BoPRC: Genera, Tauranga: Text of Email re Response to s92 Request for Further Information, 16 June 2020

Morena David

I have now gone through the information you on-forwarded. There is:

* a Beca response letter dated 5 June 2020;
* an ESR letter date 16 January 2020;
* a resend of a July 2019 (not the most recent) Recapture Monitoring report;
* a draft Beca Discharges to Air Report for Port Nelson dated 23 January 2020;
* two Genera Work Instructions and three Safe Operating Procedures (one twice) for the use of Phosphine; and
* the WorkSafe Workplace Exposure Standards (WES) and Biological Exposure document of November 2019.

Addressing each of those in turn:

Beca Response Letter

Yes, the Beca letter follows the s92 format, but it does not address all of the requests made and some of the matters that it does address are done so in a cursory manner with incomplete information. The request for further information, sent as a letter via email on 16 December 2019, is not extensive. Also, some of the matters included, such as those related to occupational matters, are probably not relevant to an application for a Discharges into Air Permit.

Of fundamental importance to an application for a Discharges into Air Permit are the nature of the activities for which approval is sought, the activity levels, and assessments of potential effects. Hence the s92 request specifically asked, as the first item, for that information on each of the fumigants. The response is “To be completed separately”.

As with most other significant applications for Discharges into Air Permits the application made on 29 October 2019 includes atmospheric dispersion modelling of the discharges. For such modelling to have credibility the discharge data must be of a high quality. The s92 request for further information specifically asked about aspects of the Discharge Data. The response is “To be completed”.

Similarly the response to the request for the Cultural Effects Assessment is “To be completed”.

The modelling is also “To be completed”. To repeat, for the modelling to have credibility the discharge data that it uses must be of a high quality.

Of particular interest to me are the responses to Section 11 of the request for further information ‘Assessment of Alternatives’. Not included there are matters that I raised in my preliminary report dated 16 December 2019 and in emails around that time. Maybe that information has not been conveyed to Genera. The most significant of these matters are listed and discussed on page 5 of my report (attached). They include:

* the impact of increased log debarking;
* whether there has been progress regarding negotiations with India to permit fumigation using Phosphine (and the concomitant possibility of greater fumigation in the holds of ships in international waters); and
* any developments on recapture technology (since the review by Jack Armstrong in June 2019 – referenced as my footnote 4).

In my opinion, considerations such as this should be helpful in defining the Best Practicable Option (BPO) for the operations carried out by Genera. The Beca letter includes the definition of the “Best Practicable Option” from s2 (Interpretation) of the Resource Management Act 1992. I was involved in the late 1980s in the drafting of that definition, it being largely based on the definition of the “Best Practicable Means” (s7) of the now repealed Clean Air Act 1972. The wording of the definition of the BPO has not changed in the 28 years since the Resource Management Bill was enacted, one of very few matters in the Act not to do so.

The response to the request about the status of the fumigation activities at Genera’s Maru Street site, which are part of the existing consent, is that “Genera’s Maru Street site is not included in this application”. What does that mean? Are those activities ceasing, or is a separate application for consent to be made?

In summary, my overwhelming comment is how little relevant information is provided in the response to the s92 request given the length of time between 16 December 2019 and 5 June 2020 (five and a half months).

ESR Letter

In the practice of Air Quality Management air quality criteria are required to assess the results of atmospheric dispersion modelling and air quality monitoring. Different averaging times may apply. Specifically, in an Assessment of Environmental Effects (AEE) accompanying an application for a Discharges into Air Permit it is usual for the applicant to use appropriate air quality criteria.

The Institute of Environmental Science and Research Limited (ESR) produced a report in July 2019, that I commented on in my preliminary report (pages 9 & 10). I referred to the Environmental Risk Management Authority – ERMA (now the Environmental Protection Authority – EPA) Tolerable Exposure Limits (TELs) for Methyl Bromide and Phosphine, and the proposed EPA TEL for Ethanedinitrile. TELs are criteria directly applicable to environmental exposures to air contaminants.

In the s92 request letter the applicant was asked to propose criteria for the assessment of the atmospheric dispersion modelling of fumigation using Methyl Bromide, Phosphine, and Ethanedinitrile, for 24-hour, 60-minute, and 10-minute exposures. In a letter dated 16 January 2020, ESR addressed that request.

For Methyl Bromide, ESR propose air quality criteria of 1.3 mg/m3, 24-hour average; 3.9 mg/m3, 1-hour average; and 15 mg/m3, 10-minute average. For Phosphine, ESR refer to the steep dose-response relationship for the contaminant and propose 0.01 mg/m3 for all short-term exposure durations. For Ethanedinitrile, ESR propose 0.072 mg/m3 for long-term exposures; 0.6 mg/m3, 24-hour average; 4.3 mg/m3, 1-hour average; and 5.3 mg/m3, 10-minute average.

