



20 September 2021

Hazardous Substances
Environmental Protection Authority
Private Bay 63002, Waterloo Quay
Wellington 6140

via email EDN@epa.govt.nz

Dear Sir / Madam

Updated EPA Science Memo and Staff Reports, August 2021

Following the release of Direction and Minute 12 by the Environmental Protection Authority (EPA) Decision-making Committee (DMC) on 31 August 2021, and the invitation to provide comments on the updated EPA Staff Report 2021 (Staff report) and updated EPA Science Memorandum 2021 (Science memo), we submit the following:

A) Worker Exposure Standard (WES) and Tolerable Exposure Limit (TEL)

Two draft safe work instruments (SWIs) have been prepared specifically for EDN, which would amend the Health and Safety at Work (Hazardous Substances—Requirements for Specified Fumigants) Safe Work Instrument 2017. Assuming that these take legal effect in their current form the following worker exposure standards (WES) will be established:

- 3 ppm (6.4 mg/m³) averaged over an 8 hour work period
- 5 ppm (10.6 mg/m³) as a maximum airborne concentration

The Science memo proposes to set additional controls under Section 77 and Section 77A of the HSNO Act to adequately manage risks to human health and the environment. These controls include a tolerable exposure limit (TEL) of:

- 0.034 ppm (0.072 mg/m³) as a 24-hour average.

Therefore based on these values, the allowable exposure for workers is almost 30 times the 'tolerable exposure limit' acceptable for the general public over 24 hours i.e. 3 ppm x 8/24 = 1 ppm (maximum level for workers over 24 hours, based on the 8 hour WES), compared to 0.034 ppm (maximum level for the general public over 24 hours).

Recommendation

- a) Provide more protection to workers, particularly those on Port property who have nothing to do with, and perhaps little knowledge of the fumigation activity. e.g. office workers in buildings located on Port land.

These workers are at particular risk since they do not wear PPE and may be in relatively close proximity to fumigation for many months or even years;

- b) Set a maximum airborne concentration for the public (just as is currently proposed for workers) and a TEL -1 hour, not just a 24 hour TEL average value as is currently proposed.

Health effects may be experienced from exposure to EDN over a much lesser period than the 24 hour average. An example of this is provided in the Science memo (p.24) which states that a neurological effect (resulting in eye irritation) can be observed in as little as 6 to 8 minutes of EDN exposure.

B) Buffer Distances for the Public

The WorkSafe SWI sets a buffer distance of 50 m, compared to the July 2018 assessment (EPA 2018d) which proposed a minimum buffer distance for the public of 120 m.

Dr Bruce Graham (on behalf of the EPA) prepared a report entitled “Review of an Assessment of Ethanedinitrile for Log Fumigation”, April 2018. In this report he states that “...*the adjusted modelled results were all well above proposed Tolerable Exposure Limit (TEL) of 0.034 ppm as a 24-hour average.*” He stated this would not be acceptable unless “*appropriate control measures are put in place*”, and identified limiting pile sizes to no more than 750 m³ as a “*key control measure*”.

He states that if “*log piles of up to 1500 m³ were allowed ... a buffer distance of about 120 metres would be necessary.*” (s.4.3)

Despite the proposed EPA controls placing no limit on the size of log piles, the buffer distance is still proposed as 50 m for the public, less than half the buffer distance that Dr Graham stated was necessary.

Recommendation

- Either increase the buffer distance to 120 m or set a maximum size log stack that may be fumigated, as a control.

C) Buffer Distance for Workers

Although the July 2018 assessment (EPA 2018d) recommended a 20 m buffer for workers from a multiple log pile source, the latest proposed controls removes any minimum buffer entirely, based on the draft SWI (WorkSafe 2021b) defining an “affected area” beyond which the WES may not be exceeded and which is adjusted as necessary depending on the “*particular circumstances of the fumigation*” and “*information obtained from the monitoring data.*”

The SWIs do not specify any requirement for PCBU to provide workers with personal monitors to warn them of high exposure levels.

As Dr Bruce Graham stated in his report (s.4.2.1) anyone standing close to the log piles when the tarpaulins are removed has the potential to be exposed to instantaneous EDN concentrations of up to 5,200 ppm (compared to the WES ceiling value of 5 ppm).

