

**IN THE MATTER OF**

The Resource Management Act 1991

**AND**

**IN THE MATTER OF**

Application for resource consent under sections 88 and 124 of the Act, in relation to the proposed re consenting of the discharge of contaminants into air from fumigation at the Port of Tauranga.

**BY**

**GENERA LIMITED**  
**Applicant**

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**STATEMENT OF EVIDENCE OF DAVID WESLEY BAKER  
ON BEHALF OF THE APPLICANT**

17 April 2023

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Background, Health, Safety, Compliance obligations and systems

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## PEPEHA<sup>1</sup>

Tēnā Koutou Whanau  
E mihi ana ahau ki nga iwi o Ngāti Ranginui raua ko Ngāiterangi  
I a koutou, tēnei te mihi maioha i a koutou  
E hore ahau i te Māori  
Engari  
No Ingarani te Tipuna  
Ko Tokoroa te Kāinga  
Ko Titiraupenga te Maunga  
Ko Waikato te awa  
Kei te mahurangi te Maunga mē te Awa hoki ahau  
Ko European tōku iwi  
Ko Baker tōku whanau  
Ko David tōku ignoa  
No reira  
Tēnā koutou Tēnā koutou Tēnā koutou katoa

## INTRODUCTION

1. My full name is **David Wesley Baker**.
2. I am the Health, Safety & Compliance Manager at Genera Limited.
3. My evidence is given on behalf of Genera Limited ("**Genera**") on its resource consent application under sections 88 and 124 of the Resource Management Act 1991 ("**RMA**") in relation to the proposed re consenting of the discharge of contaminants into air from fumigation at the Port of Tauranga.
4. My evidence relates to Genera's health, safety and compliance obligations and systems.
5. I am authorised to give this evidence on behalf of Genera.

## Qualifications and experience

6. I have the following qualifications relevant to my position and the evidence I shall give:
  - (a) Bachelor of Forestry Science (Hons); and
  - (b) National Certificate in Health & Safety Coordination Level 4.
7. I have held the position of Health, Safety & Compliance Manager since July 2018. I have over 18 years' experience in regulatory and compliance-based roles within primary industry. This includes eight years as the Quality & Technical Manager for a Ministry for Primary Industries ("**MPI**") approved independent verification agency ("**IVA**"). The IVA reviews, audits and reports on third party compliance with MPI biosecurity requirements associated with import and export. One of the companies I regulated in this capacity, was Genera.

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<sup>1</sup> Translation provided in Attachment DB1

## Code of conduct

8. Even though I am employed by Genera and am giving this evidence in my capacity as Genera's Health, Safety & Compliance Manager, I wish to confirm that I have read the 'Code of Conduct' for expert witnesses contained in section 9 of the Environment Court's Practice Note 2023<sup>2</sup>.
9. My evidence has been prepared in compliance with that Code.

## Background and role

10. As the Health, Safety & Compliance Manager at Genera I am responsible for the development, review and support of systems that facilitate operational compliance with the Health and Safety at Work Act 2015 ("**HSWA**") and compliance with the conditions of the consents and authorities that it operates under pursuant to the RMA, the Hazardous Substances and New Organisms Act ("**HSNO**") and MPI biosecurity and phytosanitary requirements.

## Scope of evidence

11. I provide evidence in relation to the following matters:
  - (a) background to the present application;
  - (b) an overview of the HSWA and compliance requirements that regulate Genera's fumigation activities at the Port of Tauranga ("**PoT**");
  - (c) a description of the systems Genera has in place to ensure compliance with those requirements;
  - (d) a summary of the overall performance of the compliance and monitoring systems;
  - (e) comments on the Section 42A Officer's Report ("**s42A Report**") that are within my area of expertise and role in Genera; and
  - (f) the proposed conditions.

## EXECUTIVE SUMMARY

12. Genera takes its health, safety and environmental responsibilities very seriously. We all work, and a number of us live, close to where the fumigations take place. We undertake our work every day to ensure that our activities are safe including ensuring that our work is in accordance with the controls and regulations that are applicable to the activities being carried out. If we, who work closest with these fumigants, do that, then I am confident that other workers and the public beyond the PoT boundary are also safe.
13. Genera is required to record all fumigation events undertaken at the PoT and provide monthly reports to BOPRC regarding MB and phosphine compliance. Additionally annual reports are

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<sup>2</sup> [Practice-Note-2023-.pdf \(environmentcourt.govt.nz\)](#)

provided to the EPA and BOPRC regarding MB compliance. Similar reports would be provided for EDN.

14. To meet these reporting obligations Genera has in place a comprehensive data recording regime that downloads directly from the monitoring devices used at each fumigation event and facilitates the provision of reports in the form required by the respective authorities.
15. The data recorded by independent contractors indicate that the ventings undertaken met the requirements of the EPA controls before the issue of its HSR001635 decision reassessing methyl bromide controls and that, as a result of that decision, there has been a ten-fold reduction in the volume of methyl bromide discharged to air.
16. In addition, monitoring undertaken by independent contractors indicates that the monitoring devices used by Genera are appropriate, accurate and conservative.
17. While I accept the s42A Report author's recommendation to grant the resource consent application that was incorporated in the Hearing Agenda provided in January, I do have significant concerns with the s42A Report itself and the BOPRC Technical Report that informed it.
18. The majority of my concerns were addressed by the peer review commissioned by BOPRC and subsequent Joint Witness Statement in relation to planning ("**JWS**") however, some proposed conditions remain that I believe are unjustified, unnecessary and would have a significant negative impact on the PoT's operability, with compounding effects throughout the supply chain, without offering any additional protection to the public or the environment.
19. For example, the proposed condition that introduces pressure testing for containers has the potential to create opportunities for unwanted biosecurity pests to escape, which would be catastrophic for both the Bay of Plenty region and the country.
20. A copy of the conditions proposed by Genera as the applicant, based on the JWS conditions, is attached as Appendix A to Mr Frentz' evidence. I have reviewed those conditions and provided feedback as part of my evidence.
21. I can confirm that with regard to the proposed conditions and controls already in place for Methyl Bromide through the EPA's decision HSR001635, Genera currently complies with, or exceeds the standards specified in those controls.

