

43743-3

7/8/2010

10f39



U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Pesticide Programs
Registration Division (7505P)
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460

EPA Reg. Number:

43743-3

Date of Issuance:

JUL - 8 2010

Terms of Issuance:
Unconditional

Name of Pesticide Product:

Gastoxin^R Fumigation Sachets

NOTICE OF PESTICIDE:
 Registration
XX Reregistration
(under FIFRA, as amended)

Name and Address of Registrant (include ZIP Code):
Bernardo Chemicals, Inc.
P.O. Box 1632
Turlock, CA 95381

Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Registration Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA registration number.

On the basis of information furnished by the registrant, the above named pesticide is hereby reregistered under the Federal Insecticide, Fungicide and Rodenticide Act. Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on his motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

Based on your response to the Reregistration Eligibility Document, EPA has reregistered the product listed above. This action is taken under the authority of section 4(g)(2)(c) of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. Reregistration under this section does not eliminate the need for continual reassessment of pesticides. EPA may require submission of data at any time to maintain the registration of your product. Within 45 days from the date of this notice, two copies of a final printed label must be submitted with the following changes:

See page 2 for label changes.

Your Confidential Statement of Formula (CSF) dated February 1, 2001 is acceptable. This CSF supercedes all previous CSFs.

A copy of the stamped label is enclosed for your records.

Signature of Approving Official:

Meredith J. Laws

Venus Eagle, Product Manager 1
Registration Division, Insecticide-Rodenticide Branch

Date:

JUL - 8 2010

20139

1. On the container label, add a solid box around the storage and disposal section.
2. On page 1 of the Applicator's Manual, revise "APPLICATOR'S MANUAL AND COMPLETE LABEL" to read "APPLICATOR'S MANUAL".
3. On page 11 Of the Applicator's Manual, revise "GLOVES: Gloves are not required to handle intact sachets. However, wear gloves of cotton or other material if contact with active or spent material from the bags is likely." to read "GLOVES: Wear gloves of cotton or other material if contact with active or spent material from the bags is likely."
4. On page 11 Of the Applicator's Manual under Advisory Dosages for Various Types of Application. Add the sentence "However, do not exceed the maximum allowable dosages specified above." directly after the sentence "The following dosage ranges can be used as a guideline for various types of fumigation."
5. On page 18 of the Applicator's Manual, revise "In addition to the plan, the applicator must read the complete label and applicator manual and follow its directions carefully." to read "In addition to the plan, the applicator must read the complete label which includes the container label and applicator's manual and follow its directions carefully"
6. On page pg 18 of the Applicator's manual, revise "Before any fumigation begins, carefully read and review the label and the Applicator's Manual." to read "Before any fumigation begins, carefully read and review the label, which includes the container label and applicator's manual."
7. On page 21 of the Applicator's manual under Farm Bins, revise "read the label, Applicator's Manual, MSDS and related safety material." To read Provide and review with them the MSDS Applicator's Manual and other relevant safety information" to read "Provide and review with them the MSDS, complete label and other relevant safety information".
8. On pages 23, 24 and 27 of the Applicator's Manual revise "Develop an appropriate Fumigant Management Plan. (Refer to FMP guidelines)." To read "Develop an appropriate Fumigant Management Plan."
9. On page 25 of the Applicator's Manual; revise "See Section 16 of this Applicator's Manual for recommendations on placarding" to read "See Section 16 of this Applicator's Manual for placarding requirements."
10. On page 27 directly beneath the heading "In-transit Shiphold Fumigation", add the sentence "Develop an appropriate Fumigant Management Plan."

30639

Page 3
Notice of Reregistration (continued)
EPA Reg. No. 43743-3

11. On page 17 of the Applicators Manual, add the following:

20.2 Transportation Special Permit:

Bernardo Chemicals. – Special Permit: DOT-XXX (insert permit number)

Purpose and Limitation: "...The motor vehicles used under the terms of this special permit 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 special permit.)

NOTE: You must have a copy of this special permit with you during transportation. For a copy of this special permit contact:

Bernardo Chemicals Inc.

PO Box 1632

Turlock, CA 95381

Tel.: 1-800-743-4599

40239

(CENTER PANEL)

**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.

THE COMPLETE LABEL FOR THIS PRODUCT CONSISTS OF THE CONTAINER LABEL AND APPLICATOR'S MANUAL WHICH MUST ACCOMPANY THE PRODUCT. READ AND UNDERSTAND THE ENTIRE CONTAINER LABEL AND APPLICATOR'S MANUAL.

