

STORED PRODUCTS RESEARCH & EDUCATION CENTER



*Division of Agricultural Sciences and Natural Resources
Oklahoma State University*

OSU TIPS on *STORED GRAIN*

The OSU Stored Product Management Newsletter

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The stored product newsletter is designed to keep the commercial grain industry current on issues regarding stored grain management. We plan to publish at quarterly intervals throughout the year. This newsletter is also written to share information from the industry and OSU to help optimize stored grain management in Oklahoma and surrounding regions. Included will be key articles about useful grain management information, safety, new technology, new developments in applied research, current and pending government regulations related to commercial grain storage, grain marketing information, and details of future industry meetings.

If you have grain management or technology information you want to contribute, please contact Ron Noyes (405-744-8416; rnon@okstate.edu), Pat Bolin (405-744- 9420; bolinp@okstate.edu), Tom Phillips, (405-744-9408; tomp@okstate.edu), Jim Criswell (405-744-5531; jtc@okstate.edu) or Kim Anderson (405-744-9817; anderso@okstate.edu).

PHOSPHINE UPDATE

From the Summer 2002 Degesch Newsletter, Degesch states that the Phosphine Coalition has completed the air monitoring studies required by EPA. The Coalition is reviewing the data prior to submitting it to EPA. The study should be submitted to EPA by this fall. EPA will review the studies and determine if the safety levels remains at 0.3ppm or if EPA will require the level to be lowered.

Related to phosphine, EPA has not signed off on the negotiated label. Degesch expects to have their new label out sometime in 2003. Degesch said EPA had agreed to allow the use of existing stock of phosphine. That will allow the use of the phosphine under the existing labels. Both Degesch and the OSU IPM Stored Product Team are encouraging all phosphine users to begin implementing the Fumigation Management Plans for your facility.

DEVELOPING A FUMIGATION MANAGEMENT PLAN (FMP) FOR YOUR ELEVATOR

The new phosphine label coming out from US EPA requires that anyone who fumigates grain storages develop a Fumigation Management Plan (FMP) for each fumigated storage site. During the fumigation workshops held at the OSU Stored Product Research and Education Center (SPREC) August 13-15, 2002, FMPs were covered in some detail.

A FMP is a written documentation record that provides specific logistical, performance and contact data and fumigation practices required by EPA to help "characterize" each fumigated grain storage site. The purpose of the FMP is to ensure the safety of the grain company employees, community and the environment. It is also designed to ensure an effective fumigation and to assist the company in meeting phosphine label requirements.

The FMP provides a uniformly organized process that will help grain managers at each grain storage site document their fumigation procedures, and thus "characterize" their fumigation. The FMP should include a layout plot plan illustrating the primary structures and technical features (such as main electrical power, gas and water shut-off points) of the storage facility, showing grain storage structures in relation to other buildings and equipment at the site.

The FMP has a standard data form that is to be completed by the person responsible for the fumigation each time a fumigation application is made. It covers important items like the volume of grain fumigated, the type and dosage level of the fumigant, starting and ending times of the fumigant dosage application and the overall fumigation time from dosage to structure ventilation. Gas levels are to be monitored and documented at points around the storage structure where personnel work, as well as at specified locations on the property, such as property boundaries downwind from fumigated structures.

Fumigation workshop participants at SPREC received a floppy disk containing a fill-in copy of the Fumigation Management Plan that they could modify to fit their local elevator situation. In that file they were instructed to mark up a layout of their elevator storage facility, showing monitoring and placard points as well as other details to include in a file folder as part of the FMP for their elevator. Laptop computers were available for each participant to begin modifying a copy of the FMP model on the floppy disk into a master copy for their own elevator.

The 2002 Fumigation Workshop Proceedings included a printed model of the FMP and printed FMP guidelines. For elevator managers and grain managers who did not attend the August 2002 Fumigation Workshops at SPREC and who would like to receive a copy of the FMP and the FMP guidelines, contact Jim Criswell and/or Pat Bolin at OSU. A copy of these printed materials on a floppy disk can be mailed out to any interested elevator organization. The information is also posted on OSU's SPREC Website, http://ipm.okstate.edu/ipm/stored_products/sprec/newsletter.htm, where you can download the information.