## **BACKGROUND MATERIALS REFERENCED**

22. In preparing my evidence, I have had regard to the following documents:
  - (a) the HSWA and Regulations, WorkSafe's Safe Work Instruments, EPA decision documents and guidance, Genera Safe Operating Procedures, PoT Operating Procedures and Consent requirements;

- (b) the application documents and AEE, including the technical reports and further information;
- (c) Air Matters 2021 Final Summary Report for WorkSafe New Zealand;
- (d) CIA provided by Ngāi Tūkairangi;
- (e) Monitoring and compliance reports prepared by independent contractors for Genera;
- (f) the application, research documentation and evidence provided for the Reassessment of Methyl Bromide by the EPA, 2020 (APP203660) and the subsequent decision HSR001635;
- (g) EPA Methyl bromide fumigations Post-reassessment guidance for fumigators April 2011;
- (h) ICCBA Methyl Bromide Fumigation Methodology;
- (i) the s42A Report;
- (j) the statements of evidence of Mr Frentz, Mr Cressey (ESR), Mr Murray (Sapere) and Nicholas Browne (AirMatters) as the applicant's expert witnesses; and
- (k) the planners' JWS.

## **BACKGROUND TO THE APPLICATION**

23. Fumigation undertaken by Genera is subject to a raft of regulations, safe work instructions, reassessment conditions and resource consent conditions under a number of different statutes, as described in more detail below. It is important to Genera that as far as possible, this regulatory regime is aligned so that fumigation for quarantine (QPS) and biosecurity purposes can be undertaken as effectively and as efficiently as possible to protect New Zealand's trading obligations and its environment.
24. Fumigation is subject to very stringent and comprehensive regulation at both central and local government levels and Genera, as well as other fumigators, must comply with that regulation.
25. In 2020 the use of methyl bromide was reassessed by the Environmental Protection Authority ("**EPA**") for the first time since its original assessment in 2010 by the former Environmental Risk Management Authority ("**ERMA**").
26. It was a requirement of that original assessment (HRC08002) that methyl bromide, which could only be used as a quarantine and phytosanitary ("**QPS**") fumigant under the Montreal Protocol, had to undergo effective recapture in 100% of cases by October 2020. Effective recapture was defined as reducing the concentration in the headspace down to 5ppm prior to venting.

27. It is important to note that the restrictions and additional controls imposed on methyl bromide use globally, are driven by the fact it's an ozone depleting gas (this is the focus of the Montreal Protocol). It is often mistakenly assumed that these restrictions are in place to address health concerns. Fumigants that are non-ozone depleting with a higher level of toxicity, are not subject to similar controls or recapture.
28. Given there is no technology available capable of reducing concentrations down to 5ppm, this decision would have resulted in the inability to use methyl bromide, which is a critical biosecurity tool for trade and border protection, as prescribed by countries New Zealand exports to and by MPI for import goods.
29. ERMA's 2010 decision led to a significant amount of work within the forestry and fumigation/processing industries to develop complying treatments and systems.
30. As Robbie Ramlose has noted in his evidence, Genera has an independent company (Genera Science and Innovation) dedicated to researching and developing complying treatments and systems.
31. During this period from 2010 Genera has developed Phosphine as an alternative treatment and now approximately 75% of logs exported to China are treated with Phosphine, the balance is debarked or fumigated on shore with methyl bromide.
32. Genera also developed liquid-based recapture equipment that was used to treat approximately 75% of logs fumigated on the wharf at Mount Maunganui and either this or a carbon-based system was used to recapture methyl bromide used to fumigate containers in 100% of cases.
33. Logs to China can also be exported without bark and Kaingaroa Timberlands has invested in a significant debarking facility at Murupara.
34. Since 2010 there has been significant progress towards meeting the recapture goal set by ERMA, but there remained obstacles to full compliance, for example, it became clear that methyl bromide could not be recaptured from ships' holds. More significantly, and as mentioned earlier, there is no technology available then or now that can recapture the methyl bromide remaining in the headspace down to 5ppm.
35. This led to an application to the EPA to reassess the controls regulating the use of methyl bromide in New Zealand which was heard over the 2020/2021 period resulting in a decision (HSR001635) dated August 2021.
36. The 2021 EPA decision HSR001635 is, not surprisingly in terms of the advances in technology and expert opinion now available to the EPA to consider, quite different from the 2010 ERMA decision with very specific standards and timeframes to comply with, such as:
  - a. the prohibition of fumigating ship holds with methyl bromide from 1 January 2023;
  - b. buffer distances related to the dosage applied and minimum recapture achieved; and

- c. a “sinking lid” on venting methyl bromide to the atmosphere so that by 1 January 2031 99% of methyl bromide remaining at the end of fumigation must be recaptured from containers with the same for fumigation under sheets by 1 January 2035.

**What has been done since 2019**

37. Genera’s current resource consent, RC62719, was due to expire in April 2020. In order to continue operating in the interim, an application to replace the expiring consent with a new consent was required to be lodged with BOPRC six months before April 2020.
38. While I know and understand that there are matters in this application that are important to the community, I believe the necessity for fumigation is equally important to achieve an effective and efficient biosecurity and QPS system that facilitates trade, and to protect New Zealand’s environment from introduced pests and diseases.
39. Genera has developed and adopted new methodologies and recapture and carbon recovery systems to enable full compliance with EPA decision HSR001635. Failure to do so would have required Genera to cease using methyl bromide for fumigation activities. Accordingly, it is important that the conditions of a new resource consent align with the conditions of the EPA’s decision HSR001635.
40. I acknowledge that as a consequence of the EPA decision HSR001635 the fumigation activity undertaken by Genera that utilised methyl bromide has changed since its application was lodged in October 2019 and this has led to the resubmission of the assessment of effects on the environment setting out these changes as well as changes made in response to the Council’s requests for further information. I understand that this is now the primary documentation in support of the application that is currently being heard and this is the subject of my evidence.

**What has happened since the EPA’s HSR001635 decision and what is likely to happen in the future**

41. Genera is currently fumigating nationally and on the PoT in full compliance with the controls stipulated in decision HSR001635.
42. Since the issue of decision HSR001635 Genera has:
  - a. stopped using methyl bromide to fumigate ship holds;
  - b. moved to a carbon-based recapture system for export logs fumigated with methyl bromide that is achieving a minimum recapture level of 90%. The 90% minimum control (HSR001635) doesn’t take effect until 1 January 2033. With the dose rate required, Genera need to recapture to this level or the buffer zone distance is too large to fumigate logs at PoT;



- c. Applied recapture to 100% of containers fumigated with methyl bromide at PoT. Genera has been achieving the 80% minimum recapture level since July 2022, noting this requirement didn't take effect until 1 January 2023;
  - d. Investigated, developed and implemented a system that recovers methyl bromide from saturated carbon then chemically destroys it. This enables reuse of the carbon, saving it from going to waste;
  - e. Since mid-2022, applied dose to concentration to all log rows, in advance of the 1<sup>st</sup> of January 2024 deadline in HSR001635, resulting in the application of approximately 30-40% less methyl bromide.
43. There is still a large amount of work to be done to achieve a sustainable future utilising a non-ozone depleting fumigant that can protect New Zealand's environment and comply with the requirements of New Zealand's trading partners.
44. The EPA and WorkSafe have approved the use of ethanedinitrile (EDN) as an alternative fumigant to fumigate export logs or timber under a sheet or in a shipping container. Agreement will need to be reached with New Zealand's trading partners for the use of EDN as an official phytosanitary treatment.
45. India are not likely to accept debarking as a risk mitigation measure for export logs, one insect of concern burrows into the log and is therefore not impacted by the removal of the bark layer.
46. EDN and phosphine do not require recapture as they are not ozone depleting gasses.