A FUMIGATION MANAGEMENT PLAN MUST BE WRITTEN FOR ALL FUMIGATIONS PRIOR TO ACTUAL TREATMENT.

CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL BERNARDO CHEMICALS INC. IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABEL.

**GASTOXIN®
FUMIGATION SACHETS**

ACTIVE INGREDIENT: ALUMINUM PHOSPHIDE	57%
INERT INGREDIENTS	43%
TOTAL	100%

(SKULL & CROSSBONES)

**KEEP OUT OF REACH OF CHILDREN
DANGER/PELIGRO - POISON**

(SKULL & CROSSBONES)

PRECAUCION AL USUARIO: Si usted no puede leer ingles, no use este producto hasta que el marbete le haya sido completamente explicado.

(TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you.)

FIRST AID

Symptoms of overexposure to this product are headache, 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, preferably by mouth-to-mouth, if possible.
- 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 sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

If on skin or clothing:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

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, label or applicator's manual with you when calling a poison control center, doctor, or when going for treatment. For information on this pesticide product (including health concerns, medical emergencies, or pesticide incidents), call the National Pesticide Information Center at 1-800-858-7378. You may also contact BERNARDO CHEMICALS INC. (209) 634-1191 / 1-800-743-4599 or CHEMTREC - 800-424-9300 for all other chemical emergencies.

See side panels for additional precautionary statements.

Manufactured for:

BERNARDO CHEMICALS INC.
P. O. Box 1632
Turlock, CA 95381
Telephone: (209) 634-1191/1-800-743-4599
Fax: (209) 634-1192
E-mail: bernardochemical@hotmail.com
EPA Est. No. 43743-BRA-01
EPA Reg. No. 43743-3

Contents: 6 Sachets - Net Weight: 204g

**ACCEPTED
With COMMENTS
In EPA Letter Dated:
JUL - 8 2010
Under the Federal Insecticide, Fungicide
and Rodenticide Act, As amended, for the
pesticide Registered under EPA Reg. No:
43743-3**

50f39

(LEFT PANEL)

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

DANGER: The dust from **GASTOXIN®** Sachets may be fatal if swallowed. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke while handling aluminum phosphide fumigants. When a sealed container is opened allowing material to come in contact with moisture, water or acids, toxic phosphine gas will be released. If a garlic odor is detected, refer to the section on Industrial Hygiene Monitoring in the Applicator's Manual for appropriate monitoring procedures. Pure phosphine gas is odorless; the odor is due to a contaminant. Since an odor may not be detected under certain circumstances, the absence of a garlic odor does not mean that phosphine gas is absent. Observe proper application, aeration, re-entry and disposal procedures specified elsewhere in the labeling to prevent overexposure.

Environmental Hazards: This product is very highly toxic to wildlife. Non-target organisms exposed to phosphine gas 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.

Physical and Chemical Hazards

Aluminum phosphide sachets and partially spent dust will release phosphine gas if exposed to moisture from the air or if it comes into contact with water, acids and many other liquids. Piling of **GASTOXIN®** Sachets or their dust may cause a temperature increase and confine the release of gas so that ignition could occur. It is recommended that you open aluminum phosphide products in open air or near a fan, which exhausts outside immediately. Never open in a flammable atmosphere because on rare occasions a flash may occur. When opening, point the container away from the face and body. These precautions will also reduce the applicators exposure to phosphine gas. 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, especially at high temperatures and humidity. Thus items such as small electric motors, smoke detectors, brass sprinkler heads, batteries and battery chargers, forklifts, temperature monitoring systems, electrical switchgear, communication devices, computers, calculators, watches, and other electronic equipment should be protected or removed before fumigation. Phosphine will also react with certain metallic salts and, therefore, such items as photographic film, copying paper and some inorganic pigments, etc. should not be exposed. See Section 4.3 of the Applicator's Manual for more detailed Physical and Chemical Hazards.