The Fumigation Management Plan

The certified applicator is responsible for working with the owners and/or responsible employees of the site to be fumigated to develop a Fumigation Management Plan (FMP). The FMP is intended to ensure a safe and effective fumigation. The FMP must address characterization of the site, and include appropriate monitoring and notification requirements, consistent with, but not limited to the following:

1. Inspect the site to determine its suitability for fumigation.
2. When sealing is required, consult previous records for any changes to the structure, seal leaks, and monitor any occupied adjacent buildings to ensure safety.
3. Prior to each fumigation, review any existing FMP, MSDS, Applicators Manual and other relevant safety procedures with company officials and appropriate employees.
4. Consult company officials in the development of procedures and appropriate safety measures for nearby workers that will be in and around the area during the application and aeration.
5. Consult with company officials to develop an appropriate monitoring plan to confirm that nearby workers and bystanders are not exposed to levels above the allowed limits during the application/aeration. This plan must also demonstrate that nearby residents will not be exposed to concentrations above the allowable limits.
6. Consult with company officials to develop procedures for local authorities to notify nearby residents in the event of an emergency.
7. Confirm the placement of placards to secure entrance into any area under fumigation.
8. Confirm the required safety equipment is in place and the necessary manpower is available to complete a safe effective fumigation.

These factors **must** be considered in putting a FMP together. It is important to note that some plans will be more comprehensive than others. All plans should reflect the experience and expertise of the applicator and circumstances at and around the site.

In addition to the plan, the applicator must read the entire label and applicator manual and follow its directions carefully. If the applicator has any questions about the development of a FMP, contact product registrant for further assistance.

The FMP and related documentation, including monitoring records, must be maintained for a minimum of 2 years.

SAMPLE Fumigation Management Plan

Also included as an insert in the 2002 Fumigation Workshop Proceedings was an **example of a completed FMP**. That example showing a Sample FMP is printed below. This document was prepared by Thadd Bigler, Ron Noyes and Jim Criswell as an EXAMPLE.

COWBOY GRAIN COMPANY FUMIGATION MANAGEMENT PLAN

DEVELOPED BY PISTOL PETE IPM SERVICES

The following documents and procedures have been assembled for the expressed purpose of fumigation activities at Cowboy Grain Co.'s grain handling facility in Stillwater, OK. This information serves as a link between the fumigant label and work practices. The fumigation management program, as written, pertains to area(s) identified

as the fumigated site as well as those areas that are connected to or in close proximity of the fumigated site. This information shall be retained and owned by Cowboy Grain Co. and Pistol Pete IPM Services.

General Information

Physical Address- 1112 Bullet Rd., Stillwater, OK 74078

Facility Manager- Mr. John Doe

Facility Superintendent- Mr. John Henry

Emergency Contact Numbers-Refer to exhibit 'A'

Emergency Action Plan-Refer to exhibit 'B'

Description of the fumigated site(s):

Flat Storage Unit #2-approx. 2,545,000 cu. ft.

Flat Storage Unit #3-approx. 2,800,000 cu. ft.

Flat Storage Unit #5-approx. 2,290,000 cu. ft.

Fumigant and Formulation- Aluminum Phosphide Tablets

Dosage Utilized-55 grams/1000 cu. ft. (1 AIP tablet releases 1 gram of PH3)

Proximity of work and office dwellings, belonging to Cowboy Grain Co. to the fumigated sites:

1. South Business Office- 70 ft. from north end of Flat Storage Unit #3
2. Truck Scale Shed- 25 ft. from west side of Flat Storage Unit #5
3. Breakroom, Bathroom, Shop- 180 ft. from Northeast corner of Flat Storage Unit #2

Proximity of Private Property Owners to the fumigated sites:

1. Mr. Robert Brains- Work Shop located approx. 290 ft. south of Shed 5 on the southeast corner of the intersection of Armstrong Rd. and Bullet Rd. Phone Number for Mr. Robert Brains is BR-555-1234.
2. Residential Dwelling-Single family dwelling owned by Mr. Robert Brains and rented to Mr. Kenneth Braine. This dwelling is approx. 370 ft from the southwest corner of Flat Storage Unit #5. This property is on Bullet Rd. Mr. Braine's telephone number is 555-1111.

Proximity of Public Roads and Property easements to the fumigated sites:

1. Armstrong Rd. - This is referred to in the plant drawing as Sand Road. This road runs east and west. From the south end of Flat Storage Unit #5-215 ft.; from the south end of Flat Storage Unit #3-35ft.; from the south end of Flat Storage Unit #2-70 ft.
2. Bullet Rd. - This road runs north and south. From the west side of Flat Storage Unit #5-140 ft.