#### **OVERVIEW OF HEALTH, SAFETY AND COMPLIANCE REQUIREMENTS**

47. Fumigation activities undertaken by Genera are permitted and controlled by legislation and regulations such as the:
- a) Health & Safety at Work Act 2015;
  - b) Maritime Transport Act 2014;
  - c) Hazardous Substances & New Organisms Act 1996;
  - d) Resource Management Act 1991;
  - e) Biosecurity Act 1993;
  - f) General Risk & Workplace Management Regulations 2016;
  - g) Hazardous Substances Regulations 2017;
  - h) Hazardous Substances Additional and Modified Requirements for Specified Class 6 and 8 substances Safe Work Instrument 2017;

- i) WorkSafe safe work instruments for Methyl Bromide and EDN;
  - j) EPA HSR001635 Decision, Methyl Bromide Reassessment 2019;
  - k) EPA approval for Aluminium Phosphide HSR001636;
  - l) EPA approval for EDN (HSR101529);
  - m) EPA Methyl Bromide Fumigations, post-reassessment guidance for fumigators 2011; and
  - n) MPI Treatment Supplier and Plant Export Certification Standards. Genera is an MPI approved treatment provider.
48. Collectively this provides a robust framework which Genera must operate within to ensure workers and the public are adequately protected from risk, plus maintain our license to operate.

## **DESCRIPTION OF THE ACTIVITY**

### **Fumigation**

49. The general principles for managing risk with fumigation are predominantly the same irrespective of the fumigant applied whether its methyl bromide, phosphine or EDN. There are four to five main phases, site evaluation, application, exposure period, recapture (where required) then ventilation.
50. A site evaluation occurs at each new fumigation location, or if a location is modified. A trained technician assesses the suitability of the site to ensure that it is secure from public access, has adequate distance to public boundaries and the fumigation enclosures or areas are suitable and safe. Any identified issues are corrected prior to fumigation or the site is not used.
51. Application is when the fumigant is applied to the covered log or timber stack, container, ships hold or fumigation chamber. The key risk management steps are:
- a) Notifications are sent out in advance, advising nearby parties when and where the fumigation will occur.
  - b) A risk area is coned off with signage placed to exclude other workers from entering the zone around the fumigation area.
  - c) The integrity of the fumigation enclosure is checked to ensure it is sufficiently gas tight, any ducting or vents are sealed and closed, repairs are made to any minor issues. If the enclosure cannot be made sufficiently gas tight then it is not used for fumigation.

- d) A small amount of fumigant is added to the fumigation enclosure, the supply is stopped and there is then a check for leaks using a gas detection device. Any leaks are repaired and gas levels rechecked prior to the full dosage of fumigant being applied.
  - e) The exception to point d) above is Aluminium Phosphide (ALP) as these are slow-release tablets. For ALP the full dosage is applied with leak checking and monitoring throughout the fumigation period. These are low dosage applications predominantly applied to logs in vessel holds typically within 4 hours of the vessel departing overseas. Where vessel holds are fumigated a trained technician travels with the vessel to undertake ongoing leak checks and monitor the fumigation in transit.
  - f) During application and on completion the technician conducts ongoing leak checks and addresses any issues.
  - g) A coned off area (risk area) with signage is left in place around the fumigation enclosure. The boundary of the risk area is checked to confirm fumigant levels are safely below the Worker Exposure Standard (“**WES**”) before the team departs.
52. The exposure period is the amount of time required for the fumigation to be successful provided the required concentration and temperature is maintained. This combination of factors is set by MPI for official import treatments and by our trading partners for official export treatments. During the exposure period:
- a) The immediate area around the fumigation enclosure remains coned off with signage in place.
  - b) Restrictions are in place for nearby activities i.e., log marshalling companies are not permitted to load in and out of log rows adjacent to any under fumigation.
  - c) A watch person monitors fumigated log rows to ensure their integrity is maintained and checks for any leaks using a gas detection device. Monitoring frequency is adjusted according to risk (i.e., increased monitoring in high wind conditions).
53. As methyl bromide is an ozone depleting substance, there are varying recapture requirements based on the type of fumigation enclosure and distance to boundary as per the EPA decision HSR001635. The general principles of recapture are the same and are summarized below:
- a) At the end of the exposure period after determining treatment success, a concentration reading is taken from inside the fumigation enclosure. The recapture unit is then run until the concentration of methyl bromide is reduced by the required percentage.

- b) The methyl bromide is extracted from inside the fumigation enclosure using ducting and fans which force the methyl bromide through a recapture medium. The most commonly used medium is activated carbon, which the methyl bromide attaches to.
  - c) The exhaust of the recapture unit is monitored to detect “breakthrough”, which indicates that the recapture medium is saturated. When breakthrough occurs, the process is paused and a new recapture unit with fresh recapture medium is attached to continue the recapture process.
54. Ventilation happens at the end of treatment, or after recapture, where recapture is required. This involves a controlled release of the fumigant into the air, at a rate which allows effective dilution and the maintenance of safe levels outside the risk area. The fumigation team inside the risk area wear PPE to protect themselves from any elevated fumigant concentration levels present inside the risk area. The key controls are:
- a) Prior to ventilation the size of the risk area is increased and neighbouring operations advised.
  - b) The risk area boundary is extended further in the downwind direction.
  - c) Warning signs are placed at all access points in the immediate area.
  - d) Checks are made to ensure no other workers (i.e., occupational bystanders) are in the risk area. All workers within the risk area have appropriate PPE.
  - e) The fumigant is slowly released from the fumigation covers while team members actively monitor fumigant levels at the risk area boundary using gas detection devices.
  - f) If fumigant levels approach the WES concentration limits at the risk area boundary, the venting process is slowed and / or the risk area boundary is increased with any nearby workers moved further away. Adjustments to the boundary are made to account for any changes in wind direction. As fumigant levels reduce and stabilize during ventilation, the risk area can be reduced in size accordingly, with the risk area boundary monitored using gas detection devices to ensure levels are maintained safely below the WES limits.
  - g) By ensuring concentrations are kept below WES limits at the edge of the risk area, this ensures levels at the PoT boundary are kept below the Tolerable Exposure Limits (“TEL”) at the buffer zone/site boundary. Monitors are placed downwind of ventilation events at the site boundary to check and confirm that TEL limits have been complied with. The recent reduction in the WES values for methyl bromide has also significantly reduced the potential for high levels to be detected at the buffer zone boundary due to the nature of this workplace control. The WES-TWA reduced from 5ppm to 1ppm and a WES-STEL of 2ppm was introduced.