Note to Physician: Aluminum phosphide sachets react with moisture from the air, water, acids and many other liquids to release phosphine gas. Mild exposure by inhalation 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, 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 (excess of blood in a body part), small perivascular brain hemorrhage and brain edema (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 or lack of urination). Pathology is characteristic of hypoxia (oxygen deficiency in blood 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 physician in accordance with his 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 the patient must be kept quiet and warm.
2. Should 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 cases 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 cases 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). Upon progressive edema of the lungs, immediate intubations with a constant removal of edema fluid and oxygen over-pressure respiration, as well as measures required for shock treatment are recommended. In case of kidney failure, extracorporeal hemodialysis is necessary. There is no specific antidote known for this poisoning.
3. Mention should be made here of suicidal attempts by taking solid phosphide by mouth. After swallowing, emptying of the stomach by vomiting, flushing of the stomach with diluted potassium permanganate solution or a solution of magnesium peroxide until flushing liquid ceases to smell of carbide, is recommended. Thereafter, apply medicinal charcoal.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. THIS PRODUCT IS FOR USE AGAINST LISTED INSECTS WHICH INFEST STORED COMMODITIES, SPECIFIED PROCESSED FOODS, AND ANIMAL FEEDS.

General Information: **GASTOXIN®** is a fumigant which when applied according to label instructions is activated by atmospheric humidity. **GASTOXIN®** has been found effective against many stored products insects and their pre-adult stages - that is eggs, larvae, and pupae. Refer to the Applicator's Manual for directions for use (e.g. pests controlled, specific commodities), precautions and restrictions.

(RIGHT PANEL)

STORAGE AND DISPOSAL**Storage Instructions:**

- Do not contaminate water, food or feed by storing pesticides in the same areas used to store these commodities.
- Store **GASTOXIN®** in a dry, well ventilated area away from heat, under lock and key. Post as a pesticide storage area.
- Do not store in buildings where humans or domestic animals reside. Keep out of reach of children.
- **GASTOXIN®** Sachets are supplied in gas-tight, metal containers. Do not expose the product to atmospheric moisture any longer than is necessary and use all contents of tin after opening.
- The shelf life of **GASTOXIN®** is virtually unlimited as long as the containers are tightly sealed.

Pesticide Disposal:

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

Unreacted or partially spent **GASTOXIN®** 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 label 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 Disposal Instructions and Spill and Leak Procedures in the Applicator's Manual.

Some local and state waste disposal regulations may vary from the following. 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.

Container Disposal:

The containers are non-refillable. Do not reuse or refill this container. Offer for recycling, if available.

Triple rinse containers with water if they have been contacted with spent or partially reacted dust from **GASTOXIN® SACHETS**. Then offer for recycling or reconditioning, or puncture and dispose 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 containers to atmospheric conditions until residue in the tin 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. If properly exposed, the residual dust remaining after a fumigation with **GASTOXIN®** will be a grayish-white powder. This will be a non-hazardous waste and contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed **GASTOXIN®** (so called "green dust") requires special care.

Spill and Leak Procedures:

General Precautions and Directions:

A spill, other than incidental to application or normal handling, may produce high levels of phosphine gas and, therefore, attending personnel must wear self-contained breathing apparatus (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 **GASTOXIN®**. Water in contact with unreacted **GASTOXIN®** will greatly accelerate the production of phosphine gas which could result in a toxic and/or fire hazard. Wear dry gloves of cotton or other material when handling aluminum phosphide. Return all containers to cardboard case or other suitable packaging which has been properly marked according to DOT regulations. Notify consignee and shipper of damaged cases.

If the containers have been punctured or damaged so as to leak, the product may be immediately used, the container may be temporarily repaired with aluminum tape, the intact tin of sachets may be transferred from the damaged case to a sound metal container which should be sealed and properly labeled as aluminum phosphide. Any sachets from damaged tins may be deactivated and disposed. Refer to the Applicator's Manual - Section 25 - for more detailed Spill and Leak procedures. Further information and recommendations may be obtained, if required, from BERNARDO CHEMICALS INC.

WARRANTY: Seller warrants that this product conforms to its commercial description and when used according to label directions under normal conditions of use, it is reasonably fit for the purposes stated on the label. To the extent consistent with applicable law, the seller makes no other warranty, either express or implied, and Buyer assumes all risks should the product be used contrary to label.

70239

RESTRICTED USE PESTICIDE

DUE TO HIGH ACUTE INHALATION TOXICITY OF PHOSPHINE 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.

THE COMPLETE LABEL FOR THIS PRODUCT CONSISTS OF THE CONTAINER LABEL AND THE APPLICATOR'S MANUAL WHICH MUST ACCOMPANY THE PRODUCT. READ AND UNDERSTAND THE ENTIRE CONTAINER LABEL AND APPLICATOR'S MANUAL.

