APPLICATOR'S MANUAL
FOR
MAGNAPHOS®
TABLETS AND GAS BAGS

THESE PRODUCTS ARE ACCOMPANIED BY AN APPROVED LABEL AND APPLICATOR'S MANUAL. READ AND UNDERSTAND THE ENTIRE LABELING AND APPLICATOR'S MANUAL. ALL PARTS OF THE LABELING AND APPLICATOR'S MANUAL ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THE PRODUCTS. CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL 1-609-392-8200/1-800-247-1557 IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

RESTRICTED USE PESTICIDE
DUE TO HIGH ACUTE INHALATION TOXICITY OF
PHOSPHINE GAS

For retail sale to Dealers and Certified Applicators only. For use by Certified Applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's certification. Refer to the directions in this Applicator's Manual for requirements of the physical presence of a Certified Applicator.

Magnesium Phosphide Fumigant

FOR USE AGAINST INSECTS WHICH INFEST STORED
COMMODITIES AND CONTROL OF BURROWING PESTS

Active Ingredient: Magnesium Phosphide.....66.0%
Inert Ingredients.….....…….34.0%
Total……...100.0%


[IN RED]

KEEP OUT OF REACH OF CHILDREN
DANGER - POISON - PELIGRO

PRECAUCION AL USUARIO: Si usted no leé ingles, no use este producto hasta que la etiqueta se le haya sido explicado ampliamente. **(TO THE USER:** If you cannot read English, do not use this product until the label has been fully explained to you.)

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT
CALL CHEMTREC 1-800-424-9300

Manufactured for:
United Phosphorus, Inc.
423 Riverview Plaza • Trenton, NJ 08611
1-609-392-8200/1-800-247-1557 • www.upi-usa.com

EPA Registration Nos. 70506-16 and 70506-17
EPA Establishment No. 41876-IY-1

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SECTION 1

FIRST AID

Symptoms of exposure to this product are headaches, dizziness, nausea, difficult breathing, vomiting, and diarrhea. In all cases of overexposure get medical attention immediately. Take victim to a doctor or emergency treatment facility.	
IF INHALED	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration immediately, preferably by mouth-to-mouth if possible. • Keep warm and make sure person can breathe freely. • Call a poison control center or doctor for further treatment advice.
IF SWALLOWED	• Call a Poison control center or doctor immediately for treatment advice. • Have person drink one or two glasses of water and induce vomiting by touching back of throat with finger, or if available administer syrup of ipecac. • Do not give anything by mouth to an unconscious person.
IF ON SKIN OR CLOTHING	• Brush or shake material off clothes and shoes in a well-ventilated area. • Allow clothes to aerate in a ventilated area prior to laundering. • Do not leave contaminated clothing in occupied and/or confined areas such as automobiles, vans, motel rooms, etc. • Wash contaminated skin thoroughly with soap and water.
IF IN EYES	• Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for further treatment advice.

HOT LINE NUMBER

Have the product container or label or Applicator's Manual with you when calling a poison control center or doctor, or going for treatment. For emergency medical treatment, contact the National Pesticide Information Center 1-800-858-7378.

SECTION 2

NOTE TO PHYSICIAN

Magnesium phosphide in MAGNAPHOS® Tablets and Gas Bags reacts with moisture from the air, water, acids and many other liquids to release phosphine gas. Mild inhalation exposure causes malaise (indefinite feeling of sickness), ringing of ears, fatigue, nausea, and pressure in the chest, which is relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, and pain just above the stomach, chest pain, diarrhea and dyspnea (difficulty in breathing). Symptoms of severe poisoning may occur within a few hours to several days, resulting in pulmonary edema (fluid in lungs) and may lead to dizziness, cyanosis (blue or purple skin color), unconsciousness, and death.

In sufficient quantity, phosphine affects the liver, kidneys, lungs, nervous system, and circulatory system. Inhalation can cause lung edema (fluid in lungs) and hyperemia (fluid in brain). Ingestion can cause lung and brain symptoms but damage to the viscera (body cavity organs) is more common. Phosphine poisoning may result in (1) pulmonary edema, (2) liver elevated serum GOT, LDH and alkaline phosphatase, reduced prothrombin, hemorrhage and jaundice (yellow skin color) and (3) kidney hematuria (blood in urine) and anuria (abnormal lack of urination). Pathology is characterized by hypoxia (oxygen deficiency in body tissue). Frequent exposure to sub-acute concentrations over a period of days or weeks may cause poisoning. Treatment is symptomatic.

The following measures are suggested for use by the physicians in accordance with their own judgment:

In its milder forms, symptoms of poisoning may take some time (up to 24 hours) to make their appearance, and the following is suggested:

1. Give complete rest for 1-2 days, during which time the patient must be kept quiet and warm.
2. Should the patient suffer from vomiting or increased blood sugar, appropriate solutions should be administered. Treatment with oxygen breathing equipment is recommended, as is the administration of cardiac and circulatory stimulants.

In case of severe poisoning (intensive care unit recommended):

1. Where pulmonary edema is observed, steroid therapy should be considered and close medical supervision is recommended. Blood transfusions may be necessary.
2. In case of manifest pulmonary edema, venesection should be performed under vein pressure control. Heart Glycosides (I.V.) (in case of hemoconcentration, venesection may result in shock). On progressive edema of lungs, immediate intubation is recommended with a constant removal of edema fluid and oxygen over-pressure respiration, as well as any measures required for shock treatment. In case of kidney failure, extra-corporeal hemodialysis is necessary. There is no specific antidote known for this poisoning.
3. Mention should be made here of suicidal attempts by taking solid phosphine by the mouth. After swallowing, emptying of the stomach by vomiting, flushing of the stomach with diluted potassium permanganate solution or a solution of magnesium peroxide is recommended until flushing liquid ceases to smell of carbide. Thereafter, apply carbomedicanalis.

SECTION 3

INTRODUCTION

MAGNAPHOS® products are used to protect stored commodities from damage by insects and for the control of burrowing pests. Fumigation of stored products with MAGNAPHOS® in the manner prescribed in the Applicator's Manual does not contaminate the marketed commodity.

MAGNAPHOS® metal phosphide fumigants are acted upon by atmospheric moisture to produce phosphine gas.

MAGNAPHOS® Tablets and Gas Bags contain magnesium phosphide (MgP) as their active ingredient and will liberate phosphine via the following chemical reaction:

$$Mg_3P_2 + 6H_2O \rightarrow 3Mg(OH)_3 + 2PH_3$$

Phosphine gas is highly toxic to insects, burrowing pests, humans, and other forms of animal life. In addition to its toxic properties, the gas will corrode certain metals and may ignite spontaneously in air at concentrations above its lower flammable limit of 1.8% (v/v). These hazards will be described in greater detail in Section 4 of this Applicator's Manual.

MAGNAPHOS® Tablets also contain ammonium carbamate, which liberates ammonia and carbon dioxide as follows:

$$NH_2COONH_4 \rightarrow 2NH_3 + CO_2$$

These gases are essentially nonflammable and act as inerting agents to reduce fire hazards.

MAGNAPHOS® is prepared in two forms: Tablets and Gas Bags. The rounded Tablets weigh approximately 3 grams and release 1 gram of phosphine gas. They are about 16.5 mm in diameter and are bulk packaged in resealable metal flasks containing 500 tablets. Each Gas Bag contains 34 grams in a sachet and releases 11 grams of phosphine gas. The sachets, or Gas Bags, are packaged in metal containers of six, ten or one hundred gas bags to the container. Other package sizes may be available.

Upon exposure to air, MAGNAPHOS® Tablets and Gas Bags begin to react with atmospheric moisture to produce small quantities of phosphine gas. This reaction starts slowly, gradually accelerates and then tapers off again as the magnesium phosphide is spent. MAGNAPHOS® Tablets react somewhat faster than do the Gas Bags. The rates of decomposition of the Tablets and Gas Bags will vary depending upon moisture and temperature conditions. For example, when moisture and temperature of the fumigated commodity are high, decomposition of MAGNAPHOS® may be complete in less than 3 days. However, at lower ambient temperatures and humidity levels, decomposition of MAGNAPHOS® may require 5 days or more. After decomposition, MAGNAPHOS® leaves a gray-white powder composed almost entirely of magnesium hydroxide and other approved inert ingredients. This will cause no problems if the fumigant has been added directly to a commodity such as grain. However, the spent powder must usually be retrieved for disposal after space fumigations. If properly exposed, the spent MAGNAPHOS® will normally contain only a small amount of unreacted magnesium phosphide and may be disposed of without hazard. While spent MAGNAPHOS® is not considered a hazardous waste, partially spent residual dusts from incompletely exposed MAGNAPHOS® will require special care. Precautions and instructions for further deactivation and disposal are given under Section 24 of this Applicator's Manual.

MAGNAPHOS® Tablets and Gas Bags are supplied in gas-tight containers and their shelf life is unlimited as long as the packaging remains intact. Once opened for fumigation, the metal flasks of Tablets may be tightly resealed and stored for future use. The MAGNAPHOS Gas Bags container cannot be resealed for future use. Storage and handling instructions will be given in detail later in Sections 18 and 24 of this Manual.

SECTION 4

PRECAUTIONARY STATEMENTS

4.1 HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: Magnesium phosphide from MAGNAPHOS® Tablets, Gas Bags and dust may be fatal if swallowed. Do not get in eyes, on skin or on clothing. Do not eat, drink or smoke while handling magnesium phosphide fumigants. If a sealed container is opened, or if the material comes into contact with moisture, water or acids, these products will release phosphine (which is an extremely toxic gas). If a garlic odor is detected, refer to the Industrial Hygiene Monitoring in Section 14 of this Manual for appropriate monitoring procedures. Pure phosphine gas is odorless; the garlic odor is due to a contaminant. Since the odor of phosphine may not be detected under some circumstances, the absence of a garlic odor does not mean that dangerous levels of phosphine gas are absent. Observe proper reentry procedures specified in Section 14 to prevent overexposure.

4.2 PHYSICAL AND CHEMICAL HAZARDS

Magnesium phosphide in Tablets and Gas Bags and partially spent dust will release phosphine if exposed to moisture from the air or if it comes into contact with water, acids and many other liquids. Since phosphine may ignite spontaneously at levels above its lower flammable limit of 1.8% v/v, it is important not to exceed this concentration. Ignition of high concentrations of phosphine can produce a very energetic reaction. Explosions can occur under these conditions and may cause severe personal injury. **Never allow the buildup of phosphine to exceed explosive concentrations.** Do not confine spent or partially spent metal phosphide fumigants as the slow release of phosphine from this material may result in formation of an explosive atmosphere. Magnesium phosphide tablets and gas bags outside the containers should not be stacked or piled up or contacted with liquid water. This may cause a temperature increase, increase the rate of gas production and confine the gas so that ignition could occur.

It is preferable to open containers of magnesium phosphide products in open air because under certain conditions, they may flash upon opening. Containers may also be opened near a fan or other appropriate ventilation that will rapidly exhaust contaminated air. When opening, invert the container several times then point the container away from the face and body and slowly loosen the cap. Although the chances for a flash are very remote, never open these containers in a flammable atmosphere. These precautions will

also reduce the fumigator's exposure to phosphine gas. Containers may be opened inside the structure to be fumigated provided worker's exposure to phosphine gas does not exceed allowable limits.