- h) On completion of venting fumigant levels are checked in and around the fumigation area e.g., the log stack. The risk area remains in place until fumigant levels are sustained below the WES. The risk area is then removed and control of the fumigated product is handed back to the customer or logistics operator.
- i) Logs in ship holds treated in-transit with phosphine are ventilated in international waters prior to arrival in China.

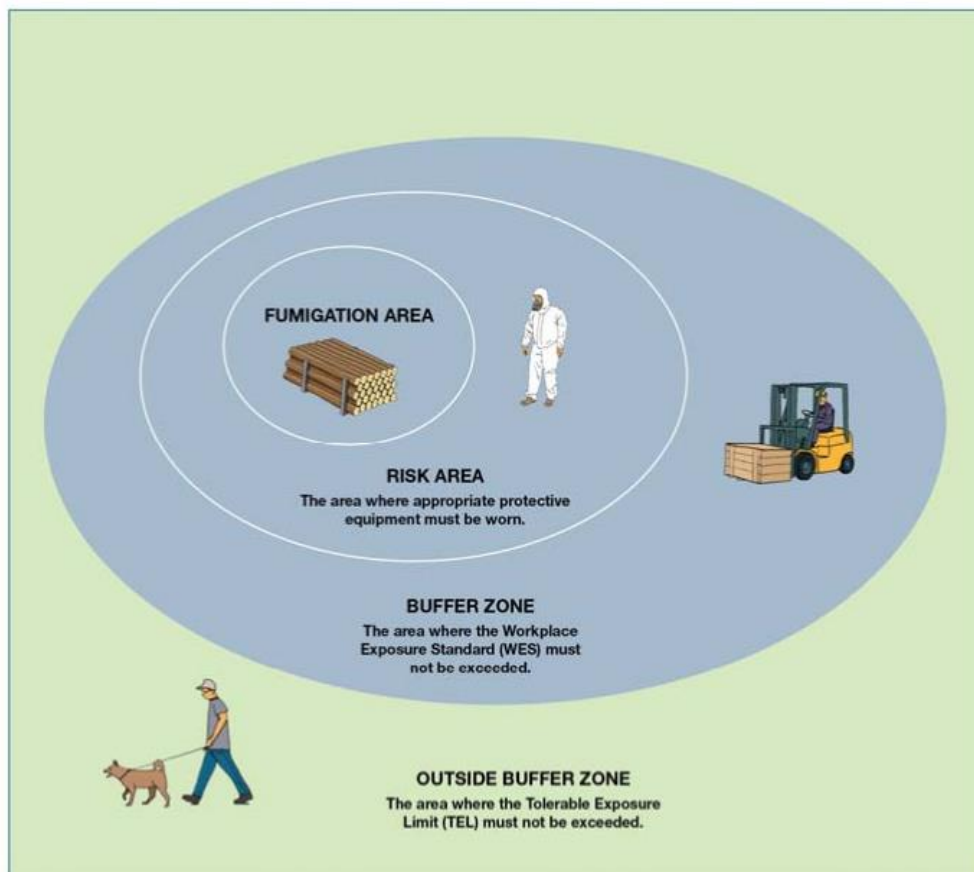


Figure 3: An illustration of where the TEL and WES values apply

- 55. Forest products, including logs, fumigated under sheets for export are subject to MPI's "Post-fumigation exposure periods for export forest products" which sets a minimum time from when fumigation sheets are removed until the forest product must be loaded onto a vessel, prior to export.
- 56. The exposure periods aim to minimise the risk of re-infestation of fumigated breakbulk forest products. Failure to meet the prescribed timeframe results in forest products having to be refumigated or not exported.
- 57. The exposure periods vary based on the time of year but may be as short as 48 hours. With such a short time frame, it is not logistically possible to fumigate forest products under sheets outside the port environment, where they need to be loaded directly onto a vessel.

## PERFORMANCE OF MONITORING AND COMPLIANCE SYSTEMS

58. There is no evidence from either the monitoring undertaken by Genera or monitoring by BOPRC or other independent organisations, such as WorkSafe NZ, that there are concentrations of methyl bromide exceeding the 1-hr, 24-hr or annual TELs at Totara Street, Blake Park, the Whareroa Marae or other areas able to be accessed by the public, on any more than a rare, short lived and unintentional basis and prior to the EPA's decision HSR001635. The detected readings were at low levels of exceedance, at the port boundary measured as TVOCs, of which methyl bromide is one component and not 100% of the reading. The TELs are described in Mr Cressey's evidence and I rely on his expert opinion that these are appropriate for the protection of human health.
59. Since 2016 there were 21 enforcement proceedings issued by the BOPRC to Genera in relation to its existing consent, with the last one being a formal warning related to a fumigation event in July 2020. These have included:
- 4 formal warnings;
  - 7 infringement notices; and
  - 10 abatement notices.
60. The formal warnings related to the late provision of an emergency management plan; incorrect or no signage at the site of the fumigation; notification less than 12 hours prior to fumigation occurring, and a vessel ventilation.
61. The infringement notices related to existing abatement notices and resulted in fines totaling \$6,000.
62. The abatement notices related to a range of conditions of consent including being within 100m of the boundary of the site (being Mean High Water Spring tide line (MHWS)) (2x), notification of fumigation less than 12 hours, notification of a complaint more than 24 hours following receipt, a plan of fumigation areas not being made available, fumigation of grain in a ship's hold without consent (albeit at the request of MPI in relation to a biosecurity risk and which is provided for under the Biosecurity Act), ventilation during the hours of darkness, insufficient or no signage and exceeding the TEL at the buffer zone boundary which was self-reported, as required, by Genera.
63. Genera also report elevated boundary readings and exceedances to WorkSafe who have not taken enforcement action where BOPRC have. WorkSafe were satisfied that the readings were attributable to other VOC's in the vicinity of the monitoring device, rather than methyl bromide.