A FUMIGATION MANAGEMENT PLAN MUST BE WRITTEN FOR ALL FUMIGATIONS PRIOR TO ACTUAL TREATMENT.

CONSULT WITH YOUR STATE LEAD PESTICIDE REGULATORY AGENCY TO DETERMINE REGULATORY STATUS, REQUIREMENTS, AND RESTRICTIONS FOR FUMIGATION USE IN THAT STATE. CALL BERNARDO CHEMICALS INC. IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND ANY PART OF THIS LABELING.

**APPLICATOR'S MANUAL & COMPLETE LABEL
FOR
GASTOXIN® FUMIGATION SACHETS**

FOR USE AGAINST INSECTS WHICH INFEST STORED COMMODITIES

Active Ingredient:	Aluminum Phosphide	(57%)
Inert Ingredients:	(43%)
Total		100%

(Skull & Crossbones) **KEEP OUT OF REACH OF CHILDREN** (Skull & Crossbones)
DANGER - POISON - PELIGRO

PRECAUCION AL USUARIO: Si usted no puede leer ingles, no use este producto hasta que el marbete le haya sido completamente explicado.
(TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you.)

**ACCEPTED
With COMMENTS
In EPA Letter Dated:
JUL - 8 2010**

Manufactured for:
BERNARDO CHEMICALS INC.
P. O. Box 1632
Turlock, CA 95381
Telephone: (209) 634-1191/1-800-743-4599
Fax: (209) 634-1192
E-mail: bernardochemical@hotmail.com
EPA Est. No. 43743-BRA-01
EPA Reg. No. 43743-3

**Under the Federal Insecticide, Fungicide
and Rodenticide Act, As amended, for the
pesticide Registered under EPA Reg. No:
43743-3**

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE NUMBER
	Front Cover	RESTRICTED USE STATEMENT
	Inside Back Cover	WARRANTY
1	FIRST AID	
1	Hot Line Number	
2	NOTE TO PHYSICIAN	
3	PRODUCT INFORMATION	
4	PRECAUTIONARY STATEMENTS	
4.1	Hazards to Humans and Domestic Animals	
4.2	Environmental Hazards	
4.3	Physical and Chemical Hazards	
	DIRECTIONS FOR USE	
5	PESTS CONTROLLED	
6	COMMODITIES WHICH MAY BE FUMIGATED	
6.1	Raw Agricultural Commodities, Animal Feed	
6.2	Processed Foods	
6.3	Non-Food Commodities	
7	EXPOSURE CONDITIONS FOR ALL FUMIGATIONS	
8	DOSAGE RATES FOR COMMODITIES	
8.1	Maximum Allowable Dosages for Fumigations	
8.2	Advisory Dosages for Various Types of Fumigations	
9	PROTECTIVE CLOTHING	
10	RESPIRATORY PROTECTION	
10.1	When Respiratory Protection Must Be Worn	
10.2	Permissible Gas Concentration Ranges	
10.3	Requirements for Availability of Respiratory Protection	
11	REQUIREMENTS FOR CERTIFIED APPLICATOR	
12	TRAINING REQUIREMENTS FOR RECEIPT OF IN-TRANSIT VEHICLES	
13	GAS DETECTION EQUIPMENT	
14	NOTIFICATION REQUIREMENTS	
14.1	Authorities and On-Site Workers	
14.2	Incident Reporting	
14.3	Theft of Products	
15	APPLICATOR AND WORKER EXPOSURE	
15.1	Exposure Limits	
15.2	Application of Fumigant	
15.3	Leakage from Fumigated Sites	
15.4	Aeration and Re-entry	
15.5	Handling Un-aerated Commodities	
15.6	Industrial Hygiene Monitoring	
15.7	Engineering Controls and Work Practices	
16	PLACARDING OF FUMIGATED AREAS	
17	SEALING OF STRUCTURE	
18	AERATION OF FUMIGATED COMMODITIES	
18.1	Foods and Feeds	
18.2	Non-Food Commodities	
18.3	Tobacco	
19	STORAGE INSTRUCTIONS	
19.1	Labeling of Storages	
20	TRANSPORTATION INSTRUCTIONS	
20.1	Transport Designations	
21	REQUIRED WRITTEN FUMIGATION MANAGEMENT PLAN	
	GUIDANCE FOR PREPARATION OF A FUMIGATION MANAGEMENT PLAN	
	Purpose	
	A checklist guide for a Fumigation Management Plan	
	A. Preliminary Planning & Preparation	
	B. Personnel	
	C. Monitoring	