Proximity of the Concrete Work House, the 'Snake' Rail Siding, and Flat Storage Units #1 and #4 to the Fumigated Sites:

1. North end of Flat Storage Unit #5 to the concrete Work House- 107 ft.
2. North end of Flat Storage Unit #5 to the 'Snake' Rail Siding- 27 ft.
3. East Side of Flat Storage Unit #5 to west wall of Flat Storage Unit #4- 25 ft.
4. North end of Flat Storage Unit #3 to the Concrete Work House- 95 ft.
5. North end of Flat Storage Unit #3 to the 'Snake' Rail Siding-17 ft.
6. West wall of Flat Storage Unit #3 to east wall of Flat Storage Unit #4- 25 ft.
7. North end of Flat Storage Unit #2 to the Concrete Work House- 75 ft.

8. North end of Flat Storage Unit #2 to the ‘Snake’ Rail Siding- 15 ft.
9. East wall of Flat Storage Unit #2 to west wall of Flat Storage Unit #1- 25 ft.

Common Access to the Fumigated Sites:

1. Bottom or ground level walk-in doors located on the south end of Flat Storage Unit #2, #3, and #5.
2. Catwalk entrances located on the north and south ends of Flat Storage Unit #2, #3, and #5.
3. Tunnel entrances on the north end, ground level of Flat Storage Unit #2, #3, and #5.
4. Tunnel access through the west end of the series 700 storage bins into the tunnel of Flat Storage Unit #5.
5. Tunnel access through the east end of series 600 or the west end of the series ‘O’ into the cross belts of Flat Storage Units #1, #2, and #3.
6. Tunnel for Flat Storage Units #2 and #3 can be accessed via the tunnel entrance door on Flat Storage Unit #1.
7. Tunnel for Flat Storage Unit #5 can be accessed via the tunnel entrance door on Flat Storage Unit #4.
8. Overhead roll up doors located on the south ends of Flat Storage Units #2, #3, and #5.

Fumigation Application Method and Fumigant Dosages:

1. Tablets to be applied subsurface
2. Dosage calculates to approx. 55 grams/1000 cu. ft. of space
3. The recirculation system as installed by Pistol Pete IPM Services will disperse the phosphine gas throughout the fumigated space.

Seal Placement to the Fumigated Structures:

1. All roof exhausters in Flat Storage Units #2, #3, and #5 were sealed from the catwalk on the inside of the structures.
2. Roll up doors were sealed using 4 mil. poly sheeting .
3. Walk in ground level doors on the south ends of Flat Storage Units #2, #3, and #5 were sealed using poly sheeting and tape.
4. Catwalk entrances on each end of Flat Storage Units #2, #3, and #5 were sealed using 4 mil. poly sheeting.
5. The north ends of the tunnels for Flat Storage Units #2, #3, and #5 were sealed using poly sheeting, glue, and tape. A 2” X 4” wood frame was constructed in each tunnel to support the pressure exerted against the plastic due to natural air currents and the use of tunnel exhaust fans.
6. Vent caps located on the north tunnel entrances to Flat Storage Units #2, #3, and #5 were sealed from the inside using 4 mil. poly sheeting.
7. Tunnel access grates located on the inside of Flat Storage Units #2, #3, and #5 were sealed using 4 mil poly sheeting. These grates are on the south end of the above-mentioned sites.
8. A precautionary seal was placed near the cross belt on Flat Storage Unit #1 as to ensure that gas will not weep into the ‘O’ and 600 series storage bin tunnels.

Placarding of the Flat Storage Units:

1. Roll up doors on the south end of the Flat Storage Units #2, #3, and #5.
2. South walk end doors of the Flat Storage Units #2, #3, and #5.
3. Ladder access on both the north and south ends leading up to the catwalk entrances of Flat Storage Units #2, #3, and #5.
4. Tunnel access doors of Flat Storage Units #1, #2, #3, #4, and #5.
5. Catwalk entrance doors on the north and south ends of Flat Storage Units #2, #3, and #5.
6. Placard was placed on each of the tunnel seals.

Caution Barrier Tape Placement:

1. Alley access between Flat Storage Units #1, #2, #3, #4 and #5
2. 30 feet north of each tunnel seal

3. Truck drive, as to prohibit truck parking during scale house closures (after hours)

Accessed Suitability and Expected Gas Loss Routes:

1. Flat Storage Units #2, #3, and #5 are in good overall shape. Sidewalls are constructed out of reinforced concrete. Roof is of material with a sealant applied to it. No appreciable damage to roof or sidewall present. There are no bulkheads in these storage units.
2. Expect slight gas loss around eave to sidewall juncture.
3. Expect slight gas loss around roof panels.