64. As the fumigation process is subject to many uncontrollable factors such as the wind and weather on any particular day and all VOCs (from all sources) are measured, of which MB is one of many, it is not unexpected that there may be measurements of TVOCs in excess of 1 ppm at the boundary as a 1-hour average, and the potential effect of these are described in Mr Cressey's evidence.
65. In summary, because of the innate conservatism of the TEL measures and the infrequency of potential exceedances it is unlikely that there would be a health risk resulting from these exceedances.
66. In my opinion, the reporting indicates that the system of monitoring is working well and the proposed conditions will refine and enhance this system. The facts, when analyzed in their correct context, do not support assertions that Genera has a track record of non-compliance.
67. During the reassessment of the use of methyl bromide that resulted in the EPA decision HSR001635, the EPA commissioned WorkSafe to conduct independent air monitoring of the concentrations of methyl bromide and TVOCs during log row ventilations at the PoT. AirMatters were subcontracted to do the monitoring and prepare the report for WorkSafe and, in turn, the EPA. In summary:
  - a) 20 fumigation events were monitored between November 2019 to January 2021;
  - b) The highest 1-hour methyl bromide concentration measured at the port boundary was 0.72ppm and the highest 24-hour concentration measured at the port boundary was 0.202ppm. Both of these concentrations are less than the respective TELs of 1ppm and 0.333ppm;
  - c) Measurements taken inside the PoT boundary also indicated levels were maintained below the WES in effect at that time.
68. Subsequently, and effective from January 2022, any fumigation under sheets using methyl bromide has been undertaken in full compliance with EPA decision HSR001635. I provide Table C from decision HSR001635 below to show what the relevant controls are:

**Table C. Minimum buffer zones for methyl bromide fumigation under sheets**

Minimum recapture (%)	Minimum buffer zone:	Minimum buffer zone:	Minimum buffer zone:
	dose rate $\leq 40 \text{ g/m}^3$ (m)	$40 \text{ g/m}^3 < \text{dose rate} \leq 72 \text{ g/m}^3$ (m)	$72 \text{ g/m}^3 < \text{dose rate} \leq 120 \text{ g/m}^3$ (m)
No recapture	210	515	700
30	155	380	520
40	135	335	455
50	120	290	395
60	100	245	335
70	80	200	270
80	65	155	210
90	50	110	150
99	50	70	95

69. At the PoT logs are only fumigated under cover at the Mount Maunganui wharves. At current fumigation rates for China (80-120g/m<sup>3</sup>), this requires recapture to a minimum of 90% and a buffer distance of 150m in accordance with Table C (see the row outlined in red).
70. The buffer zone boundary at the PoT is the same as the restricted access boundary at the Mount Maunganui wharves. This means that the public cannot inadvertently access any area within the buffer zone.
71. This limits the space available to conduct log fumigation under covers, to a small area in the centre of the wharves. Recapture to less than 90% isn't practicable as the required buffer distance in Table C becomes too large to fit within the port boundary at the dose rates that are currently required for the export of logs to China.
72. The lack of available space and the increasing levels of debarking capacity at the PoT and at Murupara has seen a significant reduction in the number of log row fumigations and consequently the volume of methyl bromide being used.
73. The reduced volume, application of dose to concentration (less methyl bromide applied at the start) and 90% recapture has resulted in significant reductions in the concentration of methyl bromide vented to air and subsequently detected at the site boundary.
74. The table below provides summary information comparing 2021 and 2022, noting that monitoring devices (Photo-Ionisation Devices or PIDs) used at the PoT boundary measure all VOCs of which methyl bromide is one of many.



<b>Total number of log rows fumigated</b>	<b>2021</b>	<b>2022</b>	<b>% Decrease</b>
		1671	174
<b>Recapture &amp; Ventilation Stats</b>			
	<b>2021<sup>1</sup></b>	<b>2022</b>	<b>% Decrease</b>
Average MB vented per log row (kg)	28.4	1.2	95.77%
Total MB vented (kg)	47395	209.15	99.56%
<b>Boundary Monitoring Results (VOC's)</b>			
<i>TEL = 1ppm methyl bromide, max 1-hour average</i>			
	<b>2021</b>	<b>2022</b>	<b>% Decrease</b>
Maximum 1-hour average (ppm)	1.14 <sup>2</sup>	0.13	88.60%
Average 1-hour average (ppm)	0.06	0.03	50.00%

75. Note 1 in the above table relates to the fact that Genera was not directly measuring (or required to measure) recapture efficiency in 2021 the recapture and ventilation statistics have been calculated using the following:
- Average log row size;
  - Average dose rate;
  - An absorption rate of 60%, meaning that at the end of the fumigation period, and immediately prior to recapture commencing, 40% of the volume applied was available for recapture; and
  - A conservative estimate that 30% of the methyl bromide remaining in the enclosure was recaptured using the liquid scrubbers.
76. Note 2 in the above table refers to a potential exceedance which was reported to BOPRC. Genera demonstrated that the exceedance was not attributable to methyl bromide which BOPRC and WorkSafe accepted. An example of how this might occur is if heavy equipment or a locomotive is being used in the vicinity of the PID recording TVOCs and diesel fuel exhaust emissions contaminate the reading.
77. Overall, there has been a reduction in the average amount of methyl bromide released to the atmosphere from each log row from 28.4 kg/row to 1.2 kg/row – a 95.77% decrease.
78. Only if a trading partner (China for example), reduced its required dose rate, say to between 40 g/m<sup>3</sup> and 72 g/m<sup>3</sup>, would the buffer zone be able to be reduced. In such a case the buffer zone would be reduced to 110 m in accordance with the 90% minimum recapture line in Table C above, and only then would more space become available for the treatment of log rows with methyl bromide at the Mount Maunganui wharves. Such a

decision is outside of Genera's control but would not change the requirement that the fumigator must comply with the controls specified in the EPA decision HSR001635.

79. As part of our existing consent condition for the PoT, Genera is required to carry out ambient air sampling followed by laboratory analysis, to determine the extent to which background VOCs may influence PID methyl bromide monitoring results.
80. To do this ECOCIFIC is engaged as an independent third party. ECOCIFIC uses a Fourier Transform Infrared Spectrometer ("FTIR") machine that can distinguish different VOCs in the air, including methyl bromide. At the same time TVOC concentrations in the same location are measured using Genera PIDs. This ensures that data is acquired and analysed under the same operating conditions.
81. Summary information from recent ECOCIFIC reports is included in the table below, noting that the 2022 data is preliminary with further ventilations yet to be analysed. Although this is based on a small sample size (only 2 fumigation events were able to be measured), there has been a substantial reduction in the TEL readings for 2022, since the introduction of, and compliance with, EPA decision HSR001635.