	D.	Notification
	E.	Sealing Procedures
	F.	Application Procedures & Fumigation Period
	G.	Post-Application Operations
22		APPLICATION PROCEDURES
22.1		Farms Bins
22.2		Flat Storages
22.3		Vertical Storages
22.4		Mills, food processing plants & warehouses
22.5		Railcars, containers, trucks, vans, and other vehicles
22.6		Tarpaulin and bunker fumigations
22.7		In-Transit Shiphold Fumigations
22.7.1		General Information
22.7.2		Pre-Voyage Fumigation Procedures
22.7.3		Application Procedures for Bulk Dry Cargo Vessels
22.7.4		In-Transit Fumigation of Transport Units Aboard Ship
22.7.5		Precautions and Procedures During Voyage
22.7.6		Precautions and Procedures During Discharge
23		BARGES
24		DISPOSAL INSTRUCTIONS
24.1		General
24.2		Container Disposal
24.3		Directions for Disposal of Residual Dust
24.4		Disposal of Unreacted or Partially Reacted Gastoxin Sachets
25		SPILL AND LEAK PROCEDURES
25.1		General Precautions and Directions
26		DEACTIVATION PROCEDURES
26.1		Dry Deactivation
26.2		Wet Deactivation - Method One
26.3		Wet Deactivation - Method Two
27		DISPOSAL PROCEDURES

FOR ASSISTANCE CONTACT NUMBERS

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, preferably by mouth-to-mouth if possible.
- Contact a poison control center or doctor for treatment advice.

If swallowed:

- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

If on skin or clothing:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

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 treatment advice

HOT LINE NUMBER

Have the product container, label, or applicator's manual with you when calling a poison control center or doctor, or when going for treatment. For information on this pesticide product (including health concerns, medical emergencies, or pesticide incidents), call the National Pesticide Information Center at 1-800-858-7378. You may also contact Bernardo Chemicals Inc, (209) 634-1191 / 1-800-743-4599 - or CHEMTREC - 1-800-424-9300 for all other chemical emergencies.

2. NOTE TO PHYSICIAN

Aluminum phosphide fumigants react with moisture from the air, water, acids and many other liquids to release phosphine gas. Mild exposure by inhalation 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 with 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 (excess of blood in a body part), small perivascular brain hemorrhages and brain edema (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 characteristic of hypoxia (oxygen deficiency in body tissue). Frequent exposure to concentrations above permissible levels 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 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):

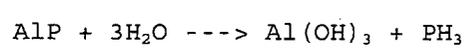
1. Where pulmonary edema is observed, steroid therapy should be considered and close medical supervision is recommended. Blood transfusions may be necessary.
2. In case of manifest pulmonary edema, venesection should be performed under vein pressure control. Heart glycosides (I.V.) (in case of hemocentration, venesection may result in shock). Upon progressive edema of lungs, immediate intubation with a constant removal of edema fluid and oxygen over-pressure respiration, as well as measures required for shock treatment are recommended. 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 aluminum phosphide 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 until flushing liquid ceases to smell of carbide, is recommended. Thereafter, apply medicinal charcoal.

3. PRODUCT INFORMATION

GASTOXIN® SACHETS are used to protect stored commodities from damage by insects and other vertebrate pests. Fumigation of stored products with **GASTOXIN®** in the manner prescribed in the labeling does not contaminate the marketed commodity.

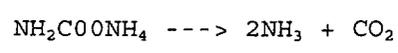
GASTOXIN® SACHETS and other metal phosphide fumigants are acted upon by atmospheric moisture to produce phosphine gas.

GASTOXIN® SACHETS contain aluminum phosphide (AlP) as their active ingredient and will liberate phosphine via the following chemical reaction:



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 (18,000 ppm). These hazards will be described in greater detail later on in this Applicator's Manual.

GASTOXIN® also contains ammonium carbamate, which liberates ammonia and carbon dioxide as follows:



These gases are essentially non-flammable and act as inerting agents to reduce fire hazards.

GASTOXIN® SACHETS are packaged in tins of 6, 10, or 100 sachets. The 100's is a sachet chain. Each sachet is approximately 3 inches by 3 inches and contains 34 grams of 57% aluminum phosphide. Sachets release 11 grams of phosphine gas when exposed to atmospheric conditions. The sachet chain, a strong paper-like strip with 100 sachets affixed to it is specifically designed for large scale fumigations. The sachet chain is packed in a hermetically sealed tin. A case contains 4 tins of sachet chains.

