

Bay of Plenty Regional Council
 By email

17 June 2022

Attention: David Greaves
by email: david@enspire.co.nz

Dear David

Resource Consent Application RM19-0663 – Request for Further Information - June 2022

Thank you for your letter dated 28 March 2022 requesting further information in relation to resource consent application RM19-0663. We provide the following response and will provide under separate cover a complete application document as you have suggested for ease of reference.

This response provides a table identifying your request and our response as set out in your letter.

Information Request	Response
<p>1a. Please confirm that no phosphine fumigations are undertaken in ship holds while the ship is berthed at the Port.</p> <p>1b. Please provide a clear and complete list of how phosphine is proposed to be used at the Port (this may include a list of all phosphine fumigations carried out during the last 12 months, their location, the product fumigated and the amount and type of phosphine used.)</p>	<p>1a. As described in the application (and the further summary application to be provided) ships' holds are "charged" with phosphine immediately prior to the ship leaving port. This involves inserting phosphine in solid form (blankets or pellets) or as a gas (Vaporphos) into the hold as required to provide treatment and then closing the access used to insert the material. As a consequence there is fumigation while the ship is berthed and there is potential for a less than minor discharge to air between the moment of activation and the time the access is closed. To be clear Phosphine from Ships' holds is not ventilated.</p> <p>1b. In addition to the application of phosphine in ships' holds it is proposed to use phosphine at the Port to treat pest infestations as required. Such fumigations are contained and may include a range of targets including grain within siloes (or containers as defined¹). The dose rates vary depending on the target and purpose of the fumigation and it is the dose rate and volume of container that determines the quantity used. Dose rates vary from 2 gm/m³ for</p>

¹ **Container** means anything used to contain methyl bromide during fumigation, except a ship's hold or sheet. (From EPA Decision, HSR001635)

	<p>logs in ships' holds to 3gm/m³ for grain. Dose rates are either determined by the Ministry of Primary Industries (MPI) or are applied at the manufacturers recommended rates. A complete list of uses, quantities etc for the last 12 months is provided attached.</p>
<p>2. Please provide detailed maps of exactly where this phosphine fumigation takes place</p>	<p>2. See attached map of fumigation areas at the Port. It should be assumed that fumigation of all consented fumigants may take place at any of the locations shown although phosphine would primarily be in ships' holds (and MB would not be used in ships' holds).</p>
<p>3. The application does not contain dispersion modelling of phosphine to show what ground level concentrations are expected to be. Please clarify.</p>	<p>3. No dispersion modelling of phosphine has been undertaken for the following reasons:</p> <ul style="list-style-type: none"> • WorkSafe NZ regulations stipulate that there is a very limited concentration of discharge to air. These are; an 8-hour average of 0.3 ppm and a 15 minute STEL of 1 ppm. • Modelling of such low concentrations would be unrealistic. <p>No adverse effects are anticipated.</p>
<p>4. Please provide a description of the behaviour and state of the phosphine used during the stages of fumigation, ventilation and post ventilation.</p>	<p>A description of the chemical breakdown of the products used is as follows:</p> <p>Currently two different brands of solid Phosphine products are used – GenFume & PestPhos. The active ingredient of both is AIP (Aluminium Phosphorus):</p> <p>Chemical equation: $AIP + 3 H_2O \rightarrow Al(OH)_3 + PH_3$</p> <p>1 mol of AIP generates 1 mol of Phosphine gas (PH₃) when reacted with water and leaves Aluminium hydroxide as residue</p> <p>Weight of ALP = 58gm/mol</p> <p>Weight of PH₃ = 34gm/mol</p> <p>This means that AIP generates 58.6% of its weight as PH₃</p> <p>For GenFume AP that contains 570 gm of AIP should generate 334 gm of PH₃ (570 gm*58.6%=334 gm)</p> <p>For PestPhos that contains 560 gm of AIP should generate 328 gm of PH₃ (560 gm*58.6%=328 gm)</p> <p>or 1kg of Product which contains either 570 gm or 560 gm of AIP would generate either 335 gm or 328 gm of PH₃ gas, respectively.</p> <p>Phosphine in the atmosphere is rapidly degraded (World Health Organization, 1988). The half-life in air is approximately five hours with the mechanism of degradation being photoreaction with hydroxy radicals. The dark half-life is approximately 28 hours.</p> <p>Phosphine applied in ships' holds is not ventilated. 2 gm/m³ is applied before the ship leaves the port and a further 1.5 gm/m³ is applied during the voyage.</p>

