Draft - Fumigation Management Plan

This Fumigation Management Plan is intended to comply with label requirements, state and federal pesticide laws and provide information to insure a safe and effective fumigation at the specific site listed below.

Location:
University of Georgia Stored Grain Research and Education Facility
Horticulture Farm, Tifton Campus
College of Agriculture and Environmental Sciences
Tifton, Georgia

From Rainwater Road turn south onto Entomology Drive. Four grain bins are located behind the main entomology building.

Certified Applicator:

Dr. Steve L. Brown
Professor and Extension Entomologist
University of Georgia
Georgia Department of Agriculture Licence # - 02240
Certification Categories: Plant Agricultural Pest Control, Demonstration and Research, and Agricultural Commodity Fumigation
Telephone numbers: 229-386-3424 (office), 229-387-1655 (cell), 229-386-4699 (home)

Types of Fumigation Conducted:

1. Aluminum phosphide applied to the grain surface with phosphine distributed by natural diffusion, and/or
2. Aluminum phosphide applied to the grain surface with phosphine distributed via closed loop fumigation techniques.

Emergency Telephone Numbers:

UGA, Tifton Campus Security - 386-3274
Tift County Sheriff’s Office - 911
Local Fire Department - 911
Local Ambulance - 911
Steve L. Brown - 386-3424 (office), 386-4699 (home), 387-1655 (cell)
Chemetrec 1-800- 424-9300
Poison Control Center - 1-800-222-1222
Georgia Department of Agriculture - 1-800-282-5852
Degesch America, Inc. (Manufacturer of aluminum phosphide products) 1-800-330-2525
Purpose of Fumigation:

Fumigations are conducted at this facility for 1) applicator training purposes, 2) as a component of research projects evaluating the efficacy of aluminum phosphide under a variety of conditions or 3) comparing the efficacy and economic return of fumigation compared to other insect management practices.

Description of structures to be fumigated:

Four identical 2200 bushel steel grain bins. The bins are numbered 1-4 and are positioned on a single concrete slab with bin 1 on the eastern end. Each bin has a diameter of 15 feet and has a column height of xx feet. The cone roof is approximately 6 feet tall. Total volume is approximately xxxx cubic feet. Each bin has two roof vents, a capped loading hole in the top center, a side door facing the northwest, an aeration fan unit and a two inch hole for a temperature probe 5 feet from the ground on the south side. There is an access ladder leading to a manhole in the northeast side of the roof and a ladder on the inside bin wall under the manhole. These bins are used for research and training purposes and, when in use, each bin will typically represent a different treatment or stored grain management practice.

Surrounding structures (see map included in this plan):

A workshop dedicated to peanut entomology research is located approximately 75 feet to the east of bin 1. A trailer housing another entomology work area is located approximately 100 feet northeast of bin 1. A small building used for peanut-grading and a greenhouse are located east of the workshop. All of these structures are occupied on an irregular schedule. There is a 10x10 storage shed approximately 50 feet northeast of bin 1 that is not occupied. This shed contains equipment and supplies related to grain storage research and education programs, including fumigation safety equipment. Department of Entomology greenhouses are also occupied on an irregular schedule and are located approximately 200 feet northeast of bin 1. The main entomology building containing offices and laboratories is approximately 300 feet northeast of bin 1. This building is continuously occupied from 8 am to 5 pm, Monday thru Friday and on an irregular schedule at other times. Land surrounding the grain bins is used for research purposes and research faculty and staff are frequently in the area.

Fumigation History:

These grain bins have been fumigated on an irregular schedule since they were built in 1995. In general, fumigations have been effective. There have been no cases of injury to applicators or bystanders.
Fumigation Checklist (Each item should be checked off for each fumigation):

It is understood that each fumigation is unique, however, the following safety checklist is provided for routine fumigation of the structures identified in this plan.

Preliminary Planning and Preparation:

_____1. The certified applicator reviews the Fumigation Management Plan, the MSDS sheet for the fumigant to be used and the fumigant label including the application manual.

