Aluminum Phosphide Industrial Hygiene

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Abstract

The major objective of this study is to determine the extent of phosphine exposure occurring in the field to application personnel and bystanders when aluminum phosphide is applied to rodent burrows. Another objective is to identify training needs and develop training practices that would reduce risk of exposure to phosphine. The dependability and accuracy of available monitoring equipment used under field conditions is also being studied.

Field trial protocol called for monitoring of 8 to 12 California Certified Qualified Applicators (QAC) and 8 to 12 non-QAC applicators for 3 to 5 day periods in both agricultural production and urban landscape settings. To date 11 non-QAC applicators performing ground squirrel and pocket gopher control in almond orchards have been monitored on three farms located in the Merced, Madera and Firebaugh areas. Additionally 7 QAC and 1 non-QAC applicators have been monitored in urban areas of Orange and Los Angeles Counties. Both ground squirrel and pocket gopher applications are also being conducted in the urban areas, however the majority of the work is for gophers.

The trials were initiated as soon as EPA had confirmed protocol acceptance in July of 2000. The hot weather and low wind conditions present were not typical of when the majority of ground squirrel fumigation would normally be performed, March through June. However the need for data was urgent and we found a sufficient number of grower co-operators who were not yet finished with treatments.

To date 19 applicators were monitored for 63 application and 26 control days. Over 7200 burrows were treated at the maximum label rate of 4 tablets per burrow with 25,296 tablets being used on over 1000 acres. Resulting exposure to applicators did not exceed the 8 hour time weighted average (TWA) of 0.3ppm established by regulations for any applicator. However, there were 8 occasions where the 15 minute short term exposure limit (STEL) of 1.0ppm was exceeded, but up to 4 a day are allowed and no one had more than 1 per day. A number of safe handling practices have been identified that could reduce risks of phosphine exposure and prevent exceeding the STEL, or the 0.3ppm level above which a full face mask must be worn. This respiratory protection currently pertains to indoor applications only. Some of the safe practices identified include: applying only when there is positive air flow, holding the flask out away from the face and body, keeping the flask closed as much as possible, applying in the cooler part of the day, and airing out newly opened flasks. At

least one trial for ground squirrel treatment in the Valley will be performed in late winter or early spring to compare cool weather condition data with the hot weather trials.

Monitoring of treated fields for worker re-entry and bystander safety during treatment and 48 hours following indicated that only insignificant traces of phosphine, well below current tolerance levels, were occasionally detected. Testing of the environment around occupied structures is not yet complete. Testing of equipment accuracy is also not complete due to a shortage of reliable, and certified, test gasses. There appears to be some cross gassing contamination problems with the new the high technology equipment, however the overall performance looks promising.