	<p>Phosphine applied to containers² is ventilated at the end of the fumigation period. As described above the released phosphine degrades rapidly in air through photoreaction.</p> <p>A risk area is maintained around the fumigation site to ensure that the WorkSafe NZ regulations are met.</p>
<p>5. Please provide a record of any incidents at the PoT that have resulted in unintentional releases of phosphine details including when, where, why the discharge(s) occurred and any associated adverse environmental effects.</p>	<p>5. There have been none in recent history. .</p>
<p>6a. Is it proposed that fumigation activities requested by MPI will be undertaken using phosphine at the PoT?</p> <p>6b. Please provide further clarity as to what situations this may be applicable to and why phosphine would be used over other fumigants such as MB.</p> <p>6c. Is it proposed that these activities will be undertaken under the same restrictions/conditions as 'normal' fumigation activities?</p>	<p>6a. It is proposed that any fumigation activities requested by MPI to counter a biosecurity threat will be assessed at the time and the most appropriate fumigant used for the threat. These would only be those fumigants for which Genera is authorised to use.</p> <p>6b. An example of previous requests from MPI include grain shipments from Australia infested with Beetles. Treatment is typically required in ships' holds to minimise the risk of release during unloading for treatment on-wharf. Genera would undertake the fumigation as directed by MPI.</p> <p>6c. The methodology of an emergency response would be determined at the time of the threat.</p> <p>The fumigation activities requested by MPI are assumed to be those related to significant biosecurity threats. These actions would be undertaken in accordance with the Biosecurity Act 1993. Section 7A of the Biosecurity Act clarifies the relationship of these actions with the requirements of the Resource Management Act:</p>

² As defined

	<p>7A Relationship with Resource Management Act 1991</p> <p>(1) The responsible Minister may exempt an action from the provisions of Part 3 of the Resource Management Act 1991 if the action is taken in accordance with Part 6 of this Act in an attempt to eradicate an organism and if—</p> <p>(a) the action would be in breach of Part 3 of the Resource Management Act 1991; and</p> <p>(b) the responsible Minister is satisfied that it is likely that—</p> <p>(i) the organism is not established in New Zealand, the organism is not known to be established in New Zealand, or the organism is established in New Zealand but is restricted to certain parts of New Zealand; and</p> <p>(ii) the organism has the potential to cause 1 or more of significant economic loss, significant adverse effects on human health, or significant environmental loss if it becomes established in New Zealand, or if it becomes established throughout New Zealand; and</p> <p>(iii) it is in the public interest that action be taken immediately in an attempt to eradicate the organism.</p> <p>(2) The exemption of an action under subsection (1) may last for up to 20 working days.</p> <p>(3) Before making a decision under subsection (1), the responsible Minister—</p> <p>(a) must consult the relevant consent authority (to the extent that is possible in the circumstances); and</p> <p>(b) may consult such other persons as the responsible Minister considers are representative of the persons likely to be affected by the eradication attempt.</p> <p>(4) If an exemption is granted under subsection (1) or continued by regulations made under section 7D, Part 3 of the Resource Management Act 1991 does not apply to the action while the exemption continues.</p> <p>(5) After the exemption ends,—</p> <p>(a) the provisions of the Resource Management Act 1991 apply to the action and its adverse effects to the same extent as those provisions would have applied but for the exemption; and</p> <p>(b) the responsible Minister must remedy or mitigate the adverse effects to which the provisions of the Resource Management Act 1991 would have applied if not for the exemption.</p> <p>(6) For the purposes of this section, consent authority has the same meaning as in section 2(1) of the Resource Management Act 1991.</p>
<p>7. It is unclear how the 'air tightness' of a ship's hold is determined prior to introduction of phosphine gas. Is it as per SOP 10.2 Pre Inspection of a Vessel for a Phosphine Fumigation V5.1 or some other means? Please clarify.</p>	<p>7. There is a three-step process to check the suitability of a ship's hold for the application of a fumigant as described in SOP 10.2 Pre Inspection of a Vessel for a Phosphine Fumigation V5.1, SOP 10.4 and VaporPhos operating procedures.</p> <p>The three steps are:</p> <ol style="list-style-type: none"> 1. Check for gas-tightness before vessel arrives and re-check on a regular basis 2. Check on arrival 3. Check for leaks following application <p>At each stage any identified leaks are remedied.</p>
<p>8. What is the range of quantities of phosphine gas used for a ship, and for a grain silo and other examples that were possibly listed in relation to question 1 above?</p>	<p>For ship holds see response to 1 above.</p> <p>For grain silos see operating procedure 11.2. The dose rate specified is 3 g/m³.</p>
<p>9a. What gas meters/monitoring devices are used to record phosphine concentrations in the atmosphere and human exposure and in an enclosed area prior to opening it?</p> <p>9b. What procedures are in place to ensure these meters/devices read accurately?</p>	<p>9a. Genera use GasBadge Pro monitors in accordance with the operating procedure attached.</p> <p>9b. Calibration and re-calibration</p> <p>Each unit is calibrated by Genera, using provided software, to ensure it can accurately detect Phosphine before issue.</p> <p>Calibration is required every 3 months and will be performed by ITT/ customer service team with a calibration docking station.</p>
<p>10. How is it confirmed that it is safe to remove a sheet</p>	<p>10. Covers are removed/containers opened when treatment is complete. The release is managed either through the rate of</p>