_____2. The certified applicator reviews appropriate safety considerations and emergency procedures with trained applicators. Verify training for trained applicators on the form include in this plan.

_____3. The certified applicator reviews the map of the fumigation structure and surrounding buildings. If any changes, including new construction, have occurred since the map was drawn, draw a new map and assess the potential impact of those changes on the ability to conduct a safe fumigation.

_____4. The certified applicator inspects the structure(s) for any changes affecting fumigation safety that may have occurred since the last fumigation. Look specifically for cracks in the concrete slab or holes other than those that are routinely sealed (see Sealing Instructions) that may allow gas leakage. If potential leak sites, other than those previously identified, have occurred since the last fumigation, determine how they can be sealed. Write sealing instructions on the fumigation management plan. If the structural changes are severe enough to prevent a safe fumigation the structure must be repaired prior to fumigation.

_____5. The certified applicator inspects aeration fans on each bin to be fumigated. Fans must be in working condition prior to fumigation and trained applicators must be instructed on their use. All aeration fans should be turned off prior to fumigation.

_____6. The certified applicator insures that any electronic equipment or equipment containing metals sensitive to phosphine are either removed from the bins or seal for protection.

Sealing

_____7. Special circumstances (identified in item 4 above) that potentially impact gas leakage from the bins must be addressed with a appropriate method of sealing.

8. Routine sealing procedures are as follows:

a. Cover roof vents with large plastic bags or sheet of 4 mil plastic and secure with duct
b. Close inner and outer parts of side door. Cover outside of door with a sheet of 4 mil plastic large enough to cover entire door housing and make a flat seal to the corrugated steel bin wall. Seal edges with duct tape making sure tape conforms with bin wall corrugations.

c. Wrap entire aeration fan housing in 4 mil plastic and secure edges tightly with duct tape.

d. The concrete/bin interface has been previously sealed with expanding foam. If that seal is intact, no further sealing is necessary. If the previously applied sealant has cracked and/or broken off, reseal with additional expanding foam. Also check foam seal around the discharge tube/bin wall interface.

e. Discharge tubes are located on the north end of each bin. If the unloading auger is not positioned in the discharge tube, fasten the end cap to each tube with six bolts. Wrap the end of the discharge tube with 4 mil plastic and secure tightly with duct tape. If the unloading auger is in place, then wrap the entire auger motor assembly in 4 mil plastic and secure the plastic tightly to the discharge tube.

f. Make sure the metal cover on the top of the bin is in position and securely latched to the roof. No further sealing is necessary if the latch mechanism is tight.

g. Bin 1 has been used for demonstration of closed loop fumigation techniques. If a standard fumigation is being done in bin 1, the holes in the roof manhole cover and aeration fan housing must be sealed. This can be done with 4 mil plastic and duct tape. When a closed loop fumigation is being conducted, circulation tubing must be securely fastened to the hole cut in the roof manhole cover and the hole cut in the aeration fan housing. This should be done with duct tape and expanding foam can be used in addition to duct tape to seal small leaks. Also, make sure all joints in the circulation tubing are tightly sealed with duct tape and that the tubing is positioned so that it will not be damaged by workers or vehicles.

h. Each bin has a 2" hole cut approximately 5 feet above the concrete pad in the south bin wall. These holes are intended for temperature probes. If temperature probes are not in use, make sure the hole is sealed with duct tape. If a temperature probe is positioned in the hole, the gap between the probe and the bin wall should be sealed with duct tape or expanding foam.

Notification:

Any buildings within 500 ft. of the fumigation site that might be occupied during the fumigation are under the authority of the University of Georgia Department of Entomology. The peanut entomology workshop and peanut entomology grading room to the east of bin 1 are occupied on an irregular basis. It is not necessary to keep workers out of these buildings during a fumigation,
but they should be notified that a fumigation is underway and made aware of emergency procedures.