Upon exposure to air, **GASTOXIN® SACHETS** 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 aluminum phosphide is spent. **GASTOXIN® SACHETS** react somewhat faster than do the pellets and tablets. The rates of decomposition will vary depending upon moisture and temperature conditions. For example, when moisture and temperature of the fumigated commodity are high, decomposition of **GASTOXIN®** may be complete in less than 3 days. However, at lower ambient temperatures and humidity levels, decomposition of **GASTOXIN®** may require 5 days or more. The spent sachet must be retrieved for disposal after fumigations. If properly exposed, the spent **GASTOXIN® SACHET** will normally contain only a small amount of unreacted aluminum phosphide and may be disposed of without hazard. While spent **GASTOXIN®** is not considered a hazardous waste, partially spent residual dusts from incompletely exposed **GASTOXIN®** will require special care. Precautions and instructions for further deactivation and disposal will be given under Section 25 of this Manual.

GASTOXIN® SACHETS are supplied in tins, are non-resealable and must be completely used when opened. Once the hermetically sealed tin is opened, the sachets will begin to release phosphine gas.

4. PRECAUTIONARY STATEMENTS

4.1 Hazards to Humans and Domestic Animals

DANGER: Aluminum phosphide dust from **GASTOXIN® SACHETS** may be fatal if swallowed. Do not get in eyes, on skin or on clothing. Do not eat, drink or smoke while handling aluminum 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 instructions found in Section 15.6 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 gas may not be detected under some circumstances, the absence of a garlic odor does not mean that dangerous levels of phosphine gas are not present. Observe proper re-entry procedures specified under Section 15.4 in this labeling to prevent overexposure.

4.2 Environmental Hazards

This product is very highly toxic to wildlife. Non-target organisms exposed to phosphine gas 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.

4.3 Physical and Chemical Hazards

Aluminum phosphide sachets 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 (18,000 ppm), it is

130239

important not to exceed this concentration. Ignition of high concentrations of phosphine gas can produce a very energetic reaction. Explosion 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. Aluminum phosphide fumigants should not be stacked or piled up or contacted with liquid water. This may cause a temperature increase, accelerate the rate of gas production and confine the gas so that ignition could occur. It is preferable to open containers of aluminum phosphide products in open air as 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, point the container away from the face and body and slowly remove the lid. 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. If containers are opened inside the structure to be fumigated, air monitoring must be conducted to ensure worker's exposure to phosphine gas does not exceed the allowable limit of 8-hour Time Weighted Average (TWA) of 0.3 ppm or the 15-minute Short Term Exposure Limit (STEL) of 1.0 ppm phosphine.

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 gas 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 GASTOXIN® SACHETS to the structure, turn off any lights and unessential electrical equipment.

GASTOXIN® SACHETS are Restricted Use Pesticides due to the high acute inhalation toxicity of phosphine gas.

Read and follow the complete label which contains instructions for the safe use of the pesticide. Additional copies are available from:

BERNARDO CHEMICALS INC.
 P.O. Box 1632
 Turlock, CA 95381
 Tel.: 209-634-1191 / 1-800-743-4599
 Fax: 209-634-1192

DIRECTIONS FOR USE

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

5. PESTS CONTROLLED

GASTOXIN® has been found effective against vertebrate and the following insects and their preadult stages - that is, eggs, larvae and pupae:

- | | | |
|----------------------|---------------------|--------------------------|
| almond moth | European grain moth | Mediterranean flour moth |
| Angoumois grain moth | flat grain beetle | pink bollworm |
| bean weevil | fruit flies | raisin moth |

bees	granary weevil	red flour beetle
cadelle	greater wax moth	rice weevil
cereal leaf beetle	hairy fungus beetle	rusty grain beetle
cigarette beetle	Hessian fly	saw-toothed grain beetle
confused flour beetle	Indian meal moth	spider beetles
dermestid beetles	Khapra beetle	tobacco moth
dried fruit beetle	lesser grain borer	yellow mealworm
dried fruit moth	maize weevil	
pea weevil		

Although it is possible to achieve total control of the listed burrowing insect pests, this is frequently not realized in actual practice. Factors contributing to less than 100% control are 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.

6. COMMODITIES, WHICH MAY BE FUMIGATED WITH GASTOXIN®

GASTOXIN® 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°F (5° C).