enclosed product or other types of enclosure once it has been fumigated with phosphine?	release or through extending the risk area around the fumigation site to ensure concentrations of phosphine in air meet WES/STEL standards outside the risk area. Confirmation is provided through monitoring concentrations in air.
11. Please clarify the proposed buffer distances to be imposed when using phosphine, in a) a ship hold, and b) elsewhere, and is this contingent on the volume used?	11. a) WorkSafe NZ does not require any specific buffer distances to be imposed when using phosphine in ship holds because phosphine is not being ventilated. b) In practice a risk area is established around each fumigation site on land to keep non-authorised bystanders at a distance from the worksite. This may vary according to target, location, dose rate and product. A site evaluation form (F9b: General Treatment – Site Suitability Checklist) is completed prior to each job (attached).
12. Is there an exclusion distance proposed for non-fumigation workers for different scales of phosphine fumigation?	12. See form F9b: General Treatment – Site Suitability Checklist.
13. It is unclear how it is proposed to ensure that the STEL is being met. Please clarify this.	13. Through an adaptive management approach including managing the rate of release, monitoring the concentration of phosphine in the air and adjusting the risk area boundary accordingly.
14. There is limited information in the application regarding what the Emergency Management Plan is proposed to include. Please provide the current version of the proposed plan.	14. A current version of the Emergency Management Plan is held by the Regional Council.
15. Please provide a complete list of the SOPs which form part of the consent application, and their current version.	15. A copy of all relevant SOPs is attached. To be clear the SOPs are referenced in the application to inform the methodology of undertaking fumigations. They are not proposed to be certified by the consent authority or prepared or approved by way of the conditions of consent. They are living documents that may need to be amended to reflect operational needs at short notice.
16. Please supply the phosphine air monitoring records for the last 6 months, for all phosphine fumigations performed during this period?	16. There is no ventilation of ship holds therefore no monitoring has been required or undertaken. There have been no grain fumigations at the port in last 6 months. In general no targeted TEL monitoring has been undertaken as there is no TEL in effect at present that can provide a meaningful record. Genera is currently engaging with WorkSafe NZ on establishing appropriate TELs – annual and hourly, for phosphine.

	<p>This includes a process of reassessment for the use of phosphine and the development of Safe Work Instruments.</p>
<p>17. Is it proposed that fumigation activities requested by MPI will be undertaken using MB at the PoT?</p>	<p>17. See above response to item 6.</p>
<p>18. It is understood that ship hold fumigations with MB are no longer undertaken. Please confirm that this is the case and if the Proposal now excludes any ship hold fumigations with MB directed by MPI.</p>	<p>18. From January 2023 HSR001635 prohibits the fumigation of ships' holds using MB.</p> <p>The Addendum to the application provided by Genera confirms that they no longer undertake ship hold fumigations using MB.</p> <p>See also above response to item 6.</p>
<p>19. It is unclear how the required level of recapture is being met. Please provide a detailed methodology for this.</p>	<p>19. Container and products (excluding logs) under sheet recapture equipment comprises two pods of activated carbon containing enough material to reduce the concentration of MB in the headspace under the sheet to less than the allowed standard. The air in the container or under the sheet is passed across the activated carbon to remove the MB. The concentration of MB in the discharge from the recapture equipment is measured and as the concentration approaches the WES it indicates the carbon in the container being used is reaching saturation i.e., its capacity to capture the MB. At that point the operator swaps to a fresh pod(s) of activated carbon.</p> <p>Recapture for containers is undertaken to meet current consent conditions and from the 1st January 2023 will be undertaken to meet EPA Decision Table A.</p> <p>Log row under sheet recapture.</p> <p>The concentration under the sheet is measured before recapture commences and then after passing across the activated carbon. The air from under the sheet is passed across the activated carbon to remove the MB. The concentration of MB in the discharge from the recapture equipment is measured and as the concentration approaches the WES an alarm sounds to indicate the carbon in the container being used is reaching saturation i.e., its capacity to capture the MB. At that point the operator swaps to a fresh container of activated carbon.</p> <p>Recapture under sheets is undertaken to meet the requirements of EPA Decision Table C.</p>
<p>20. Does the carbon container unit used for scrubbing have a discharge point/vent at ground level or at some elevation? Please provide reasoning for</p>	<p>The discharge is at the top of the recapture equipment approximately 1.5m above ground level. This point optimises the dilution effect of discharge to air at a point above ground level at a concentration that meets the requirements of HSR001635.</p>

