https://www.cdc.gov/niosh/idlh/10035106.html>

Who is testing for bromide or hydrogen bromide in our environment in and around the port and in clinical testing for health conditions? Anyone? No I didn't think so.

UK Govt toxicological overview states:

Table 2 – Human health effects of bromine vapour at various concentrations ⁽¹⁾

Bromine		Effects
mg/m ³	ppm	
0.04	0.006	Irritation to eyes
1.3-3.3	0.2-0.5	Irritation to eyes, nose and throat; cough, headache
>3.33	>0.5	Intolerable
261-392	40-60	Toxic pneumonitis and pulmonary oedema
6,536	1,000	Fatal within a few minutes

In the UK, the long-term exposure limit (LTEL) for bromine is 0.66 mg/m³ (8-hour time weighted average (TWA) exposure reference period). The short-term exposure limit (STEL) is 1.3 mg/m³ (15-minute reference period) ⁽⁶⁾. In the EU, the Scientific Committee on Occupational Exposure Limits (SCOEL) has set an Indicative Occupational Exposure Limit Value (IOEL) of 0.7 mg/m³ ⁽⁷⁾.

In the UK, the Expert Panel on Air Quality Standards has recommended that a concentration of bromine gas or mass equivalent to aerosol not exceeding 0.07 mg/m³ (equivalent to 0.01 ppm) over a 1-hour averaging period should protect against irritant and inflammatory responses to the skin, eyes and breathing airways ⁽⁸⁾.

The Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) has set a Tolerable Daily Intake (TDI) of 1 mg/kg bw/day ⁽⁹⁾. This TDI was based on a short-term toxicity study in rats and a human study ⁽¹⁰⁾.

<https://www.gov.uk/government/publications/bromine-properties-incident-management-and-toxicology/bromine-toxicological-overview>

People die because EPA's lack of duty of care

People associated with ports where log fumigation has occurred have reported their neurological illnesses.

In 2013 media reported on five cases of motor neuron disease associated with the Port of Nelson in 2005 and on a subsequent report by Canterbury University toxicologist Ian Shaw.

Professor Shaw found a way that low-level exposure to methyl bromide, which was used to fumigate logs at the port, could trigger motor neurone disease in some people. Centre for Public Health Research at Massey University found a heightened risk of motor neurone

disease in agriculture and horticulture workers, the types of industries where soil fumigations occurred with methyl bromide in the past.

A regional public health report investigated cases, and as well as a sixth, but determined they were a statistical anomaly, rather than evidence of a cause and effect relationship with methyl bromide exposure. I would argue that this report doesn't take into account a number of issues

- i) that some people have a genetic weakness that affects their detoxification pathways, these people are our 'canaries in the coal mine' that show up the health issues of poisons in the environment. They pay the price for our negligent and disinterested and siloed health system that is not holding industry to account.
- ii) that there is a cost being paid, just not by industry
- iii) that there are other factors not being taken into account, in this instance the issue is that MB is heavier than air gas and was following a clear but 'random' pathway that made it appear that the illness reports were a 'statistical anomaly'
- iv) what else is being ignored by the health system and EPA through lack of assessment, just because you can't find it, doesn't mean it's not there.

Stu Smith was diagnosed in September last year with motor neurone disease. The 33-year-old Waipukurau sheep farmer was once a Wairarapa-Bush rep rugby player, and worked at the Port of Nelson for six months in 2005 while playing for Nelson Bays. At the time, logs were being fumigated in the open at the port with methyl bromide.

Clare Allen is in her mid-50s and is in the late stages of the disease. A few months left to live. Although she said there were probably many causes of the illness she blamed methyl bromide from the Port of Wellington for hers. "I have MND [motor neurone disease] and can't talk or move much so I'll get to the point. My one finger has little power for tapping this out. "I lived on the outer part of Chaffers Marina for most of five years in the yacht Freedom while we fitted it out for ocean sailing. "We were both extremely fit and healthy. "We lived about as close to the log and car treatment area as a person can, with most common wind a NW [north- westerly], so I would say downwind of it. "Our hatch faced it and was always open." Her husband, Jon De Vries, died of a rare form of muscle cancer.