6.1 Raw Agricultural Commodities, Animal Feed and Feed Ingredients

GASTOXIN® SACHETS may be added directly to animal feed, feed ingredients and raw agricultural commodities stored in bulk. For these commodities not stored in bulk, **GASTOXIN®** 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 GASTOXIN®

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

6.3 PROCESSED FOODS

Processed foods may be fumigated with **GASTOXIN® SACHETS**. Under no condition shall any processed food or bagged commodity come in contact with **GASTOXIN® SACHETS** or their residual dust except that **GASTOXIN®** may be added directly to processed brewer's rice, malt, and corn grits for use in the manufacture of beer. We recommend tablets or pellets be used for direct addition to the commodity.

Processed Foods Which May Be Fumigated With GASTOXIN®

- 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)
- processed oats (including oatmeal)
- 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)
- 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)
- rice (brewer's rice grits, enriched and polished)
- wild rice
- other processed foods

6.3 Non-Food Commodities, Including Tobacco

The listed non-food commodities may be fumigated with **GASTOXIN® SACHETS**. The sachets or the dust from the sachets should not contact tobacco and certain other of the non-food commodities.

Non-Food Commodities Which May Be Fumigated With GASTOXIN®

- 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
- tobacco
- tires (for mosquito control)
- 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 non-food commodities

7. EXPOSURE CONDITIONS FOR ALL FUMIGATIONS

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

<u>Temperature</u>	<u>Minimum Exposure Periods for GASTOXIN® SACHETS</u>
40°F (5°C)	Do not fumigate
41°-53°F (5-12°C)	14 days (336 hours)
54°-59°F (12-15°C)	9 days (216 hours)
60°-68°F (16-20°C)	5 days (120 hours)

1160f39

above 68°F (20°C)

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 GASTOXIN® with moisture so that little or no unreacted aluminum 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 aluminum 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 hydrogen phosphide gas production by GASTOXIN® 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 gas. 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 GASTOXIN® is recommended if phosphine concentrations drop below an effective level. If re-entry 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 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 commodity 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 GASTOXIN®.

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. 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 ductwork. This method facilitates the quick and uniform penetration of phosphine throughout the commodity. In some instances a reduced dosage may be used. Please contact BERNARDO CHEMICALS INC. if assistance is required in designing the recirculation system.

8. DOSAGE RATES FOR COMMODITIES

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 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.

Somewhat higher dosages, not to exceed the maximum, 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

170239

good illustration of this point is comparison of the low dosages required to treat modern, well-sealed warehouses with the higher range used for poorly constructed buildings that cannot be sealed adequately. In certain other fumigations, proper distribution of lethal concentrations of phosphine 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 BERNARDO CHEMICALS INC. if assistance is required in designing the recirculation system.

8.1 Maximum Allowable Dosage for Fumigation with GASTOXIN® SACHETS

13 Gastoxin® Sachets per 1000 cu.ft.

Note: The maximum dosage allowed for dates and nuts is 4 sachets per 1000 cu.ft.

8.2 Advisory Dosages for Various Types of Fumigations

The following dosage ranges can be used as a guideline for various types of fumigation.

<u>Type of Storage</u>	<u>Dosage Range</u> <u>Per 1000 Cu. Ft.</u>
1. Space (including packaged commodities)	
a. Mills, Warehouses, etc.	2-6 Sachets
b. Bagged Commodities	3-6 Sachets
c. Dried Fruits, Nuts & Dates	2-4 Sachets
d. Stored Tobacco	2-4 Sachets
2. Bulk Stored Commodities	
a. Vertical Storage	3-6 Sachets
b. Tanks	4-6 Sachets
c. Flat Storage (loose construction)	5-13 Sachets
d. Farm Bins	6-13 Sachets
e. Railcars	3-6 Sachets
f. Bunkers, Tarped Ground Storage	3-6 Sachets
g. Barges	3-7 Sachets
h. Shipholds	3-6 Sachets

Higher dosages should be considered 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 hydrogen phosphide gas.

Do not exceed the maximum allowable rates specified above in Section 8.1.

9. PROTECTIVE CLOTHING

GLOVES:

Gloves are not required to handle intact sachets. However, wear dry gloves of cotton or other material if contact with active or spent material from the bags is likely.

Gloves should remain dry during use.

Wash hands thoroughly after handling aluminum phosphide products.

180239

Aerate used gloves and other clothing that may be contaminated in a well-ventilated area prior to laundering.

