

# STIMBR RESPONSE TO FURTHER INFORMATION REQUEST ABOUT LEAD TIME FOR IMPLEMENTING NEW RECAPTURE CONTROL

This document responds to Direction and Minute WGT003, issued on 20 December 2019 by the Methyl Bromide (MB) Reassessment Decision Making Committee. Specifically, the Committee requested STIMBR to “provide a clear indication of the proposed lead in time for the controls as set out in its original application (that is, how long industry would need in order to be able to comply with the controls proposed in the application)”. This document, prepared by STIMBR, responds to that request.

To compile this response STIMBR has relied upon information provided to it by Genera Science and Innovation (Genera). STIMBR acknowledges the Committee’s request for “clear evidence” to be provided in respect of the lead time, and for this purpose STIMBR expects to prepare and file a detailed statement of evidence from a suitably experienced member of Genera, to confirm the relevant matters set out below. Subject to any further guidance or directions from the Committee STIMBR expects to file that statement along with all other statements of evidence at least 10 working days prior to the hearing.

STIMBR is relying on information from Genera because Genera is the sole fumigator operating in the log yards at the three ports where MB fumigations occur, and is at the forefront, internationally, for the research, development and assessment of MB recapture technologies for use with logs that are fumigated with MB in ship holds and under tarps. As matters stand, STIMBR believes Genera is the only entity capable of producing, installing and operating the plant and equipment necessary to comply with the controls proposed in the application. No other public or private entity worldwide has been able to develop a viable recapture technology for logs that has been proven successful under commercial conditions<sup>1</sup>.

This document outlines:

- the relevant recapture technologies,
- the recapture equipment presently available in New Zealand,
- the additional equipment needed to comply with the controls proposed in the application, and
- the time needed to manufacture and install that equipment.

## MB Recapture Technologies in use in New Zealand

For recapture of MB from covered log stacks Genera has developed and deployed two technologies: liquid scrubbing systems and the Genera Active Recovery Unit (GARU).

In 2019 Armstrong extensively reviewed the MB recapture technologies available worldwide that included both activated carbon- and thiosulphate-based methods, plasma arc, combustion and incineration, phase transfer catalysis, and ozone.<sup>2</sup> Except for the two Genera technologies mentioned above, the review found that no other method has been demonstrated to have the potential for use on fumigated logs under tarpaulin or in ship holds — regardless of unsubstantiated claims by some purveyors of MB recapture equipment.<sup>3</sup>

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<sup>1</sup> Despite claims that suitable technologies are available for use with large scale log fumigations, those claims have not been substantiated by their advocates. (Armstrong, J. W. 2019. *Revised Review of Proposed Concepts and Technologies to Recapture and/or Destroy Methyl Bromide (MB) after Log Fumigations at New Zealand Ports*. A report prepared for STIMBR, submitted to the Environmental Protection Authority on 18 June 2019. 64 pp. including appendices). Genera’s MB recapture and/or destruction research and development program is addressed fully by Armstrong (2019) pp. 22 – 25.

<sup>2</sup> Armstrong (2019), above n 1.

<sup>3</sup> Armstrong (2019), above n 1.

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## *Liquid Scrubbing*

The liquid scrubbing system uses reactive liquids to absorb and chemically destroy MB. Liquid scrubbers re-circulate the air in the remaining free space of covered log stacks after fumigation and deliver the contaminated air to contact with reactive liquids for the destruction of MB. No MB remains in the waste stream after the scrubbing process. Once the reactive liquids are depleted (saturated) by MB, the scrubbers must be refilled with fresh reactive liquids.

## *GARU*

The GARU alters the physical properties of activated carbon to enable this medium to both capture MB (through absorption) and release MB for re-use (through desorption). The desorbed MB stream contains a high concentration of MB, and it can be used for fumigation or top-up of a fumigation operation. Unlike conventional carbon-based systems, such as the Nordiko system, that use carbon only once before saturation and disposal, the GARU uses high-grade activated carbon, which is more sorptive and can be used again after the MB is removed for reuse. The ability to re-use the carbon, and reuse the MB, result in a much more efficient system, with improved environmental outcomes.