Pure phosphine gas is practically insoluble in water, fats and oils, and is stable at normal fumigation temperatures. However, it may react with certain metals and cause corrosion, especially at higher temperatures and relative humidities. Metals such as copper, brass and other copper alloys, and precious metals such as gold and silver are susceptible to corrosion by phosphine. Thus, small electric motors, smoke detectors, brass sprinkler heads, batteries and battery chargers, fork lifts, temperature monitoring systems, switching gears, communication devices, computers, calculators and other electrical equipment should be protected or removed before fumigation. Phosphine will also react with certain metallic salts and, therefore, sensitive items such as photographic film, some inorganic pigments, etc., should not be exposed. Immediately after addition of phosphine to the structure, turn off any lights and unessential electric equipment.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

MAGNAPHOS® Tablets and Gas Bags are Restricted Use Pesticides due to the acute inhalation toxicity of phosphine gas. Read and follow the label and the Applicator's Manual, which contains complete instructions for the safe use of the pesticide.

Additional copies of this Manual are available from:

United Phosphorus, Inc.
423 Riverview Plaza
Trenton, NJ 08611
Telephone: 1-609-392-8200/1-800-247-1557
Fax: 1-609-392-0808
Web site: www.upi-usa.com

SECTION 5

PESTS CONTROLLED

MAGNAPHOS® has been found to be effective against the following burrowing pests, insects and their pre-adult stages, that is, eggs, larvae and pupae:

almond moth
Angoumois grain moth
bean weevil
Bees
Cadelle
cereal leaf beetle
cigarette beetle
confused flour beetle
dermestid beetles
dried fruit beetle
dried fruit moth
European grain moth
flat grain beetle
fruit flies
granary weevil
greater wax moth
hairy fungus beetle
Hessian fly
Indian meal moth
Khapra beetle
lesser grain borer
maize weevil
Mediterranean flour moth
Pea Weevil
pink bollworm
raisin moth
red flour beetle
rice weevil
rusty grain beetle
saw-toothed grain beetle
spider beetle
tobacco moth
yellow meal worm
Africanized bees & honeybees infested with/tracheal mites

Chipmunks
Mice
Norway rats
Prairie dogs (except Utah prairie dogs, *Cynomys Parvidens*)
Voles
Yellowbelly marmots (rockchucks)
Ground squirrels
Moles
Pocket gophers
Roof rats
Woodchucks

Although it is possible to achieve total control of the listed burrowing and insect pests, this is frequently not realized in actual practice. Factors contributing to less than 100% control include leaks, poor gas distribution, unfavorable exposure conditions, etc. In addition, some insects are less susceptible to phosphine than others. If maximum control is to be attained, extreme care must be taken in sealing, higher dosages must be used, exposure periods lengthened, proper application procedures followed, and temperature and humidity conditions must be favorable.

SECTION 6

COMMODITIES WHICH MAY BE FUMIGATED WITH MAGNAPHOS®

MAGNAPHOS® may be used for the fumigation of listed raw agricultural commodities, animal feed and feed ingredients, processed foods, tobacco and certain other nonfood items when their commodity temperature is above 40 ºF (5 ºC).

6.1 RAW AGRICULTURAL COMMODITIES, ANIMAL FEED AND FEED INGREDIENTS

MAGNAPHOS® Tablets and Gas Bags may be added directly to animal feed, feed ingredients and raw agricultural commodities stored in bulk. For these commodities not stored in bulk, MAGNAPHOS® may be placed in moisture-permeable envelopes, on trays, etc., and fumigated as with processed foods.

Raw Agricultural Commodities and Animal Feed and Feed Ingredients Which May Be Fumigated with MAGNAPHOS®

almonds
animal feed & feed ingredients
barley
Brazil nuts
cashews
cocoa beans
coffee beans
corn
cottonseed
dates
filberts
flower seed
grass seed
millet
oats
peanuts
pecans
pistachio nuts
popcorn
rice
rye
safflower seed
sesame seed
seed & pod vegetables
sorghum
soybeans
sunflower seeds
triticale
vegetable seeds
walnuts
wheat

6.2 PROCESSED FOODS

The listed processed foods may be fumigated with MAGNAPHOS®. Under no condition shall any processed food or bagged commodity come in contact with MAGNAPHOS® Tablets, Gas Bags or residual dust except that MAGNAPHOS® may be added directly to processed brewer's rice, malt, and corn grits for use in the manufacture of beer.

Processed Foods Which May Be Fumigated With MAGNAPHOS®

Processed candy and sugar
Cereal flours and bakery mixes
Cereal foods (including cookies, crackers, macaroni, noodles, pasta, pretzels, snack foods and spaghetti)
Processed cereals (including milled fractions and packaged cereals)
Cheese and cheese byproducts
Chocolate and chocolate products (such as assorted chocolate, chocolate liquor, cocoa, cocoa powder, dark chocolate coating and milk chocolate products)
Processed coffee
Corn grits
Cured, dried and processed meat products and dried fish
Dates and figs
Dried eggs and egg yolk solids
Dried milk, dried powdered milk, nondairy creamers, and nonfat dried milk

Dried or dehydrated fruits (such as apples, dates, figs, peaches, pears, prunes, raisins, citrus and sultanas)
Processed herbs, spices, seasonings and condiments
Malt
Processed nuts (such as almonds, apricot kernels, brazil nuts, cashews, filberts, macadamia nuts, peanuts, pecans, pistachio nuts, walnuts and other processed nuts)
Processed oats (including oatmeal)
Rice (brewer's rice grits, enriched and polished)
Soybean flour and milled fractions
Processed tea
Dried and dehydrated vegetables (such as beans, carrots, lentils, peas, potato flour, potato products and spinach)
Yeast (including primary yeast)
Wild rice
Other processed foods

6.3 NONFOOD COMMODITIES, INCLUDING TOBACCO

The listed nonfood items that may be fumigated with MAGNAPHOS® Tablets, Gas Bags or residual dust should not contact tobacco and certain other nonfood commodities.

Nonfood Commodities Which May Be Fumigated With MAGNAPHOS®

Processed or unprocessed cotton, wool and other natural fibers or cloth, clothing
Straw and hay
Feathers
Human hair, rubberized hair, vulcanized hair, mohair
Leather products, animal hides and furs
Tires (for mosquito control)
Tobacco
Wood, cut trees, wood chips, wood and bamboo products
Paper and paper products
Dried plants and flowers
Seeds (such as grass seed, ornamental herbaceous plant seed and vegetable seed)
Other nonfood commodities

SECTION 7

EXPOSURE CONDITIONS

The following table may be used as a guide in determining the minimum length of the exposure period at the indicated temperatures:

	Minimum Exposure Periods for MAGNAPHOS	
Temperature	**Tablets**	**Gas Bags**
40ºF (5ºC)	Do not fumigate	Do not fumigate
40º-53ºF (5-12ºC)	10 days (240 hours)	14 days (336 hours)
54º-59ºF (12-15ºC)	5 days (120 hours)	7 days (168 hours)
60º-68ºF (16-20ºC)	4 days (96 hours)	4 days (96 hours)
above 68ºF (20ºC)	3 days (72 hours)	3 days (72 hours)

The fumigation must be long enough so as to provide for adequate control of the insect pests that infest the commodity being treated. Additionally, the fumigation period should be long enough to allow for more or less complete reaction of MAGNAPHOS® with moisture so that little or no unreacted magnesium phosphide remains. This will minimize worker exposures during further storage and/or processing of the treated bulk commodity as well as reduce hazards during the disposal of partially spent magnesium phosphide products remaining after space fumigations. The proper length of the fumigation period will vary with exposure conditions since, in general, insects are more difficult to control at lower temperatures, and the rate of phosphine gas production by MAGNAPHOS® is lower at lower temperatures and

humidities.

It should be noted that there is little to be gained by extending the exposure period if the structure to be fumigated has not been carefully sealed or if the distribution of gas is poor and insects are not subjected to lethal concentrations of phosphine. Careful sealing is required to ensure that adequate gas levels are retained and proper application procedures must be followed to provide satisfactory distribution of phosphine gas. Application of additional MAGNAPHOS is recommended if the concentration of phosphine drops below an effective level. If reentry into the treated structure is required, follow the requirements for manpower and respiratory protection usage found under Section 10 in this Manual. Some structures can only be treated when completely tarped while others cannot be properly sealed by any means and should not be fumigated. Exposure times must be lengthened to allow for penetration of gas throughout the commodity when the fumigant is not uniformly added to the commodity mass, for example, by surface application or shallow probing. This is particularly important in the fumigation of bulk commodities contained in large storage areas.

Remember, exposure periods recommended in the table are minimum periods and may not be adequate to control all stored products pests under all conditions nor will they always provide for total reaction of MAGNAPHOS®.

It is permissible and often desirable to use a low-flow recirculation system for phosphine gas in certain bulk storages. This method may be used in ship's holds, various types of flat storage and vertical storage bins. Please contact United Phosphorus if assistance is required in designing recirculation systems.

Recirculation usually involves the application of fumigant to the surface of the commodity. The phosphine gas is then continuously or intermittently drawn out of the over-space and blown into the bottom of the storage using specially designed low volume fans and duct work. This method facilitates the quick and uniform penetration of phosphine gas throughout the commodity. In some instances a reduced dosage may be used.

SECTION 8

DOSAGE RATE GUIDELINES

Recommended and Maximum Allowable Dosage Rates
Phosphine is a mobile gas and will penetrate to all parts of the storage structure. Therefore, dosage must be based upon the total volume of the space being treated and not on the amount of commodity it contains. The same amount of MAGNAPHOS® is required to treat a 30,000-bushel silo whether it is empty or full of grain unless, of course, a tarpaulin seals off the surface of the commodity.

8.1 RECOMMENDED MAGNAPHOS® DOSAGE RATES FOR VARIOUS TYPES OF FUMIGATION

One (1) MAGNAPHOS® Tablet will produce a concentration of 25 parts per million (ppm) of phosphine gas (PH_3) in a volume of 1,000 cu. ft. (1 g PH_3/1,000 cu. ft. equivalent to 25 ppm). One (1) MAGNAPHOS® Gas Bag will produce a concentration of 275 parts per million (11 g PH_3/1,000 cu. ft. equivalent to 275 ppm).