_____ 9. Notify the Department of Entomology (Contact person, Dr. Bob McPherson, 229-386-3374) prior to the initiation of a fumigation event. Dr. McPherson will be responsible for informing all Department of Entomology personnel of the fumigation.

_____ 10. Place a notice on all entrances of the peanut entomology workshop and the peanut entomology grading room stating that a fumigation is in progress and providing telephone numbers for the certified applicator in the event of unusual smells, illnesses or fire at the fumigation site.

_____ 11. Notify the UGA Tifton Campus Security Office (currently ABAC Campus Security 229-386-3274) when the fumigation will be initiated and the anticipated date of aeration. Provide them with emergency telephone numbers for the certified applicator.

_____ 12. Notify the Tifton Fire Department at 391-3972 that a fumigation is scheduled to occur.

Application and Placarding:

These bins are small enough that the required amount of aluminum phosphide can be applied by a person outside the roof manhole cover. An applicator securely positioned on the roof ladder can open the aluminum phosphide canister in the open air and 1) pour the aluminum phosphide onto the surface of the grain (being careful not to pile the entire amount in one spot) or 2) pour small amounts of aluminum phosphide into his hand (cover with a cotton glove) and throw it into the bin. In such cases, no respiratory protection will be necessary. Due to the small volume of these bins, it is not necessary to place aluminum phosphide in the lower part of the bin. However, if these techniques are being demonstrated, small amounts may be placed in the discharge tube or in the fan housing, but make sure it is well distributed to avoid heat buildup and fire. DO NOT apply in these areas if standing water is present.

If other application techniques are being demonstrated and entry into the bin is necessary, all applicators should have face masks approved for <15 ppm phosphine concentrations with them and available for use upon entry. An electronic phosphine sensor should be worn by at least one person entering the bin.

_____ 13. Check weather conditions (do not fumigate in the rain or when temperatures are less than 40° F).

_____ 14. At least two fumigators are required to be present. These two people can be the certified applicator and one trained applicator or two trained applicators under the direct (line of sight) supervision of the certified applicator.
15. Calculate dosage necessary for the specific fumigation being conducted (routinely, one flask (500) 60% aluminum phosphide tablets).

16. Provide respiratory protection to applicators (if applicable). Respiratory protection equipment is available in the storage shed near bin 1.

17. Provide phosphine detector to at least one applicator (if applicable). Detectors are available from the certified applicator.

18. Position one applicator that has been trained in emergency procedures outside the bin during the application.

19. After aluminum phosphide had been applied and all applicators have exited the bin, seal the manhole door by placing a sheet of 4 mil plastic over the opening, closing and latching the door and sealing the edges of the door with duct tape.

20. Two weatherproof fumigation placards should be affixed to each fumigated bin, one on the sealed bin door and another at eye level on the outside bin ladder. These placards should indicate all the required information including a contact name and phone number and the time the fumigation was initiated and the anticipated time of completion. Placards are available in the storage shed near bin 1.

Monitoring:

21. Phosphine readings should be taken at 1, 2, 4, 8, 24, and 48 hours after application. Take readings in the following manner: Hold an electronic phosphine detector while slowly walking in a circle two feet away from the base of each bin under fumigation. If the detector senses any phosphine, try to determine the source of the leak. If necessary, provide additional sealing to stop the leak. If phosphine readings are above 1 ppm and less than 15 ppm, wear a gas mask approved for phosphine while making do the additional sealing. If readings are above 15 ppm, wear use a self-contained breathing apparatus.

22. Take additional readings at 1) the west door of the Peanut Entomology Workshop, and 2) the southwest corner of the Entomology Greenhouses. If readings over 1 ppm are detected at either of these locations consult “Emergency Procedures” below.

