



Department of Pesticide Regulation



Brian R. Leahy
Director

MEMORANDUM

Edmund G. Brown Jr.
Governor

TO: Saturnino Yanga
Environmental Program Manager I
Worker Health and Safety Branch

HSM-15001
(No. assigned after issuance of memo)

FROM: Harvard R. Fong, CIH
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(original signed by H. Fong)

DATE: March 3, 2015

SUBJECT: RESULTS FROM CONSULTATION WITH FRESNO CAC CONCERNING
PROPOSED USE OF PHOSPHINE FOR BIN TREATMENT OF NUTS AND
GRAIN IN PROXIMITY TO A SENSITIVE SITE

On February 27, 2015, Associate Industrial Hygienist Parissa Tehrani, Environmental Scientist Emma Wilson and I traveled to Reedley on request from the Fresno County Agricultural Commissioner's (CAC) office to provide a consultation on a proposed phosphine fumigation site. The site, Specialized Packaging at 787 W. North Avenue in Reedley, is located within the city limits and directly across North Avenue from the Reedley High School.

The operators of Specialized Packaging (SP) are proposing to conduct phosphine fumigations using Eco2Fume (E2F), a fumigant gas consisting of 2% phosphine (active ingredient) and 98% carbon dioxide pusher gas (inert ingredient). SP will be using a puncture injection system consisting of a metal injector wand, a flexible gas delivery line and a connector/control fitting to the E2F cylinder. The commodity to be treated will be assorted nut-grain mixes used in the production of animal feeds. The commodity is contained in a plastic bag which is confined within a standard nut bin (48" by 48" by 52"). The application procedure is to puncture the sealed bag with the injector wand, inject a timed amount of gas (10 to 12 seconds worth), withdraw the wand and simultaneously seal the puncture site with tape. The treated bin is then stored for later processing or potential retreatment, dependent on the processing needs of SP. Bin storage of this type always presents the potential problem of a integrity breach of the plastic bag not visible after it has been filled with product. This can result in rapid leakage of the gas from the confining bag and subsequent hazardous air concentrations within the storage structure.

The primary concern that Fresno CAC has with the proposed SP fumigation plan is its proximity to the high school. Apparently Fresno CAC has a local condition/requirement for fumigations, requiring a quarter-mile buffer surrounding sensitive areas, including schools. This requirement can be modified, but SP had not been able to adequately address the issue to the satisfaction of the CAC. The CAC requested that Worker Health and Safety, Industrial Hygiene Services provide a consultation to assist in developing conditions that would be satisfactory to both SP and the Fresno CAC.



Normally, fumigation safety issues revolve around exposure to applicators and other workers near the application and storage sites, and the most effective solution is to move the application site to an open environment and have storage in a structure with considerable passive ventilation (e.g. pole barn). However, the SP facility is not only situated near a high school, but also has both a public alleyway running along one side of the structure and a public bike/walking path on the opposite side. A major concern of Fresno CAC is that if outdoor fumigation is allowed, and there is a catastrophic failure of the fumigation system, such as a cylinder breach, a toxic atmosphere would be released within a sensitive area (school) and in an area where members of the public may be present. Given the proximity of a high school to SP, the customary solution of outdoor fumigation was not available.

The original proposed site for fumigation was a loading dock adjacent to the processing equipment where other employees would be working during the fumigation. Additionally, it faced the uncontrolled alley, down which members of the public (including students from the high school) could be walking or standing. This location was considered unworkable by the CAC. On review of the facility, it was noted that there were several storage rooms within the facility's building envelope. I asked the facility manager if any of the storage rooms could be dedicated to both fumigation and storage of fumigated commodity. Ultimately, a storage room, identified as "Room 5" was selected as a potential fumigation/storage site.

Room 5 utilization as a fumigation/storage site has many safety benefits under the conditions of operation. It isolates and secures the fumigation activity from both non-handler workers and the general public. A catastrophic failure of the cylinder would be contained, at least temporarily, within a confining structure. Monitoring for phosphine, either from applications or post-application commodity off-gassing (from either permeation or integrity breach), can be localized to the one room.

In order to use Room 5 as a fumigation/storage site, I would recommend the following:

1. All floor-level vents in Room 5 be sealed in a manner that is durable and resistant to tampering or physical damage. Simple plastic film is not adequate for this purpose.
2. Interior walls of Room 5 where structural support members (wall studs) are visible be covered with wood or plastic to maintain surface integrity. If plastic film is use, it should be 4 to 6 mils in thickness (see page 30 of the E2F Manual for guidance).
3. Entry into Room 5 to be restricted to persons equipped with a real-time phosphine monitor capable of detection to at least 0.3 ppm. This detector must be worn at the breathing zone (i.e. shoulder level) of the entering worker. If more than one person is entering, only one person is required to wear the detector, but that person should precede anyone else in moving around the room. This would not apply if the room is equipped

with a permanent stationary real-time monitoring system linked with appropriately mounted sensors throughout the room. Other than during active fumigation, the main entry into Room 5 is to be kept closed. During active fumigation, the door shall remain open to facilitate emergency evacuation for the applicator. Upon the emergency evacuation of the applicator, the door shall be sealed and emergency procedures, as outlined in the Fumigation Management Plan, will be implemented.

4. During any application, or during entry into Room 5, if phosphine is detected above 0.3 ppm, but below 1.0 ppm, the applicator or QAL should attempt to discover the source of the emission and correct it. If this cannot be done within 15 minutes, emergency procedures, as outlined in the Fumigation Management Plan, must be implemented. See page 39 of the E2F Manual for guidance on appropriate respiratory protection at levels above 0.3 ppm. Non-handlers are prohibited from performing this intervention.
5. Ventilation fans presently in place should be checked for operability, in case they need to be activated to reduce phosphine levels within the structure (see recommendation 5). These fans should be set to exhaust air out of Room 5 and above the roofline.
6. Wind turbine fans presently in place should be maintained in place.
7. Self-contained breathing apparatus (SCBA), as required by the E2F Manual, must be readily accessible in an emergency. The abandoned office near the loading docks would be an adequate location for storing the SCBA. The door into this office cannot be lockable, though an alarm may be installed to prevent unauthorized access to the SCBA.
8. Any other access doors to Room 5, other than the main sliding door, be locked and equipped with emergency exit hardware (“panic bars”). Such doors should not be modified to prevent emergency exit.
9. When not in use, E2F cylinders should be stored in the fenced area constructed for that purpose. E2F cylinders should not be left in Room 5, including ostensibly empty cylinders.
10. All other health and safety practices, as outline in the facility’s Fumigation Management Plan, should continue to be followed.
11. Room 4 will have light system in place to indicate fumigation in progress.
12. Recommend a second detection system be purchased in case of failure of primary personal monitor.

If these recommendations are implemented, I believe that the concerns of Fresno CAC regarding phosphine exposure to the public and non-handler workers will be largely mitigated and that the facility operators will be able to safely control and reduce any emissions from either applications or off-gassing.

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