Employment Notification and General Work Practices:

1. A safety meeting was conducted to alert Cowboy Grain Co. personnel the areas that will be placed under fumigation.
2. Employees were alerted as to the areas to avoid during the fumigation: alley area between the Flat Storage Units, Flat Storage Units tunnel(s)
3. Employees are to be mindful of verifying gas readings in the 700, 600, and 'O' tunnels.
4. Cowboy Grain Co. work practice was reviewed, of evacuating work areas that are found to contain phosphine levels above 0.3 ppm.
5. Brief discussion pertaining to a Pistol Pete IPM Services employees activities of gathering site reading during the course of the exposure period.

Emergency respondents notified:

1. Pesticide Label, MSDS, and Pistol Pete IPM SERVICES contact numbers were given to the Bullet County Sheriff's office and the Stillwater Rural Fire Dept.
2. Advised Sheriffs officer to alert patrolman of unauthorized activity along Armstrong Rd.

Confined Space Entry, Lock Out Procedures, and PPE Used During the Application:

1. Follow Cowboy Grain Co. Confined Space Entry protocol.
2. Shed reclaim belts and loading augers are locked out.
3. All fumigators inside the structure must wear at all times a purification canister gas mask.
4. SCBA's are on stand nearest the south entrance of each structure.
5. MSA Five Star Multi Gas Detecto will be used to verify the atmosphere during the confined space entry and will be used continuously during the application of the fumigant.

Expected Application Time Spent per Storage Unit:

From a historical reflection of application times, the time necessary for the application will be 30-35 minutes.

Post Application Perimeter Monitoring:

1. Perimeter monitoring will be conducted in order to characterize the fumigated site.
2. Monitoring shall be conducted in close proximity to public easements and roads.
3. Monitoring shall be conducted in order to verify that there is no chemical trespass to private landowners.
4. All areas monitored shall be identified as to the location they represent and recorded on a facility drawing.
5. All readings shall be entered into a log and retained as written record for characterization purposes.

Cowboy Grain Co. personnel shall alert management or a representative of Pistol Pete IPM SERVICES of excessive gas concentrations in work areas, odor, etc.

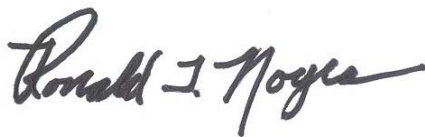
1. If gas concentrations are found to be in excess of the T.L.V. of 0.3ppm for phosphine, personnel must evacuate the area.
2. Production supervisor, superintendent, and or a Pistol Pete IPM SERVICES employee shall assist in remedial steps that need to be taken to ensure worker safety.
3. All incidents involving excess gas concentrations shall be noted on the characterization records.

4. Gas readings will be taken in critical work areas prior to shift changes or start up periods.
5. In case of a catastrophic release of gas, employees or Cowboy Grain Co. shall follow guidelines for evacuation as found in the emergency action plan. Perimeter monitoring shall verify the need for evacuation of the surrounding properties. Subsequent reentry into work areas will be permitted only after gas concentrations are found to be below the T.L.V. of 0.3ppm.

Degassing Procedures:

1. The south overhead roll up doors as well as the walk indoors shall be unsealed.
2. The recirculation equipment shall be removed from the aeration transitions. The recirculation pumps shall remain on.
3. Remove poly seals to the catwalk entrance doors found on the north and south sides of Flat Storage Unit #2, #3, and 35.
4. Defuse the gas concentration slowly.
5. Check gas concentration readings in the entrance doors on the catwalk.
6. When gas concentration readings in the above mentioned area are below 0.3ppm, remove the seals on the roof exhausters.
7. Continual site monitoring shall be performed during the degassing process.
8. Remove tunnel seals when gas concentration levels in the sealed environment are found to be less than 0.3ppm.
9. Ventilation shall be on going to the point at which the commodity mass has been monitored and found to contain less than 0.3ppm.
10. Remove all placards.
11. Gas monitoring shall be performed from the point at which the placards are removed for the purposes of complying with Cowboy Grain Co.'s Confined Space Entry protocol.

For elevator managers and grain managers who did not attend the August 2002 Fumigation Workshops at SPREC and who would like to receive a copy of the FMP and the FMP guidelines, contact Jim Criswell and/or Pat Bolin at OSU. A copy of these printed materials on a floppy disk can be mailed out to any interested elevator organization. The information is also posted on OSU's SPREC Website, http://ipm.okstate.edu/ipm/stored_products/sprec/newsletter.htm, where you can download the information.



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