Trevor Joy, of Maungaraki, died of motor neurone disease about five years ago, in his early 70s. "He was exposed while staying on his boat moored at Picton, while a ship containing logs that had been treated with methyl bromide was anchored nearby," Terry said. Trevor was fit and healthy before his diagnosis, but died about six months later.

Ray Hancock lives on a boat at Picton waterfront, near the interisland ferry terminal. He said he had been diagnosed with poisoning from methyl bromide once used to fumigate logs in the open there. "I've lost all the strength in my legs," the 74-year-old said. Before his illness he was fit and very healthy, and thought he would live forever.

Log fumigation has since been stopped at Picton. The Wellingtonian also reported these three cases below:

Rick Graham of Woburn died of motor neurone disease in 2007 after spending time inspecting imported cars at the port after they had been fumigated.

Ngaio resident **Ian McGregor** was a refrigeration engineer at Wellington's port. He was diagnosed with motor neurone disease three years ago and now lives in a hospital.

Another Hutt man who worked with used cars, after he left the wharf suffered grand mal epilepsy attacks.

Motor neurone disease is a neurological disease that causes degeneration of certain brain and spinal-cord nerve cells. Patients progressively lose muscle control and usually die within four years. There is no cure or effective treatment. At least six people associated with the Nelson port died of motor neurone disease in the 2000s.

More recently there was a case of four port staff, who were working 100m from where stacks of logs were being fumigated with methyl bromide, fell ill. An investigation later found there was insufficient evidence to support claims methyl bromide exposure was to blame for the illnesses. What else could it have been? Was there an investigation in to an alternative hypothesis? And if not, why not?

What is industry and EPA doing?

In 2010 the NZ EPA allowed continued and rapidly increasing volumes of methyl bromide release to air, on the proviso that it be recaptured come 2020. That meant another ten years of increased neurotoxic and ozone depleting gas release around New Zealand. All that time it could have been recaptured, but the EPA allowed the exporters to save money at the expense of people and planet.

I have had a long conversation with an ex-MB fumigation worker who worked in the industry 12-14 years ago. His experience was interesting and exposes the lies within the industry. 1) It is impossible to recapture all the MB EVEN with scrubbers and filters. This is because it is impossible to completely seal the "fumigation chambers" and there are always areas between the logs that MB is trapped and caught. He tested this himself one day with his monitoring equipment and found "off the chart" levels within the logs even when the environment tested "all clear". So this means that even with the best technology there will be no "100%" capture and highly likely not even close to Genera's claim of "90%" capture. 2) that the industry is not protecting its workers, as it's virtually impossible to do the job whilst wearing full mask protection. 3) perhaps industry has cleaned up its act but previously there was 'dodgy' behaviour, and if there is no one constantly watching and monitoring, etc then 'dodgy' behaviour will continue.

Criticisms regarding the EPA committee report on Methyl Bromide – my criticisms in bold.

