

Dr Matt Hall
CEO & Founder, Apreso
+61-422-938-529
www.apreso.co.nz

Recapture Report

Genera prepared a recapture monitoring report and provided it to the Bay of Plenty Regional Council on July 2019. The purpose of this report was to demonstrate that effective recapture was being achieved.

The trial was to be carried out in line with the methodology presented in appendix 12 of the Fumigation Management Plan (FMP, dated 26 April 2019), which was prepared as a requirement of condition 5.5.2 of resource consent 62719.

In response to a request by the Bay of Plenty Regional Council Dr Hall made the following comments on 13 August 2019 on the recapture report.

General comments:

- This report describes the monitoring of 3 recapture events, 2 of which were terminated before reaching 20% of the initial concentration. This comes up well short of the 10 recapture events defined by the agreed methodology.
- Recapture events 2 & 3 did not meet the minimum requirements for reporting. They either shouldn't be included in the report or they should be added to the appendix as supplementary information.
- Genera needs to allocate appropriate resources to this task to ensure that valid data is collected within the defined time frame.
- Methodology 4. & 6. i. Suggest that the age (hours) and amount (stack volume) of MeBr recaptured by the solution is reported in future.
- Methodology 6. f. Suggest that the air/fumigant mixture is circulated with the vacuum pump (liquid pump turned off) until a consistent concentration is measured. Once a stable concentration is measured at the front, middle and back then the liquid pump for the solution is turned on and this is the start time for recapture.
- It is not clear why it is not always possible to determine the volume of MeBr recaptured. I've provided a working example on page 1 of Genera's report – point 2 below.

Specific comments/questions:

- How high off the ground were the samples taken?
- How far in from the end of the stack were points A, C, D & F taken?
- Sampling points A & F seem to be taken ~20 cm off the ground at the inlet/outlet, is this correct?
- The order of sampling isn't clear. Presumably it was A, B, C etc. Suggest that positions A/F are measured first then B/E and C/D.
- How was the initial concentration quantified? With or without the use of vacuum pumps circulating the air/fumigant mixture?
- Please add a measure of variability (e.g. standard error of the mean or similar) to data presented in Figures 2, 3 & 4.
- Were single or multiple rows recaptured during your measurements? If multiple rows were recaptured then please describe the location of the monitoring relative to other stacks.
- In table 1, it states that the solution of unit 2 had been used for 1.7 h prior to recapture on the 12th July. Recapture on this day lasted ~ 6 h (0935-1545) The same unit was then used on the 13th July for replicate 3, yet it is stated that its solution had been used for 12.7 h. Please explain why the value isn't ~7.7 h. i.e. $1.7 + 6.0 = 7.7$ h.

- The sampling protocol for recapture 3 differs from the agreed methodology. Only two locations were measured and a clear reason for this deviation was not provided.
- It takes ~3 minutes to run 1 sample. Therefore, they are running 6 samples every 20 minutes or ~18 minutes of GC run time every 20 minutes which is achievable. Yet based on the data supplied, recapture is taking >6 h/replicate. Therefore with one GC they can only monitor 1 stack/day.

Dr Hall's comments / questions marked up on the Recapture report (the underlined text is from the Genera recapture report and is provided to indicate the context of Dr Hall's comments when read in conjunction with the original report):

1. This report only presents 1 completed and 2 terminated monitoring events. It should report on a total of 10 monitoring events. Genera need to allocate appropriate resources to collect the required data within the proposed time frame.
2. 6.i. does not mention that the volume of MeBr needs to be determined. The amount (weight) of MeBr destroyed can be easily calculated by the (initial conc. - the final conc.) x volume of the stack(s).
 - a. i.e., $(100 \text{ g/m}^3 - 20 \text{ g/m}^3) \times 400 \text{ m}^3 = 32,000 \text{ g}$ or 32 kg of MeBr recaptured.
 - b. GC is the best available technique to determine this.
3. Re. Recapture results. As each point on the figure is the average of 6 sampling locations, please provide a measure of variability as an error bar. e.g. standard error of the mean.
4. Re Figure 2. Were single or multiple rows recaptured during your measurements?
 - a. ~6 hours scrubbing for one row seems a long time. If multiple rows then how many? Which position did you monitor?
5. Re. Table 2. I can now see that 4 rows were simultaneously recaptured. Which one was monitored? Where was it located?
6. Re. Recapture 2 – constrained. If it didn't meet the minimum standards for reporting then it shouldn't be included in this report.
7. Re. Table 4. Does this mean that 15 rows were recaptured at the same time or row 15 & 19. Please clarify.
8. Re. Recapture 3 – constrained. This sampling protocol differs from the agreed methodology. It isn't clear why only 2 locations were selected.
9. Discussion. This is a good start but does not meet the minimum requirements defined by the methodology. Things will go wrong at this scale but sufficient resources should be allocated to this work to ensure that it succeeds.
10. List of issues confronted... This should not be an issue as 1 sample takes ~3 minutes to run with 6 samples every 20 minutes. i.e. it's close at 18 minutes of GC run time every 20 minutes but it is still achievable. Based on the data supplied, recapture takes >6 h. Therefore, with one GC they can only monitor 1 stack/day.