There is obviously a marked difference between the long-term and 24-hour criteria for Ethanedinitrile, and further work on that matter is needed. What is meant in this case by “long-term exposures”, and is such an averaging time appropriate for fumigation activities? My view at this time is that 0.6 mg/m3, 24-hour average, offers adequate protection for environmental exposures. Otherwise, the criteria proposed by ESR are appropriate and can now be established. They should be used for the follow-up atmospheric dispersion modelling.

In the ESR letter, and repeated by Beca, is the point that the “setting of exposure limits is a responsibility of the regulator”. That is obviously correct, and it is an unnecessary comment to make. In response, it should be well accepted that for an AEE to be properly completed appropriate assessment criteria are required to be used.

Recapture Monitoring Report

Section 4.3.2 of the application made on 29 October 2019 refers to a protocol between Genera and the Bay of Plenty Regional Council for monitoring the effectiveness of recapture from the fumigation of logs under tarpaulins. The protocol is provided as Appendix 12 of the Fumigation Management Plan (Revision A, dated 26 April 2019), which is Appendix C (not Appendix E, as written in both the s92 request for the further information and the Beca response letter) of the application documentation. Section 4.3.2 of the application reports that the first round of monitoring was carried out in June 2019. The s92 request for further information sought the report of that monitoring. The report (July 2019) has been supplied.

The monitoring was carried on 12 June 2019 and twice on the 13 June 2019, for periods of 5 hours and 20 minutes, 7 hours, and 5 hours and 20 minutes, respectively. On none of those occasions was the 80% recapture of Methyl Bromide achieved, although the first and second exercises went close – at 79% and 75%, respectively. Consequently, the measured final Methyl Bromide concentration exceeded the theoretical concentration for 80% recapture.

That report was actually provided to me by you in February 2020, along with another report (prepared in January 2020) for monitoring carried out on 28 November, 2 December, 13 December, 15 December, and 17 December 2019. They were for periods of 4 hours and 40 minutes, 4 hours, 2 hours and 40 minutes, 4 hours and 40 minutes, and 4 hours, respectively. Again, on none of those occasions was the 80% recapture of Methyl Bromide achieved, although the third exercise went close – at 75%. Again, consequently, the measured final Methyl Bromide concentration exceeded the theoretical concentration for 80% recapture, by more than three times for the second, fourth, and fifth monitoring exercises. Sam Weiss prepared a useful summary spreadsheet of the results of the eight monitoring exercises.

From the monitoring exercises it is clear that the recapture procedures being carried out by Genera are not sufficiently effective. This continues to be a major concern, and strengthens the need for other measures, such as those I mention in my preliminary report of 16 December 2019 and summarise in a list above.

Port of Nelson Report

The s92 request for further information asked for quantification of “the concentration of the discharge and if the volume of Methyl Bromide remaining at the time of ventilation depending on the material being fumigated. The response should provide a comprehensive assessment of environmental effects resulting from the ventilation of containers and the physical extent of the discharge”.

The responses were that:

* typically each container is fumigated with approximately 2-6 kilograms of Methyl Bromide;
* all containers are subject to recapture technology, which is used until the concentration of Methyl Bromide in the headspace is less than 5 ppm; and
* that there is a ‘puff’ discharge of residual Methyl Bromide as the container door is opened to allow equipment to be detached.

The point about differences in the fumigation depending on the material being fumigated is not addressed, but these are real. Different materials have different fumigant adsorption capacities, and subsequent desorption rates when stored.

Apparently in support of the third bullet point above, the s92 response includes the first draft of a Beca Discharges-into-Air Report for Port Nelson dated 23 January 2020. The report relates to container fumigation with Methyl Bromide, and lists Mathew Noonan as an author and Prue Harwood as a reviewer. Mathew and Prue have backgrounds in Air Quality Management.

The atmospheric dispersion modelling considered two scenarios – the second one being used to predict the maximum 99.9 percentile 1-hour average Methyl Bromide concentrations. The sources of the Methyl Bromide discharges in that scenario were the residual discharges from three recapture units and from fumigant desorption during storage in a fumigation shed. Emission rates were estimated for those sources, whereas it was assumed that no container openings occur when three ventilations are in progress.

It is unlikely that the Port of Nelson situation is sufficiently applicable to the Tauranga activities of Genera for the results in the Beca report to be of much use. The Nelson modelling predicted Methyl Bromide concentrations at both the boundary of the Port Security Area and at “the most potentially impacted residential property”. The configurations at the two Ports are quite different, as are the adjoining land uses. The revised atmospheric dispersion modelling for the Tauranga activities should be based on the prevailing local situation and use scenarios that are realistic to that.

