Environmental Protection Authority
Te Mana Rauhī Taiao

IN THE MATTER of the Hazardous Substances and New Organisms Act 1996 ("HSNO Act")

AND

IN THE MATTER of the Decision-Making Committee with delegated responsibility for powers and functions related to the hearing and deciding of applications under the HSNO Act

THE DECISION-MAKING John Taylor (Chair)
COMMITTEE

Ngaire Phillips

Kerry Laing

DATE 18 December 2018

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MINUTES OF THE TELECONFERENCE REGARDING AIR CONCENTRATION DISPERSION MODELLING

Regards application APP202804; to import EDN (Ethanedinitrile), a fumigant for use on timber/logs under commercial conditions

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1. This minute is to be documented and made available on the EPA website with the other application documents.

2. Following the expert conferencing process, Dr Graham, as the EPA consultant for matters relating to air dispersion modelling, was asked by the EPA staff to provide advice on the impact that the outcomes of the expert conferencing may have on his original advice which formed part of the EPA Science Memo.

3. Dr Graham advised that an update to his report on the air dispersion modelling undertaken by the applicant was not required. Dr Graham further added that should the DMC wish additional modelling be undertaken, there were a number of considerations which should be taken into account. This advice was made publicly available (https://www.epa.govt.nz/assets/FileAPI/hsno-ar/APP202804/APP202804-Graham-EDN-advice-after-expert-conferencing-2018-11-02.pdf) and comment and feedback invited.

4. Three submissions were received from Bay of Plenty Regional Council, STIMBR and Tauranga Moana Action Group.

Questions arising

5. Following analysis and review of this new information the DMC had a number of questions.

6. The questions raised by the DMC are provided below:

From:	
Sent:	Tuesday, 11 December 2018 6:52 PM
To:	
Cc:	
Subject:	APP202804 EDN (Ethanedinitrile) further questions regarding air dispersion modelling

Please find below a list of questions and comments the DMC have in regards to the outcome of the expert conferencing, specifically the air dispersion modelling of EDN.

EDN application - questions on air dispersion modelling

Before deciding whether there needs to be further modelling undertaken and if so what, we need to have a better understanding of what has already been done and how. Therefore a number of comments or questions are posed below that either Bruce Graham or perhaps only Dennis Hlinka can answer. In particular, a fundamental question is the relationship between what has been modelled and what happens in practice on the port as there are many assumptions in the modelling.

Note comments below use piles and stacks as in the air dispersion modelling reports.

1. In Bruce Graham's original comments he said that the modelling should have been done with a volume source. There is no comment on this in the Joint Witness Statement (JWS). Was it concluded this would not make a difference/was unnecessary or easier to do further work on the same basis as existing? Was there any discussion on alternative models that could have been used?

2. In (JWS) paragraph 6, it states that 'the results for multiple piles are approximately double those of a single pile, which is primarily due to having two adjacent piles ventilated within the same hour. Other than that the contours show only minimal overlap between the three different groups of log piles'. This indicates that the use of the term 'multiple piles' is potentially misleading as the ventilation from sets of piles at different locations are essentially independent and it is irrelevant if there are 10, 20 or 30 piles – the results are essentially for 2 piles. It also brings into question the random nature of start and thus ventilation times. Using the postulated scenario that there are 2, 4 or 6 fumigations/hour over 5 hours it means the first fumigation occurs between 7am and 2pm and the others are fixed by this. The random start times are for ventilation.

   Should consideration be given to ventilation of more than 2 piles/hour within a particular set and whether the findings are also true at shorter time periods.

3. What is meant by a 1hr and 24hr average and how are they derived?

   At the hearing and in the JWS (paragraph 4) the question was asked regarding why the 24hr average was higher than the 1hr average. In both instances the answer provided was that it was related to the high proportion of zero values in the hourly results. There is not a great difference between the 1hr averages and the 24hr averages so would have to conclude a fair proportion of zero values in the 24 hr average data set also. How do the zero values arise and why there are so many of them and what effect do they have on the percentile calculations? This is borne out by Bruce Graham's concern that the 95th percentile may be an underestimate of exposure values. There is also a concern around shorter time intervals, which are particularly relevant for port workers. Why are there no modelling results for intervals less than 1 hour?

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4. Also in JWS (paragraph 4) -with 5 years of meteorological data available not able to follow why it was considered necessary to do 40 simulated runs. Why was this done and how (particularly relevant to multiple stacks and time of day for fumigation and ventilation) and how does it affect the results?

5. In considering the array of receptors for the multiple pile fumigations is this a fixed set irrespective of which pile is being ventilated and what the wind direction may be? As an example, if the northern most pile in a set of 10 is being ventilated and the wind is blowing from the north, then the closest receptor downwind is more than 60m away. It is likely that not much of the dissipating EDN will move in a southerly direction due to the barriers in this direction but will flow in other directions. How is this determined?