- 1) “The Committee considers that incremental steps towards higher recapture rates will be more achievable than a single target rate to be achieved in 5 or 10 years’ time and will have the effect of reducing risks to negligible over that time.” **This doesn’t make sense – the investment cost to recapture will not be reduced by increasing incrementally. They either do it or don’t do it.**
- 2) A substantially revised controls framework has been put in place that will protect human health and the environment from adverse effects associated with the continued use of methyl bromide for quarantine and pre-shipment fumigations. This pragmatic and evidence-based decision will allow the significant benefits associated with methyl bromide use to be realised whilst protecting human health and the environment from the risks arising from ongoing use. **This does nothing to protect human health or the environment. Not ‘pragmatic’, not ‘evidence based’, these revised controls do nothing to protect our people, just kicking the can down the road. How much has the logging export industry profited? How much money do they make at the detriment of the local people and the ozone layer? This is called privatising profit and socialising cost – ‘business as usual’Industry has had decades to sort this out and do the right thing – and have chosen not to. They have done nothing to deserve the extra time, they need to fix the problem now. What is the actual cost to our society? Health, environment, and Genera are not paying that.**
- 3) “in order to monitor and manage the risks to human health, a number of operational parameters need to be recorded for each fumigation event and reported to the EPA” **Monitoring and recording is doing nothing to ‘manage the risks’ – however, good monitoring and recording may expose errors and prevent future ones and ensure accountability which has been lacking.**
- 4) “Notification of TELair exceedances: In the event that methyl bromide concentrations beyond the buffer zone exceed the TELair, the Committee decided that the relevant territorial authority needed to be notified within 24 hours. This will allow the territorial authority to respond to such an event in a timely manner, and to manage any health or environmental risks that could arise.” **Could the committee explain exactly HOW this Territorial Authority (and which is the relevant Territorial Authority?) is going to manage TELair exceedences? With a deadly toxic gas, does “notification within 24 hours” really a meaningful response?**

We have further concerns regarding the permit to release Ethanedinitrile (EDN) and Phosphine as these compounds are also toxic.

- a) “Like other cyanides, cyanogen is very toxic, as it readily undergoes reduction to cyanide, which poisons the cytochrome c oxidase complex, thus interrupting the mitochondrial electron transfer chain. Cyanogen gas is an irritant to the eyes and respiratory system. Inhalation can lead to headache, dizziness, rapid pulse, nausea, vomiting, loss of consciousness, convulsions, and death, depending on

exposure.^[19] Lethal dose through inhalation typically ranges from 100 to 150 milligrams (1.5 to 2.3 grains).”

- b) “Phosphine is a highly toxic respiratory poison, and is immediately dangerous to life or health at 50 ppm. Phosphine gas is denser than air and hence may collect in low-lying areas. It can form explosive mixtures with air, and may also self-ignite”

The EPA is playing up to industry. The question is, has EPA been acting illegally by not acting in the interests of public safety? It would be worth using Public Service Law and Equity Law to consider the case against EPA. The continuing release of vast amounts of methyl bromide at the Port of Tauranga even though there are well documented breaches of fumigation consent conditions, right in the heart of communities, recreation and industry is a prime example. The EPA Methyl Bromide reassessment is an embarrassment and contemptuous of those who have been poisoned.

Outdoors and Freedom Party suggests looking for new solutions entirely that are non-toxic to mankind, animals, plants and atmosphere.

Solutions regarding health may include:

- 1) Ongoing testing for environmental bromide or hydrogen bromide in and around the fumigation areas, including residential and sports areas and marine life.
- 2) Removing the silos – ensuring clinical toxicological testing for MB and its breakdown products for anyone with health issues in the vicinity of fumigation (2km radius?) and covering MB poisoning under ACC and reporting to Health and Safety if any concerns are found.
- 3) Testing fumigation workers on a regular basis for bromide levels in blood.
- 4) Investigate processes to detoxify excess bromide/MB from the human body to reduce chronic toxicity from those who have been closely associated with MB over years. And for acute poisoning as well.

Solutions regarding alternatives to MB may include:

- 1) Square logs – fibre to pulp industry, bark goes to mulch. Need volumes, need machinery but has an overall positive outcome. More logs/volume and/or weight can be loaded saving on shipping costs.
- 2) Heat treating – downside is that it would be energy intensive, but could be solar powered.
- 3) Ozone – made onsite, converts back to O₂ once used for fumigation. Needs more investigation for the specific pest insects.
- 4) Only export wood that has been processed to a certain level
- 5) Debarking

The point remains that most wood exported is owned, and profits made, by off shore companies. Why is Genera/EPA/NZ Govt prepared to harm our people and our environment for off-shore companies to make profits? This doesn't make sense to fair-minded New Zealanders. We expect EPA to work for the benefit of people who live

here, not multi-national corporations and industry. We look forward to a positive outcome for mankind and the environment from this current review.

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