Phosphine Fumigants
The only way to effectively and safely use phosphine fumigants is to use them as the product label directs. It is important to remember these substances are toxic and potentially harmful to humans. Using approved application methods and placarding all storage bins containing treated grain and transports carrying fumigated grain are the best means of ensuring the safety of all grain handlers.

Phosphine Fumigant Use

Commodity Temperature
Phosphide labels require the internal commodity temperature be tested before the fumigant is applied. If the internal commodity temperature is below 40°F, fumigation is not to be conducted as the temperature is too low for the phosphide tablets to react. If applied to cold grain, unspent tablets will not begin to react until the temperature rises.

Phosphine gas produced in a sealed area can cause severe poisoning to an individual upon opening. This is especially true when placards are not attached to warn grain handlers of the danger with commodity shipments.

1) The signal word "DANGER" and the skull and crossbones symbol in red.
2) The statement, "Area and or commodity under fumigation, DO NOT ENTER."
3) The statement, "This sign may only be removed after the commodity is aerated (contains 0.3 ppm or less phosphine gas). If incompletely aerated commodity is transferred to a new site, the new site must also be placarded and workers must not be exposed to more than 0.3 ppm phosphine."
4) The date and time fumigation begins and is to be completed.
5) Name of fumigant used.
6) Name, address and telephone number of the applicator.

Placards on railroad cars must be placed on both sides of the car near all ladders, hatches and doors.

Placards may not be removed until the treated commodity is completely aerated. The commodity must be monitored until it contains 0.3 ppm, or less, phosphine gas in the air space around and, when feasible, in the mass of the commodity. If more than 0.3 ppm is detected, the placard must be transferred with the treated commodity.

Failure to properly placard fumigated areas may expose inspectors, samplers, and other grain handlers working in and around the commodity to dangerous levels of fumigants.

Because applications to commodities are not obvious if placards are not properly posted, individuals may not realize the grain has been treated until after exposure has occurred.

Vehicles under fumigation cannot be transported over public roads or highways.

Monitoring Devices
Various types of monitoring devices are available for determining fumigant concentrations in commodities. Accurate readings are obtained by using the instrument according to the instructions, and by selecting the appropriate monitoring tube for the fumigant being used.

Fumigant Safety
Direct inhalation of toxic phosphine fumes may cause weakness, tremors, vomiting, coughing, difficult or labored respiration, and possibly pulmonary edema. For safety purposes, phosphide labels require applicators and grain handlers to wear respiratory protection during exposure to grain fumigant concentration in excess of 0.3 ppm, or when concentrations are unknown.

Placarding
Phosphide labels require the applicator to placard or post all entrances to the fumigated area with signs bearing:
Application Records

Fumigation of grain is considered a pesticide application. An application made by an elevator employee to co-mingled grain is considered a commercial application. Therefore, in accordance with South Dakota Law, each application of a pesticide, including phosphine, to storage bins, railcars or other sites, require completion of commercial pesticide application records. Private applicators must also maintain records for restricted-use pesticide applications made their stored grain.

Problems Identified with Phosphine Use in South Dakota

The Environmental Protection Agency regulates the use of fumigants through instructions on the product label. Failure to follow label instructions violates state and federal laws.

When illegal phosphine residues have been identified in South Dakota grain, the following violations have been most frequently cited.

1) Bins and railcars are not being placarded as required by product labels.

2) Application records, as required by South Dakota Law, are not being kept.

3) Applicators are not getting certified in the proper category to apply fumigants.

Pursuant to SDCL 38-21-44(2), it is a violation of South Dakota Law to apply a pesticide inconsistent with label directions; and, pursuant to SDCL 38-21-44(7), it is a violation of South Dakota Law to not keep required pesticide application records. Also, SDCL 38-21-40 mandates applicators must comply with certification requirements before using a restricted-use pesticide (RUP). Violations of these types are subject to civil penalties of up to $5,000 per offense.

From 2001 through 2010, enforcement action in cases involving misapplication of phosphine resulted in 2 civil penalties and 3 warnings. During this timeframe, there was one human death as a result of misapplication of phosphine.

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