Aeration:

Upon completion of the required fumigation time period:

23. Remove the seal on each of the two roof vents.

24. Remove the seal on the aeration fan.
25. Turn on the aeration fan and allow to run at least six hours and turn off.

26. Open roof manhole cover and reach inside with phosphine detector. If reading is less than 0.3 ppm, remove fumigation placards and remainder of plastic used for sealing purposes. If reading is 0.3 ppm or above, close manhole door and run aeration fans for at least two more hours. Turn off aeration fan and recheck phosphine concentration. Repeat until concentration is less than 0.3 ppm and remove fumigation placards. Even though headspace readings are allowable for entry without respiratory protection, anyone entering the bin should continue to wear a phosphine detector in case pockets of trapped phosphine exist inside.

**Emergency Response Plan for Specific Events:**

*Applicator disabled inside grain bin with active aluminum phosphide:*

Remove sealing materials from the aeration fan and roof vents. Turn on aeration fan to supply uncontaminated air to the victim. Call 911 and notify the operator that a rescue from a phosphine environment is needed. Do not attempt to enter the bin without a self-contained breathing apparatus (available in storage building). A harness is available in the storage building and can be placed on the victim to aid in removal. Rescuer should immediately close any open containers of aluminum phosphide upon entering the bin.

*Applicator disabled inside grain bin, but no active aluminum phosphide is present:*

Make sure manhole door is open to ensure fresh air is available. Call 911 and request assistance in removal of the victim. A harness is available in the storage building and can be placed on the victim to aid in removal.

*Major release of phosphine due to spill or structural damage to grain bin under fumigation:*

Call 911 and notify the sheriff’s office of the situation. Stay away from the source of the phosphine. Take phosphine readings at any surrounding buildings that are or may become inhabited. Evacuate and post those areas if readings are above 1 ppm. Note the wind direction and be prepared to monitor phosphine levels well downwind from the source and evacuate locations where phosphine levels reach 1 ppm or 0.3 ppm on an 8 hr. time-weighted average.

*Leakage of phosphine from grain bin under fumigation resulting in concentrations greater than 1 ppm at surrounding buildings that are inhabited or may be inhabited:*
Fire in storage building containing aluminum phosphide or in grain bin under fumigation:

Call 911 and notify the operator of a fire associated with aluminum phosphide. DO NOT put water on the fire. Monitor phosphine levels downwind from the fire and notify the sheriff’s department that evacuations may be necessary if levels in inhabited areas reach 1 ppm or 0.3 ppm on an 8 hr. time-weighted average.

Theft of aluminum phosphide from storage area:

Call 911 and notify the operator that aluminum phosphide is missing. Be prepare to provide inventory records and document the amount missing and the last time the product was accounted for.
Fumigation Record:

<table>
<thead>
<tr>
<th>Bin # (s):</th>
<th>Volume of Treated Area</th>
<th>Temp. of Commodity</th>
<th>Moisture of Commodity</th>
<th>Dosage</th>
<th>Applic. Date/ Time</th>
<th>Date/Time Placard Removed</th>
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Phosphine Monitoring Record:
Sites to be monitored listed below and indicated on attached map.

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<tr>
<th>Date</th>
<th>Time</th>
<th>Phosphine Reading</th>
<th>Approx. Wind Speed</th>
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Site 1 =
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Site 4 =
Site 5 =
Site 6 =
Documentation of Training:

I have been informed of the inhalation hazards of aluminum/magnesium phosphide products. I am aware of the importance of applying these products in accordance with the label to ensure my safety, the safety of other applicators, bystanders, pets, livestock and wildlife. I have been instructed regarding personal protective equipment and emergency procedures.

___________________________________  ______________
Trained Applicator  Date

___________________________________  ______________
Certified Applicator  Date

I have been informed of the inhalation hazards of aluminum/magnesium phosphide products. I am aware of the importance of applying these products in accordance with the label to ensure my safety, the safety of other applicators, bystanders, pets, livestock and wildlife. I have been instructed regarding personal protective equipment and emergency procedures.

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Certified Applicator  Date

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___________________________________  ______________
Trained Applicator  Date

___________________________________  ______________
Certified Applicator  Date