Recommendation

- a) Reinststate a minimum buffer distance to provide a minimum level of protection for workers without PPE to provide a minimum level of protection;
- b) Require that fumigation staff are provided with personal monitors to continually monitor their exposure.

D) Evacuation in Response to High Fumigant Concentrations

Based on previous reports from fumigators to the EPA there are regular incidents involving “*loss of containment*” that result in an uncontrolled release of fumigants. In these cases it is obviously important that the public and port workers are notified immediately.

The Science memo (p.31) refers to evacuations in the event of a TEL breach being reported. In recognising that some members of the public may be unable to evacuate themselves in the event of a TEL breach, it also recommends a larger buffer distance for some people.

Despite this it is difficult to see how a breach of the TEL (24 hour) value, which is an average of data collected over 24 hours, is at all useful for enabling the public to evacuate in a timely manner in the event of an emergency resulting from high fumigant gas concentrations.

The SWI (WorkSafe 2021b) requires that WorkSafe and the relevant medical officer of health be notified of this exceedance “*as soon as practicable but within 5 working days of the exposure level being recorded*”.

Recommendation

- Require in the event of the TEL or a maximum airborne (ceiling) concentration being exceeded, that this is immediately reported to civil defence emergency management (CDEM) of relevant local authority and neighbouring properties, in addition to Fire and Emergency New Zealand.

E) Explosive and Flammability

Item 20 of the Science memo, states that “*The lower and upper explosion limit reported for ethanedinitrile are 6 % and 32% by volume in air respectively. The original application form reported 6.45 ± 0.8 to 14.3 ± 0.8 vol%*”

This shows the reported range of the explosive percentage of EDN volume in air has increased markedly from the original 7% (i.e. 14-6) to the now reported range of 26% (32-6). This is in addition to EDN meeting the highest HSNO category of flammable gas, Category A (high hazard) – classification 2.1.1A.

The Linde Fumigas manual describes EDN as an “*extremely flammable gas*” and states that “*the risk of exposure to gases like ethanedinitrile... and the risk of explosive atmosphere creation are the most obvious and important issues to manage*”. EDN™ FUMIGAS. Manual for fumigation, Linde Gases Division, Germany.

Recommendation

- Introduce specific controls to mitigate the risk of explosion and fire.

F) Verification of Compliance e.g. Maximum Concentration under the Tarpaulin / Sheet Prior to Release

The table on page 31 of the Science memo identifies the release concentration before ventilation as a “key parameter”. We consider that ensuring a maximum release concentration of 700 ppm is critical to ensuring the safe use of EDN.

Although WorkSafe’s SWI requires this maximum concentration (s.11(b)(ii) (and a written record of the monitoring in the enclosed space, s.15(1)(d)) it does not make it clear who this data should be made available to.

According to the EPA’s website “*The EPA, WorkSafe and local authorities all have responsibilities for compliance, monitoring and enforcement activities relating to (fumigation).*” (<https://www.epa.govt.nz/public-consultations/decided/reassessment-of-methyl-bromide/>)

Without the ability to verify the monitoring data these parties may be hampered in their ability to ensure EDN is used safely.

Recommendation

- For emphasis and clarity we recommend that an EPA control be established requiring a maximum pre-release concentration of 700ppm, and that all information gathered in compliance with the EPA controls be made available on request to the parties identified above as having responsibility for compliance, monitoring and enforcement.

G) Wind Speed Minimum

Low wind speeds are associated with poor fumigant dispersion and unpredictability in wind directions, and therefore these conditions present an increased risk to workers and the general public.

S.7.46 of the July 2018 Science Memorandum (EPA 2018d) recommended that “*ethanedinitrile should not be vented under very low wind speed conditions (less than 5 km/h), or under inversion conditions.*” This is consistent with the recent EPA Decision on the modified reassessment of methyl bromide APP203660 (11 August 2021) which stated that ventilation may only occur when wind speed is at least 2 m/s.