<b>Maximum 1-hour average values measured downwind at the port boundary during log row ventilations.</b>			
<i>TEL = 1ppm methyl bromide, max 1-hour average</i>			
<b>Year</b>	<b>Ventilation Event</b>	<b>Methyl Bromide (ppm)</b>	<b>TVOC (ppm)</b>
2020	1	0.26	0.41
	2	0.12	0.08
	3	0.06	0.34
	4	0.04	0.01
	5a	0.12	0.35
	5b	0.29	0.32
	6	0.25	0.52
2021	1	0.14	0.17
	2	0.11	0.13
	3	0.29	0.26
	4	0.07	0.08
	5	0.5	0.36
2022	1	0.02	0.03
	2	0.02	0.02

82. The 2021 ECOCIFIC report concludes that:

*“although the PID measures TVOC, the generally high correlation with [the] FTIR indicates that the PID is responsive to the methyl bromide presence in ambient air at the port boundary.”*

and

*“during most venting events, [the] PID was reporting higher concentrations of TVOC than methyl bromide by [the] FTIR”*

83. Therefore, in my opinion, the Genera PID is an appropriate, fit-for-purpose monitoring device for use at the PoT boundary and that the results provided by the PIDs are conservative adding another layer of caution to the fumigation operation.
84. Devices that measure methyl bromide directly are either inaccurate in the 1ppm range of the TEL, or very expensive and complex (like the FTIR), needing highly trained technicians to operate the equipment and interpret the results, and are therefore less efficient in an operating environment where a quick response may be required.

### **BOPRC SECTION 42A REPORT AND JWS**

85. I have reviewed the BOPRC s42A Report prepared by David Greaves, the technical peer review prepared by Tonkin and Taylor and the JWS prepared by the planning experts (David Greaves, Marlene Bosch and Keith Frentz).
86. The original s42A Report and the BOPRC Technical Report appended to the s42A Report left me with significant concerns and presented a situation where Genera would not be able to both give effect to its consent conditions and continue operating.
87. The peer review and subsequent JWS have made significant improvements. There are still a few proposed conditions that lack justification and could yet mean Genera is unable to continue operating or doing so would result in significant and unnecessary increases to cost and time that would then compound throughout the supply chain. More importantly, the inability to fumigate imported cargo readily or effectively creates opportunities for biosecurity pest incursions. I address these conditions with explanations of my concerns below.
88. It is unclear to me why there is a need for variance from current EPA controls particularly in regard to methyl bromide given the recent and very comprehensive reassessment undertaken by the EPA, which was primarily based on air modelling for the PoT, with very conservative controls imposed.

### **PROPOSED CONDITIONS**

89. Unless otherwise stated below, I accept and support the agreed proposed conditions recorded in the JWS.
90. In general, I would prefer not to see duplication of EPA controls in the resource consent conditions, where they have been adopted wholesale, and would rather see them cross referenced in the consent conditions.

91. I agree with the revised position that TEL values apply at the PoT boundary and beyond rather than within the port environment which is a workplace, as supported by Nicholas Browne and Peter Cressey. In addition:
- a) It is also clear in the EPA Methyl bromide fumigations post-reassessment guidance for fumigators April 2011 document, which is posted on the WorkSafe website, and further supported by discussions I have had myself with WorkSafe, that workers can be present in the buffer zone. I note that the 2011 guidance states: "The health of workers is protected by the requirements to comply with Workplace Exposure Standards (WES). Workers are not just those who are involved in the fumigation, but include all people employed to work at the site, for example, office workers or cargo handlers".
  - b) A decision to the contrary would mean everyone except Genera staff, would be excluded from a large area around each fumigation event, which would effectively shut down significant areas of the PoT for long periods of time. For example, a buffer zone of 150m around each log row from which workers are excluded would close that area for port operations, from when methyl bromide is introduced to when ventilation is completed around 24 hours later.
  - c) This would also set a precedent with significant and far-reaching implications for other substances in the port environment and workplaces that are within worker tolerances, but not public tolerances. The same logic should be applied to all substances and not fumigants alone.
92. I agree with the revised position not to use our workers' personal health monitoring information as a biological assay for compliance with workplace exposure standards in the wider port environment. I also agree that WorkSafe is the appropriate regulator in this area as explained in Mr Browne's evidence.
93. I disagree with proposed condition 3.1, prohibiting different fumigation events to be ventilated at the same time. This is also an area of disagreement between the planners in the JWS, Although I note that the current position appears to have softened from the original s42A Report conditions:
- a) Mr. Cressey explains why this condition is unnecessary from a toxicological point of view in his evidence to the effect that the ventilation of methyl bromide, phosphine and EDN at the same time does not result in a cumulative effect.
  - b) Ultimately it is Genera's responsibility to ensure any ventilations (independent or cumulative) comply with all applicable requirements and are managed in a way to prevent adverse effects.
  - c) The effect of staggering ventilations combined with the EPA control preventing ventilation until windspeeds are 2m/s or above, would compound delays and costs throughout the

import and export supply chain. Further reducing the ability to determine when cargo would be available post fumigation. This is in an environment where accurate forward planning and efficiency is critical.

94. I disagree with proposed condition 3.5 that defines the end of ventilation as “being the time that monitoring devices at the Risk Area boundary no longer register TVOCs above background levels”. In my opinion this condition should be amended to incorporate the following from EPA decision HSR001635 for methyl bromide and the WorkSafe Safe Work Instrument (“**SWI**”) for EDN. Ideally, in my view, these should be cross referenced rather than replicated:
- a) For methyl bromide:
- “Data is to be recorded every 3 minutes from the start of ventilation until the exposure level at the monitoring location is below 0.05 ppm for at least:*
- (a) 15 minutes, where 7 kg or more of methyl bromide is applied in a 1-hour period; or*
- (b) 3 minutes, where less than 7 kg of methyl bromide is applied in a 1-hour period.”*
- b) For EDN:
- “Monitor until the end of the buffer zone period which ends with the latest of the following:*
- (a) at least 1 hour has lapsed since ventilation has been completed:*
- (b) measurements taken in the open air adjacent to the export logs or timber being fumigated in the enclosed space have, for a period of 15 minutes, continuously shown an airborne concentration of EDN below that of each workplace exposure standard.”*
95. I disagree with proposed condition 3.7 that prevents ventilation if the windspeed drops below 2 m/s at any point in the 10 minutes prior. Repeated short-lived dips in windspeed could keep delaying ventilation indefinitely. I recommend the condition requires an average windspeed of 2 m/s or above in the 10 minutes prior to ventilation starting.
96. I disagree with the proposed condition 3.10 requiring pressure testing of containers prior to fumigation. I note that this is also an area of disagreement between the planners in the JWS. The following points outline my concerns:
- a) The condition is based on a belief presented in the Tonkin and Taylor peer review that it’s best practice and commonly done. In my experience it is not. Genera are the largest provider of fumigation services in Australasia. Fumigators are not required to pressure test containers by either the Department of Agriculture, Forestry and Fisheries in Australia or the MPI in New Zealand. I am not aware of any of Genera’s competitors doing so either.
- b) Where pressure testing is undertaken it is applied to dedicated fumigation chambers which are often inside or connected to other buildings. The pressure test provides confidence

that fumigants won't readily travel into connected spaces, which could present a risk to other workers and treatment success.