Although it is permissible to use the maximum dosage listed in Section 8.2, the following table lists a range of recommended dosages which can be used as a guideline for various types of fumigation.
When a dosage range is recommended use the higher rate under conditions of severe infestation, lower temperature and other applicable variables. The following dosage ranges are recommended for bulk (per 1,000 bushels) and space (per 1,000 cu. ft) fumigations:

Type of Fumigation	Dosage Range No. of Tablets	No. of Gas Bags
1. Vertical Storages (such as silos, concrete bins, steel bins, tanks, etc.)	40-75/1000 bu. 30-60/1000 cu.ft.	2-6/1000 bu 2-6/1000 cu.ft.
Type of Fumigation	**Dosage Range** **No. of Tablets**	**No. of Gas Bags**
2. Farm Bins (Butler Type)	90-180/1000 bu. 70-145/1000 cu.ft.	2-6/1000 bu 2-6/1000 cu.ft.
3. Bulk stored commodities in flat storage, bunkers and commodities stored on ground loosely piled under gas tight covering.	60-180/1000 bu. 50-145/1000 cu.ft.	2-6/1000 bu 2-6/100 cu.ft.
4. Packaged commodities (bagged grain, process foods, etc.) in sealable enclosures.	30-60/1000 cu.ft.	2-6/1000 cu.ft.
5. Nuts, dates or dried fruit in storage boxes	20-40/1000 cu.ft.	2-6/1000 cu.ft.
6. Nuts, dates or dried fruit in bulk.	20-40/1000 bu. 20-40/1000 cu.ft.	2-6/1000 bu. 2-6/1000 cu.ft.
7. Railcars, containers, trucks, vans and other transport vehicles	40-80/1000 bu. 30-65/1000 cu.ft	2-6/1000 bu. 2-6/1000 cu.ft.
8. Space fumigation such as cereal mills, feed mills, food processing plants & warehouses	20-60/1000 cu.ft.	2-6/1000 cu.ft.
9. Stored Tobacco	20-40/1000 cu.ft	2-6/1000 cu.ft.
10. Non-food products	30-90/1000 cu.ft.	----
11. Stored beehives, supers and other beekeeping equipment for wax moth control and Africanized bees and honeybees with tracheal mites and foulbrood.	30-45/1000 cu. ft.	2-6/1000 cu.ft.
12. Barges	40-100/1000 bu. 30-80/1000 cu.ft.	2-6/1000 bu. 2-6/1000 cu.ft.
13. Shipholds	40-75/1000 bu. 30-66/1000 cu.ft.	2-6/1000 bu. 2-6/1000 cu.ft.
14 Commodity in small containers	---	1 bag per 77-500 cu.ft.
15 Rodent burrows	1-4 per burrow	---

Higher dosages are recommended in structures that are of loose construction and in the fumigation of bulk stored commodities in which diffusion will be slowed and result in poor distribution of phosphine gas.

8.2 MAXIMUM ALLOWABLE DOSAGE RATES

Maximum Allowable Dosage Guidelines for Fumigation with MAGNAPHOS®

Product	No. per 1000 cu.ft.*	No. per 1000 bu.*
Tablets	145	180
Gas Bags	6	6

*NOTE: The Maximum Dosage for dates, nuts and dried fruits is 40 tablets, 6 gas bags/1,000 cu. ft. (50 tablets, 6 gas bags/1,000 bu.).

The above maximum dosages are not to be exceeded. It is important to be aware that a shortened exposure period cannot be fully compensated for with an increased dosage of phosphine.

Somewhat higher dosages, not to exceed the maximum dosage, are usually recommended under cooler, drier conditions or where exposure periods are relatively short. However, the major factor in selection of dosage is the ability of the structure to hold phosphine gas during the fumigation. A good illustration of this point is comparison of the low dosages required to treat modern, well-sealed warehouses with the higher range doses used for poorly constructed buildings that cannot be sealed adequately. In certain other fumigations, proper distribution of insecticidal concentrations of gas to reach all parts of the structure becomes a very important factor in dose selection. An example where this may occur is in the treatment of grain stored in tall silos. Poor gas distribution frequently results when the fumigant is added on top of the grain. In such cases, use of a low flow recirculation system is recommended under these circumstances. Please contact United Phosphorus if assistance is required in designing the recirculation system.

SECTION 9

PROTECTIVE CLOTHING

9.1 GLOVES

Wear dry gloves of cotton or other material if contact with tablets or dust is likely. Gloves should remain dry during use. Wash hands thoroughly after handling magnesium phosphide products. Aerate used gloves and other clothing that may be contaminated in a well-ventilated area prior to laundering.

SECTION 10

RESPIRATORY PROTECTION

10.1 WHEN RESPIRATORY PROTECTION MUST BE WORN

National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA) approved respiratory protection must be worn during exposure to concentrations in excess of permitted limits or when concentrations are unknown. Self-contained breathing apparatus (SCBA) must be worn during entry into sites that are under fumigation if the concentration of phosphine is unknown or known to exceed the short-term exposure limit (STEL) for phosphine (l ppm for 15 minutes).

10.2 PERMISSIBLE GAS CONCENTRATION RANGES FOR RESPIRATORY PROTECTION DEVICES

A NIOSH/MSHA approved full-face gas mask - phosphine canister combination may be used at levels up to 15 ppm or following manufacturers use conditions instructions for escape. Above 15 ppm or in situations where the phosphine concentration is unknown, a NIOSH/MSHA approved, self-contained breathing apparatus (SCBA) must be worn. The NIOSH/OSHA Pocket Guide DHHS (NIOSH) 97-140 or the NIOSH ALERT – Preventing Phosphine Poisoning and Explosions During Fumigation lists these and other types of approved respirators and the concentration limits at which they may be used.

10.3 REQUIREMENTS FOR AVAILABILITY OF RESPIRATORY PROTECTION
If MAGNAPHOS® is to be applied from within the structure to be fumigated, an approved full-face gas mask - phosphine canister combination or SCBA or its equivalent must be available at the site of application in case it is needed. SCBA or its equivalent must be available locally if it is not available at the fumigation site.

Respiratory protection need not be available for applications from outside the area to be fumigated such as addition of tablets to automatic dispensing devices, outdoor applications, etc., if exposures above the permitted exposure limits will not be encountered.

If monitoring equipment is not available on a farm and application of MAGNAPHOS® fumigant cannot be made from outside the structure, an approved canister respirator must be worn during application from within the structure being treated. However, if entry into an on-farm structure that is under fumigation is required, you must wear a SCBA if the gas concentration is unknown or above the permissible limits.

SECTION 11

REQUIREMENTS FOR CERTIFIED APPLICATOR'S PRESENCE AND TRAINING FOR RECEIPT OF IN-TRANSIT VEHICLES UNDER FUMIGATION

11.1 The requirements for the presence of a Certified Applicator and their responsibility for all workers are as follows:

1. A Certified Applicator must be physically present, responsible for, and maintain visual and/or voice contact with all fumigation workers during the application of the fumigant. Once the application is complete and the structure has been made secure the certified applicator does not need to be physically present at the site.

2. A Certified Applicator must be physically present, responsible for and maintain visual and/or voice contact with all fumigation workers during the initial opening of the fumigation structure for aeration. Once the aeration process is secured and monitoring has established that aeration can be completed safely the certified applicator does not need to be physically present and trained person(s) can complete the process and remove the placards.

3. Persons with documented training in the handling of Phosphine products must be responsible for receiving, aerating and removal of placards from vehicles, which have been fumigated in transit. Refer to Section 11.2 for training requirements.

11.2 The requirements for authorized training for receipt of in-transit vehicles under fumigation are as follows:

The trained person(s) must be trained by a Certified Applicator following the EPA accepted product applicator's manual that must precede or be attached to the outside of a transport vehicle; or by other training which is accepted by local and or state authorities. When training has been completed and the employee demonstrates safety knowledge proficiency, the training date must be logged and maintained in the employee's safety training record for a minimum of three years. Refresher training must be done on an annual basis.

This training must cover the following items, each of which may be found in this manual:

a. How to aerate the vehicle and verify that it contains no more than 0.3-ppm phosphine.
OR
b. How to transfer the commodity to another storage area without prior aeration and ensure that

worker safety limits are not being exceeded during the transfer.

c. How to determine when respiratory protection must be worn.

d. How to protect workers and nearby persons from exposure to levels above the 8-hour time weighted average (TWA) of 0.3 ppm or the 15 minute TWA short-term exposure limit (STEL) of 1.0 ppm phosphine.

e. Proper removal of placards from the vehicle.

f. How to follow proper residual disposal instruction.

SECTION 12

GAS DETECTION EQUIPMENT

There are a number of devices on the market for the measurement of phosphine gas at both industrial hygiene and fumigation levels. Glass detection tubes used in conjunction with the appropriate hand-operated air sampling pumps are widely used. These devices are portable, simple to use, do not require extensive training and are relatively rapid, inexpensive and accurate. Electronic devices are also available for both low level and high phosphine gas readings. Such devices should be used in full compliance with manufacturers' recommendations.

SECTION 13

NOTIFICATION REQUIREMENTS

13.1 AUTHORITIES AND ON-SITE WORKERS

As required by local regulations, notify the appropriate local officials (fire department, police department, etc.) of the impending fumigation. Provide to the officials an MSDS and an Applicator's Manual for the product and any other technical information deemed useful. Offer to review this information with the local official(s).

13.2 INCIDENTS INVOLVING THESE PRODUCTS

Registrants must be informed of any incident involving the use of this product. Please call 1-609-392-8200 so United Phosphorus Inc. can report the incident as per requirements of OSHA CFR 29.

13.3 THEFT OF PRODUCTS

Immediately report to the local police department thefts of metal phosphide fumigants.

SECTION 14

APPLICATOR AND WORKER EXPOSURE

14.1 EXPOSURE LIMITS

Exposure to phosphine must not exceed the 8-hour TWA (Time Weighted Average) of 0.3 ppm or the 15 minute TWA short-term exposure limit (STEL) of 1.0 ppm phosphine All persons are covered by these exposure standards.

14.2 APPLICATION OF FUMIGANT

At least two persons, a certified applicator and trained person, or two trained persons under the direct supervision of the certified applicator must be present during fumigation of structures when entry into the

structure for application of the fumigant is required. Depending upon temperature and humidity, MAGNAPHOS® Tablets and Gas Bags release phosphine gas slowly upon exposure to moisture from the air. In most cases, this release is slow enough to permit applicators to deposit fumigant in the desired areas and then vacate the premises without significant exposure to the gas. If the fumigator's exposure exceeds the allowable limits, approved respiratory protection must be worn.

14.3 LEAKAGE FROM FUMIGATED SITES
Phosphine is highly mobile and given enough time may penetrate seemingly gas-tight materials such as concrete and cinder block. Therefore, adjacent, enclosed areas likely to be occupied should be examined to ensure that significant leakage has not occurred. Sealing of the fumigated site and/or airflow in the occupied areas must be sufficient to bring down the phosphine concentration to a safe level of 0.3 ppm or below.

14.4 AERATION AND REENTRY
If the structure is to be entered after fumigation, it must be aerated until the level of phosphine gas is 0.3 ppm or below. The area or site must be monitored to ensure that liberation of gas from the treated commodity does not result in the development of unacceptable levels, i.e., over industrial hygiene levels of phosphine. Do not allow reentry into treated structures by any person before the level of phosphine reaches 0.3 ppm or below unless protected by an approved respirator.

14.5 HANDLING UNAERATED COMMODITIES
Transfer of incompletely aerated commodity via bulk handling equipment such as augers, drag conveyors and conveyor belts to a new storage structure is permissible. A Certified Applicator is responsible for training workers who handle the transfer of incompletely aerated listed commodities, and appropriate measures must be taken (i.e., ventilation or respiratory protection) to prevent exposures from exceeding the exposure limits for phosphine. The new storage structure must be placarded if it contains more than 0.3 ppm phosphine. If the fumigation structure must be entered to complete the transfer, at least two trained persons, wearing proper respiratory protection may enter the structure. A certified applicator must be physically present during the entry into the structure.
REMEMBER transporting containers or vehicles under fumigation over public roads is prohibited.

14.6 INDUSTRIAL HYGIENE MONITORING
Phosphine exposures must be documented in an operations log or manual at each fumigation site and operation where exposures may occur. Monitor airborne phosphine concentrations in all indoor areas to which fumigators and other workers have had access during fumigation and aeration. Perform such monitoring in workers' breathing zones. This monitoring is mandatory and is performed to determine when and where respiratory protection is required. Once exposures have been adequately characterized, spot checks must be made, especially if conditions change significantly or if an unexpected garlic odor is detected or a change in phosphine level is suspected.

