Department of Pesticide Regulation

Mary-Ann Warmerdam
Director

M E M O R A N D U M

Arnold Schwarzenegger
Governor

TO: Mario Ibarra, Senior Pesticide Use Specialist
Central Regional Office
1130 East Shaw, Suite 100
Fresno, California 93710

HSM-05009
(No. assigned after issuance of memo)

FROM: Harvard R. Fong, CIH, Senior Industrial Hygienist *(original signed by H. Fong)*
Worker Health and Safety Branch
(916) 445-4211

DATE: January 20, 2005

SUBJECT: CONSULTATION ON PARAMOUNT FACILITY AND THEIR USE OF PHOSPHINE GAS

On December 7th I traveled to Kern County in response to your request for an industrial hygiene assessment of the phosphine use at the Paramount Farms facility in Lost Hills. This facility was bringing a VAPORPHO3S treatment unit on-line and had requested an industrial hygiene consultation. Our assessment of the facility is as follows:

During the pre-inspection meeting, Daniel Lee and Alex Ramirez of Paramount Farms explained their facility's use of phosphine and the general layout of the facility. I detailed Department of Pesticide Regulation's (DPR's) concerns with the use of phosphine, especially regarding direct-gas systems such as ECO2FUME (ECO2) and VAPORPH$_3$OS (VPH$_3$). The critical aspect of phosphine use is the monitoring of the gas from its initial release (or, in the case of phosphide materials, its evolution), through its movements through the facility, to its final dissipation to non-detectable levels.

In our walk-around of the processing facility, I observed the various processing stations used in grading, sorting, and packaging the pistachios. Mr. Lee explained that most of the pistachios going through final processing are run through a rotating roaster for approximately 20 minutes at a temperature of 400º F. This would probably be sufficient to drive off residual phosphine in the nutmeat and would most likely render the product essentially free of potential off-gassing residue. However, research into this possibility would need to be conducted to ensure that the roasted nuts are no longer a source of phosphine gas.

When we were in the processing structure, I noted that there were stacked bins sharing the same air parcel as the processing workers. DPR's INNOVA-ST phosphine detector indicated the presence of phosphine gas, both in the headspace (0.27 ppm), and in the bulk mass of the pistachio nuts (1.87 ppm). Though not necessarily indicative of hazardous concentrations of phosphine gas to workers, this did demonstrate the presence of phosphine in the bin. Title 3 CCR Section 6782 (e) states that the fumigant should not be released into an occupied work area. Title 3 CCR Section 6782 (f) states that the area should be managed so that employees are not

exposed to concentrations above the Permissible Exposure Level (PEL) listed in Title 8, section 5155. The concentration in the work place is not monitored.

We also toured the silo farm where the nuts are stored. During an unloading of one of the silos, I placed the intake of the detector above the conveyor pulling nuts out of the silo and into the processing line. The INNOVA-ST showed sporadic readings of 0.03 to 0.04 ppm at this point, once again demonstrating the presence of phosphine gas in association with movement of treated commodity.

On subsequent discussion with Mr. Lee, I once again expressed the need to be able to monitor phosphine concentrations throughout the treated commodity's processing cycle. This would include not only personnel monitoring on the application crew, but monitoring treated product as it is moved out of silo storage and into enclosed areas during processing. It is strongly recommended that a permanent remote-monitoring system be installed at critical points, including (but not limited to) areas where nuts are brought into an enclosed structure, processing areas where there is close contact between workers and treated commodity, and areas where there is bulk storage of "work in progress".

Of particular value was the inspection of the VPH3 application unit (Horn Diluphos System, HDS-200C). Upon close examination of the unit, and with an explanation of its operation and its various safeguards from Mr. Lee and Mr. Ramirez, it would appear that this system can be operated in a sufficiently safe manner. Computer control of the phosphine introduction and mixing procedures seems designed to prevent explosive conditions from being created.

A system that monitors airborne phosphine concentrations, from initial injection of the gas, through emissions from off-gassing commodity from the silos, and through the tarpaulins while in storage, to final aeration and processing, would be the best approach to monitoring and controlling phosphine exposure to workers. A major concern of DPR is that even though the applicators may be using personal phosphine monitors, there is no detection system for fugitive emission (by leakage from tarpaulin damage, simple penetration of the gas through the plastic or off-gassing from nuts in the processing line) from treated commodity. Even if there is only, on average, slight leakage per pound of processed commodity, the accumulation of tons of commodity from treated bins or silos within a confining structure could result in detectable concentrations of phosphine gas in the breathing zone of workers. This suggests that storage and processing structures may require monitoring, ideally constant real-time monitoring, for the duration of fumigated product storage or processing. It is strongly advised that the real-time stationary phosphine-monitoring system be installed as quickly as feasible. Other mitigation measures may also be applicable.

Since phosphine gas, in the ECO2 and VPH_3 formulations, appear to be a methyl bromide replacement, it is critical that the use of these materials be properly reviewed and that facilities

using them sample and document air concentrations in the workplace. DPR is willing to discuss these recommendations with a consultant.

Unrelated to the use of phosphine in the facility, the tour of the mobile methyl bromide chambers at the off-site was very informative and indicates a novel approach to dealing with buffer-zone requirements for fumigation and aeration.

We look forward to providing further consultation services to Central Regional Office/Enforcement in investigating and reviewing work environments where phosphine gas fumigants are in use.

cc: Al Lomali, Enforcement Branch
Susan Edmiston, Worker Health and Safety Branch
Frank Schneider, Worker Health and Safety Branch