The applicant has argued that very low wind speed conditions or inversion conditions would not typically occur in port locations where sea breezes are always expected (emphasis added) (s.7.47). A wind rose presented in Appendix 07A – Air Dispersion modelling report prepared by Sullivan Environmental Consulting (SEC) for the Methyl bromide reassessment <https://www.epa.govt.nz/assets/FileAPI/hsno-ar/APP203660/54ae837cca/Appendix-07A-Air-dispersion-Modeling-Report.pdf> shows these situations of low wind speed do occur, although they are uncommon.

The Staff report (s.7.58) stated that, despite acknowledging that this would further reduce exposure levels outside of the treatment areas, “*the controls for wind speed restriction ... proposed in the Science Memorandum (EPA 2018d) ... are no longer necessary as these are better addressed by the requirements suggested in the draft SWI related to fumigation.*” This is despite WorkSafe’s SWI not requiring a minimum wind speed requirement before fumigants may be released.

Recommendation

- Require that ventilation of any fumigation only occur when wind speed is at least 2 m/s, consistent with the EPA decision on the modified reassessment of methyl bromide.

H) Interpreting Modelling Results

The same company that prepared the modelling for EDN also prepared the application for reassessment of methyl bromide i.e. Sullivan Environmental Consulting (SEC).

As part of the methyl bromide reassessment, Todoroski Air Sciences Pty Ltd prepared a report entitled “Air Quality Review Dispersion Modelling Assessment of Methyl Bromide,” dated 23 July 2020, https://www.epa.govt.nz/assets/FileAPI/hsno-ar/APP203660/APP203660_Todoroski_Air_Sciences_Review-of_Updated_Air_Dispersion_Modelling_July2020.pdf

This was a peer review of the *Modelling Report for Methyl Bromide Exposures for Timber Fumigation at the Port of Tauranga, New Zealand* (the Assessment Report) (Sullivan Environmental Consulting, June 2020) conducted by Sullivan Environmental Consulting (SEC). https://www.epa.govt.nz/assets/FileAPI/hsno-ar/APP203660/APP203660_Modeling-Report-for-Methyl-Bromide-Exposures-for-Log-Fumigation-at-the-Port-of-Tauranga.pdf

Todoroski concluded that there were fundamental errors in the SEC report and that it was not performed as per the NZ guidelines for modelling.

Recommendation

- Any conclusions based on modelling carried out by SEC should be carefully scrutinised by independent and internationally recognised air dispersion modellers.

The matter of whether recapture is required may also need to be revisited depending on how well the SEC work stands up to scrutiny.

I) The Confidence Level for Interpreting Modelling Results

The (EDN) Expert Conferencing Joint Witness Statement Topic: Air Concentration Dispersion Modelling Date: 15 October 2018 <https://www.epa.govt.nz/assets/FileAPI/hsno-ar/APP202804/8bff6b821f/APP202804-Joint-Expert-Statement-Air-Concentration-Dispersion-Modelling.pdf> suggests that 95th percentile values, as reported in the modelling, were used as the basis to establish the proposed buffer distances for EDN.

This is at odds with the approach taken for the recent methyl bromide modified reassessment where 99.9th percentile values were used, as shown below.

The EPA methyl bromide decision document of the modified reassessment of methyl bromide (APP203660) “The Decision” states (s.4.36) that *“the Committee has heard from experts regarding what percentile value is appropriate to use in modelling estimated exposure and consequently in determining appropriate buffer zones. The Committee considered the data generated from modelling represented by the 99.9th percentile to be the best balance of precaution and accuracy”* (emphasis added).

The New Zealand guidelines (as set by the Ministry for the Environment) also recommends using the 99.9th percentile for predicting concentrations of a fumigant (methyl bromide).

Recommendation

- Reconsider the buffer distance based on using the 99.9th percentile values in the modelling.

J) Consistency with the Recently Introduced Controls for Methyl Bromide

Recommendation

- In order to make it clearer for both fumigators and regulators, the controls introduced for EDN should (where possible) be identical to those recently introduced for methyl bromide. This includes controls for notification, ventilation, the requirement to keep records and reporting.

A notable difference is that Regional Councils must also be notified in advance of fumigations, and have the ability to inspect the required records and data gathered.

Don't hesitate to contact us for clarification of any of these points.

Yours sincerely,



Bay of Plenty Regional Council