14.7 ENGINEERING CONTROLS AND WORK PRACTICES
If monitoring shows that workers may be exposed to concentrations in excess of the permitted limits, then engineering controls (such as forced air ventilation) and/or appropriate work practices must be used to reduce exposure to within permitted limits. In any case, appropriate respiratory protection must be worn if phosphine exposure limits are exceeded.

SECTION 15

PLACARDING OF FUMIGATED AREAS

All entrances to the fumigated structure must be placarded. Placards must be made of substantial material that can be expected to withstand adverse weather conditions and must bear the wording as follows:

1. The signal word DANGER/PELIGRO and the SKULL AND CROSSBONES symbol in red.

2. The statement "Area/Structure and/or commodity under fumigation, DO NOT ENTER/NO ENTRE".
3. The Statement, "This sign may only be removed by a certified applicator or a person with documented training after the commodity is completely aerated (contains 0.3 ppm or less of phosphine gas). If incompletely aerated commodity is transferred to a new structure, the new structure must also be placarded if it contains more than 0.3 ppm. Worker exposure during this transfer must not exceed allowable limits".
4. The date the fumigation begins.
5. Trade name of the fumigant used and EPA Registration Number.
6. Name, address and telephone number of the fumigation company and/or applicator.
7. A 24-hour emergency response telephone number.

All entrances to a fumigated structure must be placarded. Where possible, placards should be placed in advance of the fumigation to keep unauthorized persons away. For railroad hopper cars, placards must be placed on both sides of the car near the ladders and next to the top hatches into which the fumigant is introduced.

Do not remove placards until the treated commodity is aerated down to 0.3 ppm phosphine or less. To determine whether aeration is complete, each fumigated site or vehicle must be monitored and shown to contain 0.3 ppm or less phosphine gas in the air space around and, if feasible, in the mass of the commodity.

SECTION 16

SEALING OF STRUCTURES

The structure to be fumigated must first be inspected to determine if it can be made sufficiently gas tight. Careful sealing is required so that adequate gas levels are retained. Turn off all ventilation, supply air, air conditioning, and any other air moving systems which could negatively affect the fumigation. Thoroughly inspect the structure to be fumigated and seal cracks, holes and openings. These areas could include, but are not limited to: windows, doors, vents, chimneys, open pipes and structural flaws. Sealing techniques can vary, but most often include polyethylene sheeting, adhesive tapes and adhesive sprays. Expandable foam or caulking material can work well on structural flaws. Proper sealing will insure sufficient gas levels within the fumigated structure and will decrease the chance of unwanted exposures outside of the fumigated area.

As with all fumigations, it is required that sealing be inspected for leaks. If phosphine above 0.3 ppm is found in an area where exposure to workers or bystanders may occur, the fumigator, using proper respiratory protection equipment must attempt to seal the leak from the exterior of the structure. Failing this, the fumigators, following proper procedures to prevent accidental poisoning, can enter the structure and seal the leaks from the interior. If the concentration inside the structure has decreased below the target level as a result of the leakage, additional fumigant may be added following the sealing repairs.

DO NOT FUMIGATE A STRUCTURE THAT CANNOT BE SEALED SUFFICIENTLY GAS-TIGHT.

SECTION 17

AERATION OF FUMIGATED COMMODITIES

As an alternative to the aeration time periods listed below, each container of the treated commodity may be analyzed for residues using accepted analytical methods.

17.1 FOODS AND FEEDS
Tolerances for phosphine residues have been established at 0.1 ppm for animal feeds and 0.01 ppm for processed foods. To guarantee compliance with these tolerances, it is necessary to aerate these commodities for a minimum of 48 hours prior to offering them to the end consumer.

17.2 NON-FOOD COMMODITIES
Aerate all non-food commodities to 0.3 ppm or less of phosphine. Monitor densely packed commodities to ensure that aeration is complete.

17.3 TOBACCO
Tobacco must be aerated for at least three days (72 hours) when fumigated in hogsheads and for at least two days (48 hours) when fumigated in other containers or until concentration is below 0.3 ppm. When plastic liners are used, longer aeration periods will probably be required to aerate the commodity down to 0.3 ppm.

SECTION 18

STORAGE INSTRUCTIONS

MAGNAPHOS® Tablets and Gas Bags must be stored in a dry, well-ventilated area away from heat, under lock and key. Post as a pesticide storage area. Do not contaminate food, water or feed by storing pesticides in the same areas used to store these commodities. Do not store in buildings where humans or domestic animals may reside. Keep out of reach of children.

18.1 LABELING OF STORAGE
The labeling of the storage area should take into account the needs of a variety of organizations. These should include, but not be limited to: corporate policy, insurance carrier, Occupational Safety and Health Administration (OSHA), Emergency Planning and Community Right to Know and local emergency response professionals. At a minimum, the storage must be marked with the following signs:

1. Danger, Poison (with skull and cross bones)
2. Authorized Personnel Only
3. Pesticide Storage NFPA Hazard Identification Symbols

The National Fire Protection Association (NFPA) has developed NFPA Hazard Identification Symbols. This standardized system is designed to provide, at a glance, the information regarding the health, fire and reactivity hazards associated with hazardous materials. The following are the hazard categories and degree of hazard for magnesium phosphide:

Category	**Degree of Hazard**
Health	4 (Severe Hazard)
Flammability	4 (Severe Hazard)
Reactivity	2 (Moderate)
Special Notice Key	~~W~~

NOTE: When using the NFPA Hazard Identification System, the characteristics of all hazardous materials stored in a particular area must be considered. The local fire protection district should be consulted for guidance on the selection and placement of such signs.

SECTION 19

TRANSPORTATION INSTRUCTIONS

The United States Department of Transportation (DOT) classifies magnesium phosphide as Dangerous When Wet material and it must be transported in accordance with DOT regulations.

19.1 TRANSPORT DESIGNATIONS

The following transport designations apply to magnesium phosphide

Proper Shipping Name:	Magnesium phosphide
Hazard Class:	4.3
Identification No.:	UN 1397
Packing Group:	PG I
Shipping Label:	Dangerous When Wet/Poison
Shipping Placard:	Dangerous When Wet

19.2 TRANSPORTATION EXEMPTION

Exemption: DOT-E
Purpose and Limitation: "…The motor vehicles used under the terms of this exemption are not required to be placarded…"
Modes of Transportation Authorized: Motor vehicle (Only private motor vehicles used in pest control operations are authorized to transport the packages covered by the terms of this exemption.)
NOTE: You must have a copy of this exemption with you during transportation. For a copy of this exemption contact United Phosphorus, Inc., Telephone: (609) 392-8200/1-800-247-1557, Fax: 1-609-392-0808.

SECTION 20

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 and follow 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 application and aeration.
5. Consult with company officials to develop an appropriate monitoring plan that will confirm that nearby workers and bystanders are not exposed to levels above the allowed limits during application, fumigation and 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 structure under fumigation.
8. Confirm the required safety equipment is in place and the necessary manpower is available to complete a safe and effective fumigation.
9. Written notification must be provided to the receiver of a vehicle that is fumigated in transit.

These factors **must** be considered in putting together an FMP. 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 the Applicator's Manual and must follow its directions carefully. If the applicator has any questions about the development of a FMP, contact United Phosphorus, Inc. for further assistance.

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

GUIDANCE FOR PREPARATION OF A FUMIGATION MANAGEMENT PLAN

20.1 PURPOSE

A Fumigation Management Plan (FMP) is an organized, written description of the required steps involved to help ensure a safe, legal, and effective fumigation. It will also assist you and others in complying with pesticide product label requirements. The guidance that follows is designed to help assist you in addressing all the necessary factors involved in preparing for and fumigating a site.

This guidance is intended to help you organize any fumigation that you might perform PRIOR TO ACTUAL TREATMENT. It is meant to be somewhat prescriptive, yet flexible enough to allow the experience and expertise of the fumigator to make changes based on circumstances which may exist in the field. By following a step-by-step procedure, yet allowing for flexibility, safe and effective fumigation can be performed.

Before any fumigation begins, carefully read and review the label and the Applicator's Manual. This information must also be given to the appropriate company officials (supervisors, foreman, safety officer, etc.) in charge of the site. Preparation is the key to any successful fumigation. If you do not find specific instructions for the type of fumigation that you are to perform listed in this Guidance Document you will want to construct a similar set of procedures using this document as your guide or contact United Phosphorus for assistance. Finally, before any fumigation begins you must be familiar with and comply with all applicable federal, state and local laws. The success and future of fumigation are not only dependent on your ability to do your job but also by carefully following all rules, regulations, and procedures required by governmental agencies.

20.2 A CHECKLIST GUIDE FOR A FUMIGATION MANAGEMENT PLAN

This checklist is provided to help you take into account factors that must be addressed prior to performing all fumigations. It emphasizes safety steps to protect people and property. The checklist is general in nature and cannot be expected to apply to all types of fumigation situations. It is to be used as a guide to prepare the required plan. Each item must be considered.

A. PRELIMINARY PLANNING AND PREPARATION

1. Determine the purpose of the fumigation.
    a. Elimination of insect infestation
    b. Elimination of rodent infestation
    c. Plant pest quarantine.
2. Determine the type of fumigation, for example
    a. Space: tarp, mill, warehouse, food plant
    b. Vehicle: railcar, truck, van, container
    c. Commodity: raw agricultural or processed foods
    d. Type of storage: vertical silo, farm storage, flat storage
    e. Vessels: ship or barge. In addition to the Applicator's Manual, read the US Coast Guard Regulations 46 CFR 147A.

3. Fully acquaint yourself with the site and commodity to be fumigated, including.
    a. The general structure layout, construction (materials, design, age, maintenance) of the structure, fire or combustibility hazards, connecting structures and escape routes, above and below ground, and other unique hazards or structure characteristics. Prepare, with the owner/operator/person in charge. Draw or have a drawing or sketch of structure to be fumigated, delineating features, hazards, and other structural issues.
    b. The number and identification of persons who routinely enter the area to be fumigated (i.e., employees, visitors, customers, etc.)
    c. The specific commodity to be fumigated, its mode of storage, and its condition.
    d. The previous treatment history of the commodity, if available.
    e. Accessibility of utility service connections.
    f. Nearest telephone or other means of communication, and mark the location of these items on the drawing/sketch.
    g. Emergency shut-off stations for electricity water and gas. Mark the location of these items on the drawing/sketch.
    h. Current emergency telephone numbers of local Health, Fire, Police, Hospital and Physician responders.
    i. Name and phone number (both day and night) of appropriate company officials.
    j. Check, mark and prepare the points of fumigation application locations if the job involves entry into the structure for fumigation.
    k. Review labeling and Applicator's Manual.
    l. Exposure time considerations.
        1. Product (tablet and gas bag) to be used.
        2. Minimum fumigation period, as defined and described in the use directions of the Applicator's Manual.
        3. Down time required to be available
        4. Aeration requirements
        5. Cleanup requirements, including dry or wet deactivation methods, equipment, and personnel needs, if necessary.
        6. Measured and recorded commodity temperature and moisture.
    m. Determination of dosage
        1. Cubic footage or other appropriate space/location calculations.
        2. Structure sealing capability and methods.
        3. Label recommendations.
        4. Temperature, humidity, wind.
        5. Commodity/space volume.
        6. Past history of fumigation of structure.
        7. Exposure time.