<p>the location of this discharge point.</p>	
<p>21. Does the restoration/rejuvenation process of the carbon from the scrubber (saturated with MB and other contaminants) result in any release of contaminants to the environment? If so what and at what quantity/concentration are these, and what is the location for this process?</p>	<p>21. Currently there is no restoration/rejuvenation process and activated carbon is disposed of by a registered chemical waste operator to an approved site.</p> <p>Genera are currently undertaking trials to release the captured MB and then put the vapour through a liquid recapture medium which destroys the MB. This is a proprietary Genera process. All MB is destroyed in this process and the residual recaptured in the liquid recapture medium is disposed of by a registered chemical waste operator to an approved site.</p> <p>This process enables the carbon to be reused thus providing for greater efficiencies and cheaper cost in the recapture process.</p>
<p>22. If restoration/rejuvenation proves not to be a viable option, please specify the proposed process/action addressing the used carbon product.</p>	<p>22. It is likely that if carbon cannot be reused following the restoration/rejuvenation process described above then fumigation of logs using MB may not be economically feasible.</p>
<p>23. In relation to the ventilation control, please provide clarification where the windspeed measurements are to be taken (spatially and also in relation to elevation).</p>	<p>23. Genera use the port anemometers as other locations are unreliable for the reasons described in the request for information item.</p> <p>The operations team on the ground determine local wind speed when managing a ventilation and make decisions based on those observations. However, the port anemometers are most relevant when determining the potential for downwind distribution as the release will rise to, and be carried/diluted by this wind stream.</p>
<p>24. The application states that the latest decision has reimposed the requirements of the 2010 decision. It is noted that within the 2010 table there is a temporal factor present in relation to a 60 minute time window. This seems to be removed in the latest version. Please explain the effect the absence of this requirement will have on your operation.</p>	<p>24. In relation to the use of MB all fumigations will be undertaken in accordance with HSR001635.</p>
<p>25. What buffers are proposed for containers, containers under tarps and flat racks under tarps?</p>	<p>25. The buffers required for MB are prescribed in HSR001635 as:</p> <p>(1) From 1 January 2022, for fumigation under sheets, a PCBU with management or control of quarantine or pre-shipment fumigation using methyl bromide must set a buffer zone for each fumigation</p>

	<p>that is equal to or more than the relevant distance in Table C for the relevant dose rate of methyl bromide.</p> <p>(2) For fumigation of containers of up to 77 m³ in volume the PCBU must set a buffer zone for each fumigation that is equal to or more than 10 m.</p> <p>(3) For fumigation of containers equal to or greater than 77 m³ in volume the PCBU must set a buffer zone for each fumigation that is equal to or more than 25 m.</p>
<p>26. For completeness, please provide a detailed description of the methodology proposed to be used to undertake the actions required to meet the requirements of the EPA restrictions on the use of MB, as per the attached table.</p>	<p>See summary application.</p>

If you have any further queries please do not hesitate to contact me.

Yours sincerely



Keith Frentz

Technical Director - Planning

on behalf of

Beca Limited

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David Baker, Genera Ltd



List of Phosphine fumigations 2021 - 2022

Fumigation Management Plan for Port of Tauranga

Port Boundary

-  Port Boundary
-  PoT Mount Maunganui Landward Boundary
-  PoT Sulphur Point Landward Boundary

Fumigation Area

-  Sulphur Point Fumigation Area (MB, Phosphine, EDN)
-  Mount Maunganui Fumigation Area (MB, Phosphine, EDN)
-  Phosphine Grain Silo Fumigation
-  Phosphine ONLY ship hold Fumigation



SOPs and Forms Relevant to Phosphine