Phosphine Work Instructions and Safe Operating Procedures

The response to the s92 request for further information focuses on phosphine. Provided are the following Genera documents:

* Work Instruction 4A: Aluminium Phosphide Initial Application – Logs, Version 2.2, February 2020
* Work Instruction 12: Aluminium Phosphide Fumigation in Containers/Chambers other than Log Vessels, Version 2, October 2017
* Safe Operating Procedure 10.2: Pre Inspection of a Vessel for a Phosphine Fumigation – Version 5.11, January 2020
* Safe Operating Procedure 10.4: Phosphine Application to Vessel Holds – Version 10.4, January 2020 (supplied twice)
* Safe Operating Procedure 13.1: Phosphine Residual Removal & Vessel Gas Free Version 3.1, September 2019

The documents are the most useful of the new information supplied as part of the response to the s92 request for further information. They all are subject to regular review, and three of the five documents are very recent. They all relate to on-shore fumigation activities. Fumigation by phosphine in the holds of ships in international waters is not included.

WorkSafe WES etc. Document

The response to the s92 request for further information includes, in the Beca letter, definitions of Workplace Exposure Standard (WES) and Time-Weighted Average (WES-TWA), with the suggestion that these “may be useful”. Actually those definitions have been known for decades. There is also a definition of a Short-term Exposure Limit (WES-STEL), viz.:

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| *The 15-minute time weighted average exposure standard. Applies to any 15-minute period* *in the working day and is designed to protect the worker against adverse effects of irritation,**chronic or irreversible tissue change, or narcosis that may increase the likelihood of accidents.**The WES-STEL is not an alternative to the WES-TWA; both the short-term and time-weighted**average exposures apply. Exposures at concentrations between the WES-TWA and the WES-STEL**should be less than 15 minutes, should occur no more than four times per day, and there should**be at least 60 minutes between successive exposures in this range.*  |
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Also included, as an attachment to the response , is the current version (11th Edition, November 2019) of the “Workplace exposure standards and biological exposure indices” document.

Workplace Exposure Standards have existed since the 1970s, administered by the then Department of Labour, with significant input from the then Department of Health (where I was employed). When the Health and Safety in Employment Act 1992 came into force, the series with the expanded title, that is, including Biological Exposure Indices, started to be issued by the Ministry of Business, Innovation and Employment, in conjunction with such agencies as the Environmental Risk Management Authority/Environmental Protection Authority and Responsible Care New Zealand Incorporated, and input from others.

The first edition of the series was published in 1994, and the document was revised as Editions 2 to 11 and published in 2001, 2002, 2010, 2010 (again), 2011, 2013, 2014, 2017, 2018, and 2019, respectively. All three of fumigants considered here are listed in the 11th Edition, viz.:

* Methyl Bromide: a WES-TWA of 5 ppm (19 mg/m3)
* Phosphine: a WES-TWA of 0.3 ppm (0.42 mg/m3) – a 2019 change
* Ethanedinitrile: a WES-TWA of 3 ppm (6.4 mg/m3); a WES-STEL ceiling of 5 ppm (10.6 mg/m3) – introduced in 2018

The responsible agency is now Worksafe New Zealand (WorkSafe), under the Health and Safety at Work Act 2015 and the Health and Safety at Work (General Risk And Workplace Management) Regulations 2016. There are proposed changes to the WES of 18 substances later this year, but none to those for the three fumigants considered here.

Although Workplace Exposure Standards provide useful information about the relative toxicity of air contaminants their use (with adaptation) as air quality criteria should be avoided. There is a long-established hierarchy of criteria for assessing the effects of air quality, viz.

* National Environmental Standards for Air Quality (NES-Air Quality)
* National Ambient Air Quality Standards (NAAQGs)
* Any Regional Guidelines
* World Health Organization (WHO) Air Quality Guidelines
* Other international criteria such as the California Environmental Protection Agency (CEPA) reference exposure levels (acute and chronic), the United States Environmental Protection Agency (USEPA) inhalation reference concentrations and unit risk factors (chronic), the US National Research Council Committee on Acute Exposure Guideline Levels (AEGL), etc

There are no NES-Air Quality, NAAQGs, Regional Guidelines, or WHO Air Quality Guidelines for Methyl Bromide, Phosphine, or Ethanedinitrile. The ERMA (now EPA) tolerable exposure limits for those fumigants are derived from CEPA and AEGL guidance. On the question of adapting Workplace Exposure Standards, such as those in the WorkSafe WES document, as criteria for an air quality assessment, they should only be used as a last resort and only by experienced practitioners with expertise in this field. Hence they are not recommended for use in this assessment.

Other matters

A couple of other matters, both of which I have raised before. First, when I was engaged by the Bay of Plenty Regional Council to work on this application, on 4 December 2019, it was based on an expectation that a visit to the Genera site in Tauranga would soon occur. As I recorded in my preliminary report of 16 December 2019 (see footnote 2 on page 3 of my report) that was expected early in 2020. That visit didn’t happen; I have no explanation for why not. I would be grateful if a visit could be set up to happen as soon as possible.

Second, again to repeat, where to from here? As previously advised by email, I suggest a team meeting where the further information received, these comments, and those of any others can be discussed. Please expedite that, preferably at the same time as the site visit.

If you, or others, have any comments on these inputs, please let me know.

Nga mihi nui

Kevin

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