B. PERSONNEL

1. Confirm in writing that all personnel in and around the structure to be fumigated have been notified prior to application of the fumigant. Consider using a checklist that each employee initials indicating they have been notified.
2. Instruct all fumigation personnel to read the Applicator's Manual and about the hazards that may be encountered and about the selection of personal protection devices, including detection equipment.
3. Confirm that all personnel are aware of and know how to proceed in case of an emergency situation.
4. Instruct all personnel on how to report any accident and/or incidents related to fumigant exposure. Provide a telephone number for emergency response reporting.
5. Instruct all personnel to report to proper authorities any theft of fumigant and/or equipment related to fumigation.
6. Establish a meeting area for all personnel in case of emergency.

C. MONITORING

1. Safety
    a. Monitoring of phosphine conditions must be conducted in areas to prevent excessive exposure and to determine where exposure may occur. Document where monitoring will occur.
    b. Keep a log or manual of monitoring records for each fumigation site. This log must at a minimum contain the timing, number of readings taken and level of concentrations found in each location.
    c. When monitoring, document even if there is no phosphine present above the safe levels. In such cases, subsequent monitoring is not routinely required. However spot checks must be made occasionally, especially if conditions significantly change.
    d. Monitoring must be conducted during aeration and corrective action must be taken if gas levels exceed the allowed levels in an area where bystanders and/or nearby residents or domestic animals may be exposed.
2. Efficacy
    a. Phosphine readings should be taken from within the fumigated structure to insure proper gas concentrations. If the phosphine levels have fallen below the targeted level, the fumigators, following proper entry procedures may reenter the structure and add additional product.
    b. All phosphine readings should be documented.

D. NOTIFICATION

1. Confirm the appropriate local authorities (fire departments, police departments, etc.) have been notified as per the instructions in the Applicator's Manual, local ordinances, or instructions of the client.
2. Prepare written procedure ("Emergency Response Plan") which contains explicit instructions, names, and telephone numbers so as to be able to notify local authorities if phosphine levels are exceeded in an area that could be dangerous to bystanders or domestic animals.
3. Confirm that the receivers of in-transit vehicles under fumigation have been notified and are trained according to Section 11 of this Applicator's Manual.

E. SEALING PROCEDURES

1. Sealing must be adequate to control the pests. Care should be taken to insure that sealing materials will remain intact until the fumigation is complete.
2. If the site has been fumigated before, review the previous FMP for previous sealing information.
3. Make sure that construction/remodeling has not changed the building in a manner that will affect the fumigation.
4. Warning placards must be placed on every possible entrance to the fumigation site.

F. APPLICATION PROCEDURES AND FUMIGATION PERIOD

1. Plan carefully and apply the product in accordance with the registrant's label requirements.
2. When entering into the area under fumigation always work with two or more people under the direct supervision of a certified applicator wearing appropriate respirators.
3. Apply fumigant from the outside where appropriate.
4. Provide watchmen when entry into the fumigation site by unauthorized persons cannot otherwise be assured.
5. When entering structures always follow OSHA rules for confined spaces.
6. Document that the receiver of in-transit vehicles/containers under fumigation has been notified.
7. Turn off any electric lights in the fumigated area of the structure as well as all nonessential electrical motors.

G. POST-APPLICATION OPERATIONS

1. Provide watchmen when you cannot secure the fumigation site from entry by unauthorized persons during the aeration process.
2. Ventilate and aerate in accordance with structural limitations.
3. Turn on ventilating or aerating fans where appropriate.
4. Use a suitable gas detector before reentry into a fumigated structure to determine fumigant concentration.
5. Keep written records of monitoring to document completion of aeration.
6. Consider temperature when aerating.
7. Ensure aeration is complete before moving a treated vehicle onto public roads.
8. Remove warning placards when aeration is complete.
9. Inform business/client that employees/other persons may return to work or otherwise be allowed to reenter the aerated structure.

SECTION 21

APPLICATION PROCEDURES

An FMP must be devised to cover application and exposure period, aeration and disposal of the fumigant so as to keep to a minimum any human exposures to phosphine and to help assure adequate control of the insect pests. The following instructions are intended to provide general guidelines for typical fumigation sites.

21.1 FARM BINS

Leakage is the single most important cause of failures in the treatment of farm storages. Since these storages are often small, they usually have a higher leakage area in proportion to their capacity. Most wooden storage structures are so porous that they cannot be successfully fumigated unless they are completely tarped. Do not fumigate a storage that will be entered by humans or animals prior to aeration. Do not fumigate areas which house sensitive equipment containing copper or other metals likely to be corroded by phosphine gas.

1. Read the label, Applicator's Manual, MSDS and related safety material.
2. Inspect the bin to determine if you can fumigate effectively.
3. If the bin is located in an area where nearby workers and/or bystanders or domestic animals would be exposed to phosphine gas because of leakage from the bin:
    (i) Develop a monitoring procedure that will confirm if leakage from the bin is above the allowable limits in an area that would affect nearby workers or bystanders.
    (ii) Advise local authorities when and where you will be fumigating. Provide and review with them the MSDS, Applicator's Manual and other relevant safety information.
4. If the bin is in an isolated area on private property (i) and (ii) above are not required.
5. Seal the bin as tightly as possible. It is recommended that the surface of the grain be covered with polyethylene sheets (poly) after MAGNAPHOS® has been applied. Tarping the grain surface will greatly reduce the leak rate of the gas as well as reduce the amount of MAGNAPHOS® required. Only the volume below the tarp must be dosed. If not tarped, the entire volume of the storage must be treated, whether full or empty.
6. Using the Applicator's Manual, calculate the dosage of tablets or gas bags to be applied based upon type of structure, its sealing properties, content type, weather, commodity temperature and moisture content of the commodity and length of fumigation.
7. MAGNAPHOS® Tablets and Gas Bags required for the fumigation may be scattered over the surface. Tablets can be probed into the grain using a rigid PVC pipe about 5 to 7 feet in length and having a diameter of 1-1/4 inches. Use about 20-50 tablets per probe. Probe the dosage uniformly over the surface.
8. Immediately cover the surface of the grain with a plastic tarpaulin.

9. Place no more than 25 percent of the total dose at the bottom if the bin is equipped with aeration fans. **Caution:** Make sure that the aeration duct is dry before adding MAGNAPHOS®. Addition of MAGNAPHOS® to water in an aeration duct may result in a fire.
10. Seal the aeration fan with 4-mil plastic sheeting.
11. Place placards on all entrances to the bin and near the ladder.
12. Following aeration of the bin, the surface of the grain may be sprayed with an approved protectant to discourage reinfestation.

Note: If monitoring equipment is not available on a farm and application cannot be done from outside of a structure, an approved canister respirator must be worn during application from within an enclosed indoor area.

21.2 FLAT STORAGES

Treatment of these types of storages often requires considerable time and physical effort. Therefore, sufficient manpower should be available to complete the work rapidly enough to prevent excessive exposure to phosphine gas. Vent flasks outside the storage, conduct fumigations during cooler periods, and employ other work practices to minimize exposures. It is likely that respiratory protection will be required during application of fumigant to flat storages. Refer to Section 14 Applicator and Worker Exposure and Section 10 Respiratory Protection.

1. Inspect the site to determine its suitability for fumigation.
2. Determine if the structure is in an area where leakage during fumigation or aeration would adversely affect nearby workers or bystanders if concentrations were above the permitted exposure levels.
3. Develop an appropriate Fumigation Management Plan. (Refer to FMP guidelines.)
4. Consult previous records for any changes to the structure. Seal vents, cracks and other sources of leaks.
5. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of tablets or gas bags to be applied based upon volume of the building, contents, air and/or commodity temperature and the general tightness of the structure.
6. Apply tablets or gas bags by surface application. Tablets may be applied by shallow probing, deep probing or uniform addition as the bin is filled.
   Storages requiring more than 24 hours to fill should not be treated by addition of fumigant to the commodity stream as large quantities of phosphine may escape before the flat storage is completely sealed.
   Probes should be inserted vertically at intervals along the length and width of the flat storage. Tablets may be dropped into the probe at intervals as it is withdrawn.
   Surface application may be used if the bin can be made sufficiently gas tight to contain the fumigant gas long enough for it to penetrate the commodity. In this instance, it is advisable to place about 25 percent of the dosage in the floor level aeration ducts. Check the ducts prior to addition of MAGNAPHOS® to make sure that they contain no liquid water.
7. Placement of plastic tarp over the surface of the commodity is often advisable, particularly if the overhead of the storage cannot be well sealed.
8. Lock all entrances to the storage and post fumigation warning placards.

21.3 VERTICAL STORAGES (concrete upright bins and other silos in which grain can be rapidly transferred)

1. Inspect the site to determine its suitability for fumigation.
2. Determine if the structure is in an area where leakage during fumigation or aeration would expose nearby workers or bystanders to concentrations above the permitted levels.
3. Develop an appropriate Fumigation Management Plan (Refer to FMP guidelines).
4. Consult previous records for any changes to the structure. Close openings and seal cracks to make the structure as airtight as possible. Prior to the fumigation, seal the vents near the bin top which connect to adjacent bins.
5. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of

Tablets or Gas Bags to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure.

6. Tablets may be applied continuously by hand or by an automatic dispenser on the headhouse/gallery belt or into the fill opening as the commodity is loaded into the bin. An automatic dispenser may also be used to add MAGNAPHOS® into the commodity stream in the up leg of the elevator.
7. Seal the bin deck openings after the fumigation has been completed.
8. Bins requiring more than 24 hours to fill should not be fumigated by continuous addition into the commodity stream. Probing, surface application, or other appropriate means may be employed to fumigate these bins. Exposure periods should be lengthened to allow for diffusion of gas to all parts of the bin if MAGNAPHOS® has not been applied uniformly throughout the commodity mass.
9. Place warning placards on the discharge gate and on all entrances.

21.4 MILLS, FOOD PROCESSING PLANTS AND WAREHOUSES

1. Inspect the site to determine its suitability for fumigation.
2. Determine if the structure is in an area where leakage during fumigation or aeration would expose nearby workers or bystanders if concentrations were above the permitted exposure levels.
3. Develop an appropriate Fumigation Management Plan. (Refer to Fumigation Management Plan guidelines.)
4. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of tablets or gas bags to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure.
5. Read the directions found under Section 4.2 Physical and Chemical Hazards and remove or cover any of the listed items that can become damaged from exposure to phosphine gas.
6. Consult previous records for any changes in the structure. Carefully seal and placard the space to be fumigated.
7. Place trays or sheets of Kraft paper or foil, up to 12-sq. ft. (1.1 sq. M) in area, on the floor throughout the structure.
8. Spread MAGNAPHOS® on the sheets at a density no greater than 30 tablets per sq. ft. This corresponds to slightly more than 3/4ths of a flask containing 2500 tablets per 3'x4' sheet. Check to see that MAGNAPHOS® has not piled up and that it is spread out evenly to minimize contact between the individual tablets. Gas bags may be placed directly on the floor.
9. Turn off any lights within the treated area and shut off all electrical motors not essential to operations of the storage. Doors leading to the fumigated space must be closed, sealed, and placarded with warning signs.
10. Upon completion of the exposure period, windows, doors, vents, etc., should be opened and the fumigated structure allowed to aerate. The structure should not be entered without proper Personal Protective Equipment (PPE) unless gas readings have been taken and the concentration is below the allowable limits. Gas concentration readings may be taken using low-level detector tubes or similar devices to ensure safety of personnel who reenter the treated area.
11. Collect the spent MAGNAPHOS® dust and dispose of it, with or without further deactivation. Refer to Disposal Instructions in Section 24 of this Manual.
12. Remove fumigation warning placards from the aerated structure.

