DEPARTMENT OF PESTICIDE REGULATION
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June 12, 1992

TO: INTERESTED PARTIES

SUBJECT: Guidance for Protocol Development for Methyl Bromide Monitoring

The basic elements of an acceptable protocol for determining workplace exposure to methyl bromide to satisfy our requirements are detailed below:

- Protocols should contain at a minimum the detail required in 40 CFR 160.120 Subpart G. (Attached) See also memorandum of June 10, 1992 to clarify the applicable sections of this US EPA document. (Attached).

- Protocols should specify that each worker to be monitored should know the basis for conduct of the monitoring and how the monitoring is to be conducted.

- All exposure monitoring equipment should be installed on the worker prior to the start of the work task being monitored and removed after completion of the task. The monitoring time (time air pump is operating) must be accurately recorded. For work tasks that last only a short period of time, consideration must be given to minimum volumes of air sampled and laboratory detection limits in order to obtain meaningful data.

- With regard to replication, 5 replicates of each job task for each location at up to 3 locations is the target. For example, for cotton fumigation by the vacuum chamber method, if there are only two sites where this type of fumigation is performed, worker exposure measurements should be collected at both sites with five replicates each. This would probably involve monitoring each person involved or potentially affected by a typical fumigation during five separate fumigations at each site.

Details of monitoring and the method used by the Worker Health and Safety Branch (WH&S) are included on the attachment.

For further assistance, contact John Ross, Dennis Gibbons or Tian Thongsinthusak at the WH&S office at (916) 654-0455.

Cal/EPA, Department of Pesticide Regulation Methodology for Measuring Methyl Bromide Exposure to Application Personnel and Other Potentially Exposed Workers

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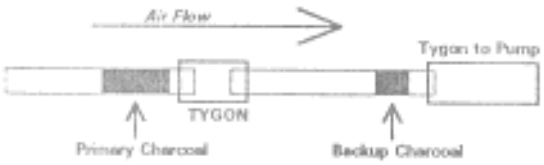
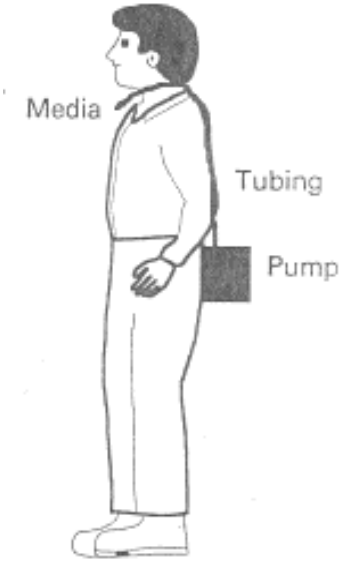
Objective:
The Department of Pesticide Regulation (DPR) has proposed new, more stringent levels of permissible exposure for persons working with or in proximity to methyl bromide commodity fumigations. The Worker Health and Safety Branch of DPR has been tasked with measuring applicator and other worker's potential exposure.

Methods and Materials:
Equipment used in this project includes:

1. MSA Model C-210 Air Pumps
2. SKC Petrol. Based Two-part (400/200 ma) Charcoal Tubes
3. TygonR Tubing
4. MSA 10 Unit MultiCharger
5. Drager Kit with Methyl Bromide 3/a Tubes
6. Air Motion Indicator



Drager tubes are used to identify areas of concern for airborne levels of methyl bromide. Long-term air samples are taken using the C-210's and the charcoal tubes. The maximum volume these two-part (primary and backup) tubes can handle is 11 liters, so care must be taken in setting the flow rate of the pumps. Excess air volume may cause breakthrough into the backup section. The charcoal tubes are connected in series, primary ahead of backup, using short lengths of new TYGON® tubing.



Personnel Sampling:
Personnel samples should be obtained to characterize the exposure for the specific job-tasks. Sampling rate should be adjusted to reflect the estimated time of task completion so as to not exceed the maximum sample volume restriction cited above. Samples should be taken from the breathing zone (BZ) by positioning the sampling media intake at the shoulder using sufficient plastic tubing to connect it to the pump located on the worker's belt. The BZ is located within a 20 cm radius circle of the worker's mouth and nose.

The C-210's used by DPR are set to sample less than 10 liters during the duration of the work task or interval of concern. Pumps on the workers are powered by their internal batteries. Stationary pumps are connected to MultiCharger, insuring constant power during the extended sampling times. The MultiCharger run off of onsite power. The C210 pump is piston-driven with a known displacement and does not normally require mass-flow calibration.

Area Sampling:
Area samples may be obtained of the general work area to determine potential exposure to other persons at risk to exposure. Sampling periods should be as open as resources and conditions allow. Ideally, the first few days should be sampled at a higher frequency than later days. A sampling scheme either workshift-based or time-based (12 to 18 hours for the first 24 to 48 hours, for example) could yield valuable information on the initial dilution/dissipation of the fumigant. This information can be related to human exposure potential. Sampling sites should include not only obvious choices, such as the fumigation chamber, but also area not readily associated with exposure, such as holding/storage areas and sorting facilities.

After removal, tubes should immediately be detached, primary from backup, to prevent any migration. The tubes should then be immediately capped and cooled, preferably on dry ice. Analysis should follow NIOSH Method 2520.