Additional details on these two technologies can be found in the “Response to an additional information request from the EPA” dated 28 June 2019, *viz.*:

- Liquid scrubbing system (GS48, GS375 ‘Nessie’) – Appendix F to Revised Review of MB Recapture and Destruction Systems, 25 June 2019.
- GARU – Appendix E to Revised Review of MB Recapture and Destruction Systems, 25 June 2019

## **Recapture Equipment presently available in New Zealand**

Genera currently has a total of seven prototype liquid scrubbing units. These are six medium-sized scrubbers (“GS48”), and one large-sized scrubber (“GS375”) capable of handling a number of log stacks at a time. A GS48 unit was used for the confirmatory testing that is the basis for STIMBR’s proposal for an 80% recapture standard. The sole GS375 prototype is being operated as a part of Genera’s design evaluation process to facilitate further improvements.

Genera currently also has one GARU. Similar to the GS375 liquid scrubbing unit, the GARU is a prototype, and it is being tested at Port of Tauranga for validation and optimisation.

Genera also has eight activated carbon scrubbers (including three Nordiko scrubbers) that are used only for the recapture of MB from shipping containers and similar sized break-bulk cargo after fumigation. Genera has purchased several MB recapture systems available worldwide, including the three Nordiko scrubbers, to test their efficacy for capturing and/or destroying MB after the fumigation of logs under tarpaulin or in ship holds. None were found to provide adequate and/or economically viable MB recapture. Genera is no longer purchasing the Nordiko systems because it has developed its own capacity to construct activated carbon-based MB recapture systems. Genera’s eight activated carbon scrubbers cannot be used for log stacks or ship holds because the activated carbon tends to preferentially absorb the moisture released from the logs. Hence, the sorptive capacity of the activated carbon decreases. Although the activated carbon can adsorb MB under these high moisture conditions, a significantly greater consumption of activated carbon is required compared with adsorbing MB under

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drier conditions (e.g. from shipping containers containing dry goods, household effects and other items).

Genera is also planning the design and manufacture of a new model of liquid scrubber GS100 which will enjoy comparable capacity with the GS375, but will be designed to be more compact to reduce the footprint within the operation area at the ports.

## The additional equipment needed

Genera has estimated the additional equipment needed to comply with the controls proposed in the application, taking into account the following factors:

- It is assumed that compliance will rely solely on liquid scrubbers. As the GARU technology is still in a testing phase, no reasonable reliance can be placed upon it yet.
- The size of recapture units makes it both difficult and costly to transfer equipment between ports. Therefore, provision needs to be made to locate an adequate number of dedicated units at each of the three ports where MB is used to fumigate logs.
- An “over-capacity” of equipment must be available to ensure that adequate capacity will be available to meet peak demands that will occur at the three ports where methyl bromide is used in New Zealand.
- Additional reserve equipment is needed to ensure units are on hand should a break down occur. Genera anticipates a minimum of one backup unit at each port.

Genera estimates the number of units needed to achieve recapture of 100% of fumigations under tarpaulins (i.e. based on 2018 fumigation data), and not allowing for reserve equipment, as follows:

2020 estimate	Port of Tauranga	Port of Napier	Northport
No. units needed to meet 100% of current capacity	9	6	13
No. currently available units	6	0	1
<b>No. new units needed</b>	<b>3</b>	<b>6</b>	<b>12</b>

Allowing for reserve equipment, Genera’s assessment is that up to 24 additional liquid scrubbers will be needed to address the MB recapture from log stacks at all New Zealand ports that Genera services. Furthermore, the GS48 may not consistently achieve an 80% MB reduction rate when used in an operational context on the largest log stacks in a reasonable time frame, i.e. 3-4 hours. To achieve an 80% MB reduction rate in an operational context on the largest log stacks in a reasonable time frame, some of the additional liquid scrubbers may need to be GS375s or other recapture options.