21.5 RAILCARS, CONTAINERS, TRUCKS, VANS, AND OTHER TRANSPORT VEHICLES

Railcars and containers, trucks, vans, and other transport vehicles shipped piggyback by rail may be fumigated in-transit.

However, the aeration of railcars, railroad boxcars, containers and other vehicles is prohibited en-route. It is not legal to move trucks, trailers, containers, vans, etc., over public roads or highways until they have been aerated.

Transport vehicles loaded with bulk commodities to which MAGNAPHOS® Tablets or Gas Bags may be

added directly are treated in essentially the same way as any other flat storage facility. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of tablets or gas bags to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure. MAGNAPHOS® may be added as the vehicle is being filled, the dose may be scattered over the surface after loading has been completed or the tablets may be probed below the surface. Carefully seal any vents, cracks or other leaks, particularly if the fumigation is to be carried out in-transit. See Section 15, the Placarding of Fumigated Areas section of this Applicator's Manual for recommendations on placarding.

The Shipper and/or the fumigator must provide written notification to the receiver of railcars, railroad boxcars, shipping containers and other vehicles, which have been fumigated in-transit. A copy of the Applicator's Manual must precede or accompany all transportation containers or vehicles which are fumigated in-transit. If the Applicator's Manual is sent with the transport vehicle it must be placed securely on the outside of the vehicle.

Proper handling of treated railcars at their destination is the responsibility of the consignee. Upon receipt of the railcar, railroad boxcars, shipping containers and other vehicles a certified applicator and/or persons with documented authorized training must supervise the aeration process and removal of the placards.

MAGNAPHOS Gas Bags are suited to fumigation of package commodities or bulk processed foods. The Gas Bags are not to be placed in or attached directly to commodity packages containing processed food. If placement of Gas Bags on the floor of a boxcar is not convenient, or if the vehicle is being fumigated in-transit, the Gas Bags may be attached to a wall or other support. They may also be applied by taping the Gas Bags on cardboard with spacing between the Gas Bags. Tape across the Gas Bag ends only. Specially designed cardboard discs or boards are available for this purpose. If the boards or discs are used, taping of the Gas Bags is not necessary. Instructions that follow give specific procedures for treatment of rail cars when direct addition to the commodity is not permitted (see Sections 6.2 Processed Foods and Section 6.3 Nonfood Commodities Including Tobacco in this Manual).

21.5.1 Procedures for Hopper Rail Cars – Round Hatch

1. Close and secure all hatch covers except those being utilized for the fumigation.
2. Seal all other openings. Pay particular attention to vents.
3. Clean the flange lip of hatch (or hatches) being utilized. If the commodity extends into the throat of the hatch, force it away to the extent possible.
4. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of gas bags to be applied based upon volume of the car, air and/or commodity temperature and the general tightness of the rail car.
5. Open cans, insert gas bags into the pockets or tape the gas bags on the disc. Gas Bags must not be folded.
6. Secure the disc into place with tape. Place the loaded disc into position with the Gas Bag side in the up position.
7. Cover the hatch opening with poly sheeting before closing the cover.
8. Lower the cover into place and secure. Insert the placard into a clear plastic bag, and affix it to the hatch cover. Affix placards near the ladder on each side of the car.

21.5.2 Procedures for Hopper Rail Cars – Slot Hatch

1. Fold the edges of a board to form a tray. The board is designed to "hang' in the hatch opening.
2. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of gas bags to be applied based upon volume of the car, air and/or commodity temperature and the general tightness of the rail car.
3. Open containers and insert Gas Bags into the pockets of the board. Gas Bags must not be folded.
4. Place the loaded board into position with the Gas Bag side up.
5. Secure the board in place with tape.
6. Cover the entire hatch opening with poly sheeting before closing the cover.
7. Lower the hatch covers.

8. Insert the placard into a clear plastic bag, and affix it to the hatch cover. Affix placards near the ladder on each side of the car.

21.5.3 Procedures for Box Cars

1. Close and secure one of the doors. Seal all openings and joints. If needed, caulk joints and drape entire doorway with poly film, securing the edges to the inner wall, floor and ceiling with tape or suitable adhesive.
2. Inspect the roof, floor and walls for holes and/or cracks. Seal all openings with either tape or caulking compound.
3. If needed, drape remaining doorway with polyethylene film before door is closed. Secure edges to door jams and floor. Close door and secure. If doorway is draped with poly, it may not be necessary to seal the door from the outside. If doorway is not draped, seal all cracks, openings and leaky joints with masking tape and/or caulking compound from the outside.
4. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of gas bags to be applied based upon volume of the car, air and/or commodity temperature and the general tightness of the rail car.
5. Open containers and insert Gas Bags into the pockets of the disc or board or use tape to secure the Gas Bags.
6. Place the loaded disc or board onto the load, with the Gas Bag side up. Secure the board in place with tape or nail it to the wall.
7. Post placards into a clear plastic bag, and affix it to the doors of the cars.

21.6 TARPAULIN AND BUNKER FUMIGATIONS

Use of plastic sheeting or tarpaulins to cover commodities is one of the easiest and least expensive means for providing relatively gas tight enclosures which are very well suited for fumigation. Polyethylene (poly) tarps are penetrated only very slowly by phosphine gas, and tight coverings are readily formed from the sheets. The volume of these enclosures may vary widely from a few cubic feet (for example, a fumigation tarpaulin placed over a small stack of bagged commodity) to a plastic bunker storage capable of holding 600,000 bushels of grain or more.

1. Develop an enclosure suitable for fumigation by covering bulk or packaged commodities with poly sheeting. The sheets may be taped together to provide a sufficient width of material to ensure that adequate sealing is obtained. If the flooring upon which the commodity rests is of wood or other porous material, the commodity to be fumigated should be repositioned onto poly prior to covering for fumigation. The plastic covering of the pile may be sealed to the floor using sand or water snakes, by shoveling soil or sand onto the ends of the plastic covering or by other suitable procedures. The poly covering should be reinforced by tape or other means around any sharp corners or edges in the stack so as to reduce the risk of tearing. Thinner poly, about 2 mil, is suitable for most indoor tarp fumigations and for sealing of windows, doors and other openings in structures. However, 4 mil poly or thicker is more suitable for outdoor applications where wind or other mechanical stresses are likely to be encountered.
2. Determine if the enclosure is in an area where leakage during fumigation or aeration would affect nearby workers or bystanders.
3. Develop an appropriate Fumigant Management Plan. (Refer to Section 20, Fumigation Management Plan guidelines.)
4. Using the guidance given under Section 7 Exposure Conditions, determine the length of the fumigation and calculate the dosage of tablets or gas bags to be applied based upon volume of the spaces under the tarp, air and/or commodity temperature and the general tightness of the structure.
5. Tablets and Gas Bags may be applied to the tarped stack or bunker storage of bulk commodity through slits in the poly covering. Probing or other means of dosing may be used. Avoid application of large amounts of MAGNAPHOS® at any one point. The MAGNAPHOS® should be added below the surface of the commodity if condensation or other source of moisture is likely to form beneath the poly. The slits in the covering should be carefully taped to prevent loss of gas once the dose has been applied and to prevent the introduction of water from rain. Care should be taken to see that the poly is not allowed to cover the MAGNAPHOS® and prevent contact with

moist air or confine the gas.

6. Distribution of phosphine gas is generally not a problem in the treatment of bagged commodities and processed foods. However, fumigation of larger bunker storages containing bulk commodity will require proper application procedures to obtain adequate results.
7. Place warning placards at conspicuous points on the enclosure.

21.7 IN-TRANSIT SHIPHOLDS

21.7.1 General Information

Important – In-transit ship or shiphold fumigation is also governed by U.S. Coast Guard Regulation 46 CFR 147A, Interim Regulations for Shipboard Fumigation. Refer to this regulation prior to fumigation. For further information contact:

Commandant U.S. Coast Guard
Hazardous Materials Standards Division GMSO-3
Washington, DC 20593-0001

21.7.2 Pre-Voyage Fumigation Procedures

1. Prior to fumigating a vessel for in-transit cargo fumigation, the master of the vessel, or his representative, and the certified applicator must determine whether the vessel is suitably designed and configured so as to allow for safe occupancy by the ship's crew throughout the duration of the fumigation. If it is determined that the design and configuration of the vessel does not allow for safe occupancy by the ship's crew throughout the duration of the fumigation, then the vessel must not be fumigated unless all crew members are removed from the vessel. Crew members are not allowed to reoccupy the vessel until the vessel has been properly aerated and the master of the vessel and the certified applicator has made a determination that the vessel is safe for occupancy.
2. The certified applicator must notify the master of the vessel, or his representative, of the requirements relating to personal protection equipment*, detection equipment, and that a person qualified in the use of this equipment must accompany any vessel containing cargo under fumigation. Emergency procedures, cargo ventilation, periodic monitoring and inspections, and first aid measures must be discussed with and understood by the master of the vessel or his representative.
   **Note: Personal protection equipment means a NIOSH/MSHA approved respirator or gas mask fitted with an approved canister for phosphine. The canister is approved for use up to 15 ppm. SCBA or its equivalent must be used above 15 ppm or at unknown concentrations.*
3. Seal all openings to the cargo hold or tank and lock or otherwise secure all openings, manways, etc., which might be used to enter the hold. The overspace pressure relief system of each tank aboard tankers must be sealed by closing the appropriate valves and sealing the openings into the overspace with gas-tight materials.
4. Using the Applicator's Manual, determine the length of the fumigation and calculate the dosage of tablets or gas bags to be applied based upon volume of the vessel, air and/or commodity temperature and the general tightness of the vessel.
5. Placard all entrances to the treated spaces with fumigation warning signs.
6. If the fumigation is not completed and the vessel aerated before the manned vessel leaves port, the person in charge of the vessel shall ensure that at least two units of personal protection equipment and one phosphine gas detection device, and a person qualified in their operation be on board the vessel during the voyage.
7. During the fumigation or until a manned vessel leaves port or the cargo is aerated, the certified applicator shall ensure that a qualified person using phosphine gas detection equipment tests spaces adjacent to areas containing fumigated cargo as well as all regularly occupied spaces for fumigant leakage. If leakage of the fumigant is detected, the person in charge of the fumigation shall take action to correct the leakage, or shall inform the master of the vessel, or his representative, of the leakage so that corrective action can be taken.
8. Review with the master, or his representative, the precautions and procedures to follow during the

voyage of a shiphold in transit fumigation.

21.7.3. Application Procedures for Bulk Dry Cargo Vessels and Tankers

1. Apply tablets by scattering uniformly over the commodity surface, or they may be shallow or deep probed into the commodity mass. Gas bags may be placed on the surface of the commodity.
2. Immediately after application of the fumigant, close and secure all hatch covers, tank tops, butterworth valves, manways, etc.

21.7.4. In-transit Fumigation of Transport Units (Containers) Aboard Ships

In-transit fumigation of transport units on ships is also governed by DOT RSPA 49 CFR 176.76(i) Transport Vehicles, Freight Containers, and Portable Tanks Containing Hazardous Materials and International Maritime Dangerous Goods Code P9025-1 Amdt. 27-94. Application procedures for fumigation of raw commodities or processed foods in transport units (containers) are described in the Railcars, Containers, Trucks, Vans and Other Transport Vehicles section of this Manual.