- c) With shipping container fumigations or fumigations that are not connected to other buildings, access is available to all sides of the container to check for and manage any leaks. Any nearby workers are already excluded through the imposition of the Risk Area boundary and this boundary may easily be moved further away if required.
- d) The following paragraphs set out the process undertaken prior to fumigation to ensure that the fumigation enclosure is fit-for-purpose:
  - I. Pre-treatment, the container is inspected for any visible gaps or holes which are addressed before any fumigant is applied.
  - II. A small amount of fumigant is introduced, the supply is then stopped while a thorough leak check is undertaken using a gas detection device. Identified leaks are repaired or where this isn't possible, the container is fumigated under a cover instead. The comments in proposed condition 5.2 support this approach as it states: "any leaks are managed, as an alternative to pressure testing".
  - III. Given only a small amount of fumigant is in the enclosure at this stage, with visibly identifiable holes or gaps already repaired, it is highly unlikely that high levels of fumigant would escape and cause a TEL exceedance at the port boundary. To the best of my knowledge this has never happened.
  - IV. A signed and coned off area remains in place around the container the entire time from which people without the necessary PPE are excluded and the technician ensures fumigant levels remain below the WES at this boundary.
- e) The best available reference is the ICCBA Methyl Bromide Fumigation Methodology<sup>3</sup>. ICCBA stands for the International Cargo Cooperative Biosecurity Arrangement. Although I do note that New Zealand has only adopted certain parts of the methodology specific to monitoring fumigation concentrations to determine treatment success. ICCBA has 22 member countries across Australasia, Asia, South America and the Pacific Islands.
- f) This methodology states a pressure test is only required for chambers that are permanent structures designed specifically for fumigation and have an inbuilt extraction system to vent the fumigant from the chamber.

- g) For containers and fumigations under sheets there is no reference to a pressure test being required, instead there are references to preventing excessive leakage and ensuring they are adequately gas tight. Noting that the fumigant must be retained not only to protect workers and the public, but also to ensure the treatment is effective.
  - h) Leak checking and management is a key part of routine external audits undertaken by an independent entity on behalf of MPI. Last year at PoT there were 60 audits, an average of five per month.
  - i) As containers and also silos, ship holds and covered goods are not dedicated fumigation chambers it is highly unlikely they would pass a pressure test. I am unsure how a pressure test would be able to be conducted on large structures. The current leak checking process as described above is effective, efficient and maintains the safety of other people in the vicinity of the fumigation site.
  - j) If a pressure test failed, the contents would need to be moved to another container, ships hold or enclosure. For the most part this would not be possible. Containers could be fumigated under a sheet. The cost and disruption to the import and export supply chain would be significant.
  - k) With import goods, any transfers to alternate treatment enclosures increases the potential for unwanted pests to escape. This would be a significant risk to the biosecurity of the region and the country.
  - l) For example, approximately 1,536 containers were fumigated at the PoT in 2022. The extra time required to cover then uncover a container (given its highly likely to fail a pressure test) is approximately 90 minutes. Factoring in time, labour, equipment and administration, I estimate this would add an additional total cost of \$537,600 to our service. The extra 90 minutes per container has a knock-on effect to the supply chain, further reducing efficiency and increasing costs.
  - m) Fumigating a container under a cover increases the overall volume and the amount of fumigant required and, consequently the amount of fumigant discharged to air.
97. I disagree with the JWS agreed position to delete condition 3.13 in its entirety. The WorkSafe Safe Work Instrument for EDN states that “*ventilation is carried out only during the hours between sunrise and sunset*”, this provision should therefore remain as an EDN specific condition. My position in general, is that consent conditions must align with EPA and, where applicable, WorkSafe controls, unless there is a technically justified reason not to.
98. I disagree with the position put forward in condition 5.1 that all boundary monitoring must include a left and right monitor at 45° to the direct downwind monitor; this is also an area of disagreement between the planners in the JWS. The following points outline my concerns:

- a) This is currently undertaken for all covered fumigations (under sheets) and I would not see this changing.
  - b) However, I see no added benefit in the case of smaller fumigations, such as for shipping containers, that have lower dosages and minimal short-lived discharges.
  - c) With smaller fumigations the buffer distance is closer to the site of the fumigation (10m or 25m for shipping containers) so there is far less potential for significant drift to the left and right during the ventilation.
  - d) Depending on the predominant wind at the time, if the downwind boundary is 10m away the left and right monitors would only be placed 7.5m either side of the direct downwind monitor. If the wind direction means the downwind PoT boundary is hundreds of metres away, the monitors are highly unlikely to register anything from the minimal discharge. With methyl bromide this also increases the potential for false positive readings due to VOCs from other operational areas.
  - e) The EPA Methyl bromide fumigations Post-reassessment guidance for fumigators April 2011 has a provision for reducing monitoring to one “worst case” location, once confidence around monitor placement has been established for a given site and levels are maintained consistently below TEL levels, which they are.
99. Proposed condition 5.1 suggests that where it's not possible to place a monitor on the wharves edge, the monitor is instead placed as far as practicable immediately downwind of the fumigation activity. My comments in relation to this condition are:
- a) The closest possible location could be well within the buffer zone increasing the potential for the readings to be above TEL values, noting that this would not represent actual values at the boundary and an actual exceedance.
  - b) With the significant reduction in discharges that Genera has achieved, this suggestion should be workable provided that when elevated levels are detected inside the buffer zone boundary there is an agreed method of extrapolation to the buffer zone boundary, which is established before compliance with the condition is assessed.
  - c) The goal of the PoT is to keep the berths busy. This means that more often than not, it is not possible to monitor at locations directly downwind where ships are berthed, noting that this is already 50m – 80m inside the buffer zone boundary which extends into the harbour, depending on whether there is a ship berthed at the time.
  - d) When the berths are operational, they are hazardous and access is heavily restricted. There will also be significant sources of other VOC's which would create false positives with our methyl bromide boundary monitoring. Genera will address these points in the fumigation monitoring plan.