6. The related question is how does the model deal with the fact that upon ventilation (an air/EDN mixture that is not buoyant and modelled as releasing at half the stack height) deal with the fact that there is a wall 1m away and the wind direction may be directly towards the wall?

7. Modelling assumes all the EDN is vented within the first hour. How is this dealt with? Is there an assumption that there is a linear decrease in concentration from that assumed at the initiation of ventilation to zero after 1 hour, some other rate of decrease that assumes more rapid decrease at shorter times and a slowing decrease towards the 1 hour mark or something else?

Thanks and I look forward to receiving a response in due course.

Best,

John

John A Taylor PhD

7. The questions from the DMC were forwarded to Dr Graham on 13 December 2018 and Dr Graham was then asked to attend a conference call with the DMC on 18 December 2018.

Teleconference – 18 Dec 2018

8. The meeting was attended by Dr John Taylor (Chair), Dr Ngaire Phillips, Dr Kerry Laing, and Dr Bruce Graham (the EPA consultant for matters relating to air modelling).

9. EPA staff assisting with the applcaition were also in attendance.

10. Dr Graham opened the meeting with an overview of air dispersion modelling in general and the AERMOD Modelling System.

11. Dr Graham provided a handout, appended to these minutes.

12. AERMOD is a steady-state plume model. Further information on this model can be found **AERMOD Modeling System**

13. A summary of the key points in relation to the overview of Aermod modelling are provided below:

    a. The model is not designed for picking up variability so it would be important to either factor in variability, or to take the worst case scenario

    b. The modelling is not considered suitable for estimating worker exposure, and a different approach would be required to pick up short term and acute exposure

    c. Models can be refined repeatedly, with different input values, and still produce high uncertainties due to the nature of the dependency between those input values and representative real world use scenarios.

Response to Questions – Discussion

In addition to the notes below capturing more of the general discussion, Dr Graham has provided (on 29 Jan 2019) a written summary of his responses to each question, appended to these minutes.

14. Question 1

Modelling using a volume source may have been preferable over the use of an area source (as was done for this application). Both however are equality valid, and have their own limitations.

While alternative Gaussian dispersion models exist any model used would be based on the same underlying parameters and input values and similar alogorithms. Any other alternative would mean starting afresh and the experts agreed that any further modelling should use AERMOD

A summary of response has also been provided by Dr Graham (appended).

15. Question 2

Dr Graham stated that it took 10-15 minutes to remove a tarpaulin, and 4-5 piles could be uncovered in one hour, however, generally these would usually not be adjacent. It was estimated that up to 30 piles could be uncovered in one day. Dr Graham noted that for some of the monitoring undertaken on methyl bromide fumigations, that up to five piles could have a cumulative effect, but the sixth pile would be too far away in distance and time.

A summary of response has also been provided by Dr Graham (appended).

16. Question 3

The model only illustrates scenarios at an hourly interval so this modelling is not considered suitable for estimating worker exposure within shorter periods. A different approach would be required to pick up short term and acute exposure. In order to determine worker exposure in a representative and accurate manner, good quality monitoring data from a field trial is therefore highly desirable.

It was noted that the Applicant had provided monitoring data from the field trial carried out in Tokoroa however that there were some concerns over the quality and reliability of that data.

Given the nature and limitations of any form of modelling, regardless of which model is utilised, the level and degree of uncertainly associated with that modelling will always be significantly higher than

any uncertainty relating to actual quality data generated from an appropriately designed and executed field trial.

A summary of response has also been provided by Dr Graham (appended).

17. Question 4

See general discussion on the modelling capability and limitations in Question 1 and 3 and summary of response provided by Dr Graham (appended).

18. Question 5

See general discussion on the modelling capability and limitations in Question 1 and 3 and summary of response provided by Dr Graham (appended). The use of distant receptor points in determining maximum values was not discussed.

19. Question 6

See general discussion on the modelling capability and limitations in Question 1 and 3 and summary of response provided by Dr Graham (appended).

20. Question 7

See general discussion on the modelling capability and limitations in Question 1 and 3 and summary of response provided by Dr Graham (appended).

Teleconference closing

21. Once the DMC were satisfied that Dr Graham had addressed those matters at hand relating to clarification around the modelling, Dr Graham left the conference call.

22. The DMC noted that no further information relating to the specific questions outlined above was required at this time.

23. The DMC noted they would meet in due course to continue their considerations and determine if they now had sufficient information to make their decision.

24. The DMC noted that achieving certainty about which controls could be applied to manage workplace risks to the extent that they are material to the final decision, would require WorkSafe to develop Safe Work Instruments or other regulatory means of ensuring risks arising from the use of this substance in a workplace were managed appropriately.