## The time needed to manufacture and install the equipment

Genera has developed the capability for in-house construction of liquid scrubbers. One of the practical limits on this capability is the amount of maintenance work required to keep all current MB recapture systems at Port of Tauranga in operation as Genera strives to meet the demands of its resource

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consent.<sup>4</sup> The maintenance of and urgent repairs to existing units have hindered Genera's focus on building and testing new scrubbers.

The liquid scrubber GS48 takes about two to three months to construct at current manufacturing capability. Assuming the current workload and manufacturing capability, Genera anticipates being able to construct up to six GS48 units (for use with log stack fumigations) annually.

At current capability the manufacture of a GS375 unit takes about 4-5 months.

At current manufacturing capability, the manufacture of 24 GS48 units could take ~4 years. As stated above, a number of GS375 units may be required for effective recapture on the largest log stacks. If one third of the scrubber fleet (8 units) will be GS375 units, then at current manufacturing capability, this could take ~6 years.

In the event that the Reassessment imposes the controls proposed in the application, this will create greater certainty for Genera to make investment decisions to increase manufacturing capability, principally by employing a greater number of experienced fitters to construct the equipment. Genera considers it is feasible that it could double or treble the number of employees manufacturing the requisite scrubber units. This has the potential to reduce the lead time to achieve compliance for all log stacks to 2-3 years.

Four aspects of this estimate should be noted.

First, it is based on the lead time to achieve compliance for *all* log stacks. In practice, compliance would be achieved incrementally as new plant and equipment is constructed and installed. For instance, the existing GS48 units provide the capability to apply recapture<sup>5</sup> on about 20% of all log stacks (based on the total volume of log stacks currently fumigated, nationally). If Genera's current manufacturing capability were trebled, then ~50% of all log stacks could be subject to recapture 12 months after the Reassessment decision, ~75% 18 months after the decision and ~100% 24 months after the decision. However, those estimates make no allowance for the time it would take for Genera to treble its capability.

Second, the estimates provided above do not address the lead time to achieve recapture from shipping containers. As stated above Genera has eight activated carbon scrubbers for recapture from containers. In order to achieve recapture from 100% of containers, Genera estimates an addition 2-3 scrubbers would be needed. These would take 4-6 months to manufacture.

Third, the estimates provided above have not allowed for additional time to train additional scrubbing technicians in the operation of the additional plant and equipment. In the event the Reassessment imposes the controls proposed in the application and makes allowance for the lead time to manufacture the requisite additional plant and equipment, Genera would also have to train additional scrubbing technicians.

Fourth, Genera cannot prudently invest in any further units until such time as the Decision-making Committee releases a decision that imposes controls that are feasible to achieve with current technology. Assuming such a decision is made, Genera management would then develop a business case for investment and the Genera Board would need time to consider that case. Assuming Board

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<sup>4</sup> The consent held by Genera, issued by the Bay of Plenty Regional Council, requires the introduction of recapture technologies ahead of the deadlines set by the EPA.

<sup>5</sup> STIMBR understands that the existing plant and equipment achieves recapture of up to 80% of the residual MB in the headspace following fumigation, but not consistently 80% at the current time.

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approval, some time would also be taken to source funding, and commitment from customers. No allowance for these steps has been included in the estimates above.

## **Conclusion**

Based on the information provided by Genera, and assuming the controls proposed in the application are applied, STIMBR understands that:

- Recapture is already achievable for approximately 20% of log fumigations under tarpaulins, using Genera's existing GS48 scrubbers;
- Additional GS48 and GS375 scrubbers would need to be manufactured to achieve recapture from all log fumigations under tarpaulins;
- At current capability the time needed to manufacture that equipment is estimated to be ~6 years;
- However, there is potential for this to be reduced to 2-3 years, subject to a number of factors outlined above.