21.7.5. Precautions and Procedures During Voyage

1. Using appropriate gas detection equipment, monitor spaces adjacent to areas containing fumigated cargo and all regularly occupied areas for fumigant leakage. If leakage is detected, the area should be evacuated of all personnel, ventilated, and action taken to correct the leakage before allowing the area to be occupied.
2. Do not enter fumigated areas except under emergency conditions. If necessary to enter a fumigated area, appropriate personal protection equipment must be used (see Section 21.7.6 Precautions and Procedures During Discharge). Never enter fumigated areas alone. At least one other person, wearing personal protection equipment, should be available to assist in case of an emergency.

21.7.6. Precautions and Procedures During Discharge

If necessary to enter holds prior to discharge, test spaces directly above grain surface for fumigant concentration using appropriate gas detection and personal safety equipment. Do not allow entry to fumigated areas without personal safety equipment, unless fumigant concentrations are at safe levels, as indicated by a suitable detector.

21.7.7 Barges

Barge fumigation is also regulated by U. S. Coast Guard Regulation 46 CFR 147A as modified by U. S. Coast Guard Special Permit 2-75. This permit which must be obtained prior to the fumigation is available from:

Commandant U. S. Coast Guard
Hazardous Materials Standards Div. GMSO-3
Washington, DC 20593-0001

Leaks are a common cause of failures in the treatment of commodities aboard barges. Carefully inspect all hatch covers prior to application of MAGNAPHOS® and seal, if necessary. Placard the barge. Notify consignee if the barge is to be fumigated in-transit and provide safety instructions for receipt and unloading.

21.8. SMALL SEALABLE ENCLOSURES

Excellent results may be attained in the treatment of small enclosures since it is often possible to control the temperature during fumigation and also to make the enclosure virtually gas tight. Take care not to overdose during these fumigations. A single MAGNAPHOS® tablet will treat a space of 1.4 to 10 cubic feet. A single MAGNAPHOS® tablet will treat a space of 6.9 to 50 cubic feet. A single MAGNAPHOS® gas bag will treat a space of 77 to 500 cubic feet.

21.9. BEEHIVES, SUPERS AND OTHER BEE KEEPING EQUIPMENT

MAGNAPHOS® Tablets and Gas Bags may be used for the control of the Greater wax moth in stored beehives, supers, and other bee keeping equipment and for the destruction of bees, Africanized bees, and

diseased bees including those infested with tracheal mites and foulbrood. The recommended dosage for this use is 30-45 tablets or 3-4 gas bags per 1000 cu. ft.

Fumigations may be performed in chambers at atmospheric pressure, under tarpaulins, etc., by using gas bags or by placing the tablets onto trays or into moisture permeable envelopes. Do not add more than 2 tablets onto trays or into each envelope. Honey from treated hives or supers may only be used for bee food.

21.10. BURROWING PEST CONTROL

21.10.1 Use Restrictions

This product may be applied to underground burrow systems located in noncrop areas, crop areas, or orchards occupied by woodchucks, yellowbelly marmots (rockchucks), prairie dogs (except Utah prairie dogs, *Cynomys Parvidens*), Norway rats, roof rats, mice, ground squirrels, moles, voles, pocket gophers, or chipmunks.

All treatments for control of these species in burrows must be made outdoors. Tablets must be applied directly to underground burrow systems. Before using MAGNAPHOS tablets for burrowing pest control, read the applicable restrictions under Section 22 Environmental Hazards and Section 23 Endangered Species below.

This product may be used out of doors only for control of burrowing pests. THIS PRODUCT MUST NOT BE APPLIED INTO A BURROW SYSTEM THAT IS WITHIN 15 FEET (5 METERS) OF A BUILDING THAT IS, OR MAY BE, OCCUPIED BY HUMANS, AND/OR ANIMALS, ESPECIALLY RESIDENCES. Document any burrows that open under or into occupied buildings, and do not apply to these burrows. In addition, check for any other source through which the gas may enter into occupied buildings as a result of application to burrows. If there is any way gas can move through pipes, conduits etc., from burrows, do not treat these burrows. Prior to treating a rodent burrow on a property containing an inhabited structure, the applicator must provide the customer (e.g. tenant, homeowner, or property manager) with an MSDS or appropriate sections of the Applicator's Manual.

21.10.2. Application Directions

Use application procedures appropriate to the type of burrow system being treated. DOSAGE RATES MUST NOT BE EXCEEDED UNDER ANY CIRCUMSTANCES.

1. For species with open burrow systems, locate all entrances to each burrow system. Treatment of more than one entrance in a system is often desirable as systems often overlap and are not defined. Treat all entrances except for those entrances you are sure connect to already treated entrances. Insert 2 to 4 tablets into each burrow entrance to be treated. Use the lower rates for smaller burrows and/or when soil moisture is high. Use the higher rates for larger burrow systems and when soil moisture is relatively low. Pack the treated entrance with crumpled paper and shovel soil to completely cover the paper. Using crumpled paper will prevent soil from covering the tablets and slowing down their action. Rocks, clods of soil, cardboard, etc. may be used for this purpose. Be sure to seal all untreated entrances by shoveling and packing soil and/or sod to completely seal the opening. Inspect treated areas 1 or 2 days following treatment for signs of residual activity of target species. Treat all reopened burrow openings in the manner prescribed above.
2. For species with closed burrow systems, (pocket gophers, and moles in some situations), locate the main underground runway by probing with a smooth-sided rod 12 to 18 inches from a fresh mound. For pocket gophers, begin probing on the flat side of the mound. A sudden reduction in soil resistance to the probe indicates that the main runway has been located. Once the main runway is located, remove the probe and apply 2 to 4 tablets through the probe hole. Adjust treatment rate according to the level of soil moisture, using more tablets if the soil is relatively dry. Do not treat if soil is extremely dry or if there are no signs of recent gopher or mole activity. Make a tight seal to close probe hole by using a clod of soil or a sod plug to cover the hole or by

using the heel of your shoe to push sod and/or soil over the surface opening. If the probe hole is more than one inch in diameter, place crumpled paper in the hole before closing it with soil and/or sod. Two days after treatment, you may check area for residual pest activity by poking holes in main runways of burrow systems, flagging holes and inspecting them two days later. You should retreat all reclosed burrow systems, on both sides of the plug.

SECTION 22

ENVIRONMENTAL HAZARDS

This product is very highly toxic to wildlife. Many non-target organisms exposed to phosphine gas in burrows will be killed. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water by cleaning of equipment or disposal of wastes.

SECTION 23

ENDANGERED SPECIES RESTRICTIONS

The use of MAGNAPHOS® in a manner that may kill or otherwise harm an endangered or threatened species or adversely modify their habitat is a violation of Federal laws. Before using this pesticide on range and/or pastureland you must obtain the PESTICIDE USE BULLETIN FOR PROTECTION OF ENDANGERED SPECIES for the county in which the product is to be used. The bulletin is available from your County Extension Agent, State Fish and Game Office, or your pesticide dealer. Use of this product in a manner inconsistent with the PESTICIDE USE BULLETIN FOR PROTECTION OF ENDANGERED SPECIES is a violation of Federal laws.

Even if applicable county bulletins do not prohibit the use of this product at the intended site of application, you may not use this product for control of prairie dogs in the states of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah or Wyoming unless a pre-control survey has been conducted. Contact the nearest U. S. Fish and Wildlife Service Endangered Species Specialist to determine survey requirements in your area. This survey must be in compliance with the Black-Footed Ferret Survey Guidelines, developed by the U.S. Fish and Wildlife Service, and a determination must be made in accordance with the Guidelines that black-footed ferrets are not present in the treatment area.

CALIFORNIA (all endangered species)
Fresno, Inyo, Kern, Kings, Madera, Merced, Monterey, San Benito, San Luis Obispo, Santa Barbara, Stanislaus and Tulare. See the U.S. EPA Interim Measures Bulletin for your county. To obtain a copy of the bulletin, contact your county agricultural commissioner or visit the following website: http://www.cdpr.ca.gov/docs/es/index.htm. If there is no current bulletin available for your county, contact the U.S. Fish and Wildlife Service office in Portland, OR to determine whether there are endangered species that might be adversely affected by your proposed use of MAGNAPHOS® and the steps you should take to mitigate any such risks.

FLORIDA
Statewide

GEORGIA
Appling, Atkinson, Bacon, Baker, Ben Hill, Bleckley, Berrien, Brantley, Brooks, Bryan, Bullock, Calhoun, Camden, Chandler, Charlton, Chatham, Clinch, Coffee, Colquitt, Cook, Crisp, Decatur, Dodge, Dooly, Dougherty, Early, Echols, Effingham, Emanuel, Evans, Glynn, Grady, Irwin, Jeff Davis, Jenkins, Johnson, Lanier, Laurens, Lee, Liberty, Long, Lowndes, Macon, McClintosh, Miller, Mitchell, Montgomery, Pierce, Pulaski, Screven, Seminole, Telfair, Tattnall, Thomas, Tift, Toombs, Treutlen, Turner, Ware, Wayne, Wheeler, Wilcox and Worth.

NEW MEXICO
Hidalgo
UTAH
Beaver, Garfield, Iron, Kane, Piute, Sevier, Washington and Wayne
WYOMING
Albany

Special Local Restrictions

1. NORTH CAROLINA
MAGNAPHOS® Tablets may only be used for control of rats and mice in the State of North Carolina. Use against other burrowing (not insect pests) pests is not permitted.

2. OKLAHOMA
A special permit for black-tailed prairie dog control by poisoning is required in Oklahoma. Contact the Oklahoma State Department of Wildlife Conservation to obtain this permit.

3. WISCONSIN
A state permit is required for use of pesticides in Wisconsin to control small mammals, except rats or mice. Contact your local Department of Natural Resources office for information.

4. INDIANA
Use of MAGNAPHOS® Tablets for mole control is not legal in the State of Indiana.

5. MISSOURI
A state permit is required for use of pesticides in Missouri to control small mammals, except rats and mice. Please contact the Missouri Department of Conservation for information.

6. KANSAS
A special permit for black-tailed prairie dog control by poisoning is required in Kansas. Contact the Kansas Fish and Game Commission to obtain this permit.

7. CALIFORNIA
Use of MAGNAPHOS® Tablets for chipmunk control is not legal in the State of California.

SECTION 24

DISPOSAL INSTRUCTIONS

24.1 GENERAL
Do not contaminate water, food or feed by storage or disposal.

Unreacted or partially reacted MAGNAPHOS® is acutely hazardous. Improper disposal of excess pesticide is a violation of Federal Law. If these wastes cannot be disposed of by use according to the Applicator's Manual instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. For specific instructions, see Spill and Leak Procedures in Section 25 of this Manual.

Some local and state waste disposal regulations may vary from these general recommendations. Disposal procedures should be reviewed with appropriate authorities to ensure compliance with local regulations. Contact your state Pesticide or Environmental Control Agency or Hazardous Waste Specialist at the nearest EPA Regional Office for guidance.

24.2 DISPOSAL OF METAL CONTAINERS

Triple rinse metal containers and stoppers with water. They may then be recycled or reconditioned, or punctured and disposed of in a sanitary landfill, or by other procedures approved by state and local authorities. Rinsate may be disposed of in a sanitary landfill by pouring it out onto the ground or by other approved procedures. It is also permissible to remove lids and expose empty flasks and cans to atmospheric conditions until residue in the flasks and cans is reacted. In this case puncture and dispose of in a sanitary landfill or other approved site, or by other procedures approved by state and local authorities.