100. Proposed condition 5.4 in the s42A Report, which has been incorporated into JWS condition 5.7(f), makes reference to sections 9 and 11 of the Worksafe New Zealand document titled 'Health and Safety at Work (Hazardous Substances—Requirements for Specified Fumigants) Amendment Safe Work Instrument 2021' and the need for it to be incorporated into the condition 5.7. This document is also referenced elsewhere in the JWS. It is important to note that this document is specific to EDN, it is not applicable to other fumigants. The current date of the document is 2022 rather than 2021.
101. I disagree with the following points in proposed condition 5.7. These are managed in practice, but are worker protection measures regulated by WorkSafe and therefore not subject to control through the conditions of a resource consent:
- a) The presence of an alarmed monitor at the MSZ/Risk Area that has the ability to instantly warn fumigation staff if the ceiling value of the relevant fumigant is exceeded.
  - b) The presence of a monitor between a fumigation site being ventilated and downwind workers. Mr Browne is also of the view that such an additional monitor is unnecessary.
102. I disagree with the proposed condition in 6.1 that requires our emergency response plan - ERP (or emergency management plan) to be "certified" by BOPRC. This is also an area of disagreement between the planners in the JWS. The following points outline my concerns:
- a) An ERP is a required document under the HSWA. It is a critical health and safety document and, as far as I am aware, the existing process has been working well to date with no concerns raised by BOPRC, FENZ or WorkSafe.
  - b) At present, after any significant changes or updates, the ERP is sent to Fire & Emergency New Zealand (FENZ) for review and feedback. BOPRC is provided a copy of the ERP annually in May which incorporates any revisions and updates considered necessary to meet current operating conditions.
  - c) It is important that the PCBU for HSWA purposes (Genera) is able to respond to emergencies as they arise and for it to be in full control of a potential emergency situation at all times, subject to direction from FENZ, without being required to modify or certify the ERP or otherwise be delayed or unreasonably influenced by BOPRC in undertaking its responsibilities under the HSWA.
  - d) In my opinion this condition should be changed to supplying council a copy for review and comment as Genera have done historically, with concerns raised by BOPRC to be managed in good faith. Including arbitration, if required.
103. I disagree with the need to supply an aerial photograph of each fumigation event to BOPRC on a routine basis. This is proposed in condition 7.2 that requires all records captured in 7.1 to be submitted to BOPRC on a monthly basis:

- a) This is a huge volume of data and will be administratively burdensome for both Genera and the BOPRC.
  - b) BOPRC is currently provided with monthly summary data including GPS coordinates and in my opinion this has been proven to be sufficient.
  - c) If necessary, Genera can supply all detailed information, including specific aerial photos (i.e. satellite view from Google maps) on request and would make all data available during compliance audits and inspections.
104. I note that there is a comment in the JWS in relation to proposed condition 8.1 that the Buffer Zone provides wider protection to non-fumigation staff. This is incorrect as the buffer zone is in place to protect the public outside the port boundary. This is clearly identified in the EPA decision HSR001635 and is also addressed in the evidence of Mr Browne. This same comment is present throughout the JWS and should be corrected.
105. I agree that proposed condition 8.9 is not technically required. Genera currently use activated carbon as our recapture medium. When this becomes saturated it is taken to an off-port location where the carbon is subjected to a chemical treatment that removes and destroys the methyl bromide and allows re-use of that carbon for further recapture. This prevents the methyl bromide saturated carbon going to landfill where it would slowly desorb methyl bromide, negating the environmental benefit offered by recapture.

**Definitions:**

106. The definition in the JWS for the monitored safety zone / risk area should state that it's in place from application to the conclusion of ventilation. The current definition is included below with the suggested amendments underlined:

***Monitored Safety Zone/Risk Area***

*means a restricted area around the fumigated enclosed space in place from when the fumigant is applied until the completion of ~~during~~ ventilation into which non fumigating staff may not enter.*

107. The definition in the JWS for ventilate should also refer to phosphine. Note that it's not ventilated from vessels but occasionally there is fumigation using phosphine in containers and under covers, usually on grain. The dosages are very low, the treatment time is long and phosphine has a short half-life. The concentrations during ventilation are negligible. The current definition is included below with the suggested amendments underlined:

***Ventilate***

*means, for methyl bromide, ethanedinitrile and phosphine, the release of a fumigant into the atmosphere following fumigation and recapture, where relevant, as part of the treatment process, and ventilation has a corresponding meaning.*

## CONCLUSION

108. Fumigation practices have evolved and continuously improved over time; improvement and technological advances continue. Recently there has been a quantum shift due to the recent methyl bromide reassessment by the EPA:
- a) The EPA decision was the result of a comprehensive reassessment for which the PoT was used as the primary source for air modelling that played a significant role in determining the detail of its controls.
  - b) This has resulted in a 99.56% reduction in Genera's methyl bromide ventilation emissions from log rows alone.
  - c) Prior to the EPA decision, Genera was managing discharges effectively with limited intervention from the BoPRC as described in paragraphs 59 – 62. With the significant reduction in methyl bromide ventilated to air because of the decision, and the additional controls it has introduced on methyl bromide use, I am more than confident that the existing framework sufficiently manages the risks with a high level of conservatism.
109. In my opinion, the EPA controls successfully provide for the management of fumigant discharge to air, in a way that reduces the impact to the environment and protects the public from adverse health and safety effects, specifically for the PoT and the people in the surrounding area.
110. A consent with balanced conditions that align with the EPA decisions and controls is critical for the protection of the region, the country and our trading partners from potential biosecurity threats. It also contributes, in my opinion, to the efficient running of the PoT whose economic success is tied to that of region and all the employment it supports throughout the import and export supply chain.
111. Genera operates in a busy and potentially dangerous environment and it must ensure that it contributes to an effective and efficient port operation. In 2022 Genera conducted 1820 fumigations at PoT or on average 35 per week. The fumigations tend to cluster around incoming and departing vessels, timing, efficiency and reliability is critical.
112. Delays to vessels at berth and vessels waiting to berth are expensive (circa \$30,000 USD / day / vessel) and have a ripple effect throughout the global supply chain that is still in arrears after the global pandemic.
113. Delays also impact numerous other businesses on and off the port from tug and pilot boats, crane operators, stevedores, marshallers, trucking firms, logistics business, the owner of the goods and their customers, to name a few.
114. As a result there are significant direct costs and unquantifiable indirect costs if there are inefficiencies. All of which impact consumers.

115. Protecting people and the environment is my primary concern as Genera's Health, Safety & Compliance Manager. I am confident that the procedures and processes that Genera has in place, in hand with the existing EPA controls, are not only very conservative but also very effective in achieving safe outcomes for the public (including my friends and family) and workers alike.

**David Wesley Baker**

**17 April 2023**

**ATTACHMENT DB1 –PEPEHA TRANSLATION**

Greetings to you all

I am acknowledging the Iwi of this area, Ngāti Ranginui and Ngāiterangi

To you all, this is a grateful acknowledgement to you all

I am not Māori

However

My ancestors are from England

I was raised at Tokoroa and consider this to be my home

Titiraupenga is the mountain

Waikato is the river

The mountain and the river are important to me too

I am European

My family name is Baker

My name is David

Therefore

Greetings to you all