24.3 DIRECTIONS FOR DISPOSAL OF RESIDUAL DUST FROM MAGNAPHOS® – TABLETS

If properly exposed, the residual dust remaining after a fumigation with MAGNAPHOS® will be a grayish-white powder. This will be a nonhazardous waste and contain only a small amount of unreacted magnesium phosphide. However, residual dust from incompletely exposed MAGNAPHOS®, (so called green dust) requires special care.

Confinement of partially spent residual dust (as in a closed container) or collection and storage of large quantities of dust may result in a fire hazard. Small amounts of phosphine may be given off from unreacted magnesium phosphide, and confinement of the gas may result in a flash.

In open areas, small amounts of residual dust, up to about 5 to 8 kg may be disposed of on site by burial or by spreading over the land surface away from inhabited buildings.

Spent residual dust from MAGNAPHOS® may also be collected and disposed of at a sanitary landfill, incinerator or other approved sites or by other procedures approved by Federal, State or Local authorities. "Green dust" must be further deactivated before disposal at a landfill.

From 2 to 3 kg (4 to 7 lbs.) of **spent dust** from 2 to 3 flasks of MAGNAPHOS® Tablets may be collected for disposal in a 1-gallon bucket. Larger amounts, up to about one-half case, may be collected in burlap, cotton or other types of porous cloth bags for transportation in an open vehicle to the disposal site. Do not collect dust from more than 7 flasks of tablets (about 11 kg or 25 lbs.) in a single bag. Do not pile cloth bags together. Do not use this method for partially spent or "green" dust. **Caution: Do not collect dust in large drums, dumpsters, plastic bags or other containers where confinement may occur.**

24.4 DIRECTIONS FOR DEACTIVATION OF PARTIALLY SPENT RESIDUAL DUST FROM MAGNAPHOS® - TABLETS

Partially spent dust must be deactivated further prior to ultimate disposal. This is especially true in cases of incomplete exposure that has resulted in so-called “green dust” or following a fumigation that has produced large quantities of partially spent material.

Caution: - Wear a NIOSH/MSHA approved full-face gas mask – phosphine canister combination (if exposed to levels between 0.3 ppm and 15 ppm) or a Self Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 15 ppm) during wet deactivation of partially spent material. Do not cover the container being used for wet deactivation. Do not dispose of MAGNAPHOS® dust in a toilet.

Residual dust from MAGNAPHOS® Tablets may be deactivated as follows using the "Wet Method."

1. Deactivating solution is prepared by adding the appropriate amount of low sudsing detergent or surface-active agent to water in a drum or other suitable container. A 2% solution (or 4 cups in 30 gallons) of detergent is suggested. The container should be filled with deactivating solution to within a few inches of the top.
2. Residual dust is poured slowly into the deactivating solution and stirred so as to thoroughly wet all of the particles. This should be done in the open air and not in the fumigated structure. Do not cover the container being used for wet deactivation. Dust from MAGNAPHOS® Tablets should

be mixed into no less than about 10 gallons of water-detergent solution for each case of material used. Wear appropriate respiratory protection during wet deactivation of partially spent dust.

3. Dispose of the deactivated dust-water suspension, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, the slurry may be poured out onto the ground. If the slurry has been held for 36 hours or more, it may be poured into a storm sewer.

Residual dust from MAGNAPHOS® Tablets may also be deactivated as follows using the "Dry Method."

1. Extension of the fumigation period is the simplest method for further deactivation of "green" or partially spent dust prior to ultimate disposal.
2. Small amounts of partially spent dust, from 2 to 3 kg (4 to 7 lbs.) may be further deactivated by storage in a 1-gallon bucket. Larger amounts of dust (about 11 kg or 25 lbs.) may be held for deactivation in porous cloth bags (burlap, cotton, etc.). Caution: Transport these bags in open vehicles. Do not pile up the bags. Do not store "green dust" in bags.

24.5 DIRECTIONS FOR DEACTIVATION OF PARTIALLY SPENT RESIDUAL DUST FROM MAGNAPHOS® - GAS BAGS

Unless it can be determined with certainty that the gas bags are spent, they must be deactivated using the Dry Deactivation or Wet Deactivation methods as described below prior to disposal.

Caution: - Wear a NIOSH/MSHA approved full-face gas mask – phosphine canister combination (if exposed to levels between 0.3 ppm and 15 ppm) or a Self Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 15 ppm) during wet deactivation of partially spent material. Do not cover the container being used for wet deactivation. Do not dispose of MAGNAPHOS® dust in a toilet.

Residual dust from MAGNAPHOS® Gas Bags may be deactivated using the "Wet Method."

1. Deactivating solution is prepared by adding the appropriate amount of low sudsing detergent or surface-active agent to water in a drum or other suitable container. A 2% solution (or 4 cups in 30 gallons) of detergent is suggested. The container should be filled with deactivating solution to within a few inches of the top.
2. Submerge intact gas bags for 36 hours. A metal grid works well to keep gas bags submerged. This should be done in the open air and not in the fumigated structure. Do not cover the container being used for wet deactivation. Use no less than 1 gallon of water/detergent solution for 60 gas bags. Wear appropriate respiratory protection during wet deactivation of partially spent gas bags.
3. Dispose of the deactivated dust-water suspension, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, the slurry may be poured out onto the ground. If the slurry has been held for 36 hours or more, it may be poured into a storm sewer.
4. Collect spent gas bags and dispose of them in a sanitary landfill, approved pesticide incinerator or other approved sites or by other procedures approved by federal, state and local authorities.

Residual dust from MAGNAPHOS® Gas Bags may be deactivated using the "Dry Method."
Extension of the fumigation period is the simplest method for further deactivation of "green" or partially spent dust in Gas Bags prior to ultimate disposal.

1. Collect gas bags and place them into a secure, ventilated holding container. Store the gas bags until they are spent. Caution: Transport these bags in open vehicles. Do not pile up the bags. Do not store "green dust" in bags. Ignition can occur if large numbers of incompletely reacted gas bags are contacted by liquid water. This can occur in open or perforated storage containers. Storage should be out of doors in a relatively isolated area, protected from rain.
2. Collect spent gas bags and dispose of them in a sanitary landfill, approved pesticide incinerator or other approved sites or by other procedures approved by federal, state and local authorities.

SECTION 25

SPILL AND LEAK PROCEDURES

25.1 GENERAL PRECAUTIONS AND DIRECTIONS

A spill, other than incidental to application or normal handling, may produce high levels of gas and, therefore, attending personnel must wear SCBA or its equivalent when the concentration of phosphine gas is unknown. Other NIOSH/MSHA approved respiratory protection may be worn if the concentration is known. Do not use water at any time to clean up a spill of MAGNAPHOS®. Water in contact with unreacted tablets will greatly accelerate the production of phosphine gas that could result in a toxic and/or fire hazard. Wear dry gloves of cotton or other material when handling magnesium phosphide.

Return all intact metal flasks and cans to fiberboard cases or other packaging which has been suitably constructed and marked according to DOT regulations. Notify consignee and shipper of damaged cases.

If metal flasks or cans have been punctured or damaged so as to leak, the container may be temporarily repaired with aluminum tape or the MAGNAPHOS® may be transferred from the damaged flask or can to a sound metal container which should be sealed and properly labeled as magnesium phosphide. Transport the damaged containers to an area suitable for pesticide storage for inspection. Further instructions and recommendations may be obtained, if required, from your distributor.

Never place tablets or dust in a closed container such as a dumpster, sealed drum, plastic bag, etc., as flammable concentrations and a flash of phosphine gas are likely to develop.

If a spill has occurred which is only a few minutes old, collect the tablets and place them back into the original flasks or cans, if they are intact, and stopper tightly. Place the collected tablets in a sound metal container if the original flasks or cans are damaged. **Caution:** these flasks or cans may flash upon opening at some later time.

If the age of the spill is unknown or if the Tablets or Gas Bags have been contaminated with soil, debris, water, etc., gather up the spillage and place it into small open buckets having a capacity no larger than about 1 gallon. Do not add more than about one flask of spilled material, 1 to 1.5 kg (2 to 3 lbs.), to the bucket. If on-site, wet deactivation is not feasible, these open containers should be transported in open vehicles to a suitable area. Wet deactivation may then be carried out as described in Sections 24.4 and 24.5 of this Manual. Alternatively, small amounts of spillage from 4 to 5 flasks (4 to 8 kg, 9 to 18 lbs.) may be spread out in an open area away from inhabited buildings to be deactivated by atmospheric moisture.

25.2 DIRECTIONS FOR DEACTIVATION BY WET METHOD

Caution: - Wear a NIOSH/MSHA approved full-face gas mask – phosphine canister combination (if exposed to levels between 0.3 ppm and 15 ppm) or a Self Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 15 ppm) during wet deactivation of partially spent material. Do not cover the container being used for wet deactivation. Do not dispose of MAGNAPHOS® dust in a toilet.

If the contaminated material is not to be held until completely reacted by exposure to atmospheric moisture, deactivate the Tablets by the "Wet Method" as follows:

1. Deactivating solution is prepared by adding low sudsing detergent or surface-active agent to water in a drum or other suitable container. A 2% solution or 4 cups in 30 gallons is suggested. The container should be filled with deactivating solution to within a few inches of the top.
2. The Tablets should be poured slowly into the deactivating solution and stirred so as to thoroughly wet all of the MAGNAPHOS. This should be done in the open air. Do not cover the container being used for wet deactivation. MAGNAPHOS Tablets should be mixed into no less than about 15 gallons of water-detergent solution for each case of material. Wear appropriate respiratory protection during wet deactivation.

3. Allow the mixture to stand, with occasional stirring, for about 36 hours. The resultant slurry will then be safe for disposal. Dispose of the slurry of deactivated material, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, this slurry may be poured into a storm sewer or out onto the ground.

The following procedure is used to deactivate Gas Bags using the "Wet Method.:

1. Deactivating solution is prepared by adding the appropriate amount of low sudsing detergent or surface-active agent to water in a drum or other suitable container. A 2% solution (or 4 cups in 30 gallons) of detergent is suggested. The container should be filled with deactivating solution to within a few inches of the top.
2. Submerge intact gas bags for 36 hours. A metal grid works well to keep gas bags submerged. This should be done in the open air and not in the fumigated structure. Do not cover the container being used for wet deactivation. Use no less than 1 gallon of water/detergent solution for 60 gas bags. Wear appropriate respiratory protection during wet deactivation of partially spent gas bags.
3. Dispose of the deactivated dust-water suspension, with or without preliminary decanting, at a sanitary landfill or other suitable site approved by local authorities. Where permissible, the slurry may be poured out onto the ground. If the slurry has been held for 36 hours or more, it may be poured into a storm sewer.
4. Collect spent gas bags and dispose of them in a sanitary landfill, approved pesticide incinerator or other approved sites or by other procedures approved by federal, state and local authorities.

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT
CALL CHEMTREC 1-800-424-9300

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READ BEFORE USING PRODUCT

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Label Revision Notes

Revision Date: 2/06/04. Typos were corrected based on errors found in the Weevil-cide applicator's manual.

Revision Date: 9/29/03 EPA approved 9/23/03. Revised 9/29/03 per EPA letter dated 9/23/03.

Revision Date: 5/20/03: Revised for new RUP statement and certified applicator section 14.2; Revised 9/17/02 to correct EPA Reg. Nos.; revised 12/03/02 to incorporate EPA suggested comments/changes to PPA TF