10. RESPIRATORY PROTECTION

10.1 When respiratory protection must be worn

Respiratory protection is required when concentration levels of phosphine are unknown.

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 condition instructions for escape. Above 15 ppm or in situations where the phosphine concentration is unknown, a NIOSH/MSHA approved, 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 GASTOXIN® 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. Respiratory protection must also be available for applications from outside the area to be fumigated such as addition of tablets or pellets to automatic dispensing devices, outdoor applications, etc.

11. REQUIREMENTS FOR CERTIFIED APPLICATOR TO BE PRESENT AND RESPONSIBLE FOR ALL WORKERS AS FOLLOWS:

- A. 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 and also during the opening of the product containers. 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.
- B. 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.
- C. 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 12 for training requirements.

12. TRAINING REQUIREMENTS FOR RECEIPT OF IN-TRANSIT VEHICLES UNDER FUMIGATION.

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 instructions.

13. 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.

14. NOTIFICATION REQUIREMENTS

14.1 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 a complete label for the product and any other technical information deemed useful. Offer to review this information with the local official(s).

14.2 Incidents involving these products:

Registrants must be informed of any incident involving the use of this product. Please call BERNARDO CHEMICALS INC. (209) 634-1191 / 1-800-743-4599 so the incident can be reported to Federal and State Authorities.

14.3 Theft of products:

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

15. APPLICATOR AND WORKER EXPOSURE

15.1 Exposure Limits

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

15.2 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 when entry into the structure for application of the fumigant is required. Depending upon temperature and humidity, **GASTOXIN® sachets** 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 will exceed the allowable limits, approved respiratory protection must be worn.

15.3 Leakage from Fumigated Sites

Phosphine gas 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 must be examined to ensure that significant leakage has not occurred. Sealing of the fumigated site and/or airflow into the occupied areas must be sufficient to bring down the phosphine concentration to a safe level of 0.3 ppm or below.

15.4 Aeration and Re-entry

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 re-entry into treated areas by any person before the level of phosphine reaches 0.3 ppm or below unless protected by an approved respirator.

15.5 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.

15.6 Industrial Hygiene Monitoring

Phosphine exposures must be documented in an operations log or manual at each fumigation area 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.

15.7 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.

16. PLACARDING OF FUMIGATED AREAS

All entrances to the fumigated area 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 "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 structure and/or commodity is completely aerated (contains 0.3 ppm or less of phosphine gas)".

If incompletely aerated commodity is transferred to a new storage structure, the new structure must also be placarded if it contains more than 0.3 ppm. Workers exposure during this transfer must not exceed allowable limits.

4. The date the fumigation begins.
5. Name and EPA registration number of fumigant used.
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 area must be placarded. Where possible, place placards 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 or area is aerated down to 0.3 ppm hydrogen phosphide or less. To determine whether aeration is complete, each fumigated structure or transport 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.

17. 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 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 protective equipment must attempt to seal the leak from the exterior of the structure. Failing this, the fumigators, following proper procedures to prevent accidental poisoning, may 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.

18. 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.

18.1 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 48 hours prior to offering them to the end consumer.

18.2 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.

18.3 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 may be required to aerate the commodity down to 0.3 ppm.

19. STORAGE INSTRUCTIONS

- Do not contaminate water, food or feed by storing pesticides in the same areas used to store these commodities.
- Store **GASTOXIN®** in a dry, well-ventilated area away from heat, under lock and key. Post as a pesticide storage area.
- Do not store in buildings where humans or domestic animals may reside. Keep out of reach of children.
- **GASTOXIN®** Sachets are supplied in tins in a case. The case is resealable; however, the tins are not and once opened the entire contents must be used.
- The shelf life of **GASTOXIN®** is virtually unlimited as long as the containers are tightly sealed.

19.1 Labeling of Storages

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: company 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 and must be locked:

1. Danger, Poison (with skull and cross bones)
2. Authorized Personnel Only

3. National Fire Protection Association (NFPA) Hazard Identification Symbols for the pesticide

The NFPA has developed 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 aluminum phosphide:

<u>Category</u>	<u>Degree of Hazard</u>
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.

20. TRANSPORTATION INSTRUCTIONS

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

20.1 TRANSPORT DESIGNATIONS - The following transport designations apply to aluminum phosphide

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

21. REQUIRED WRITTEN FUMIGATION MANAGEMENT PLAN

The certified applicator is responsible for working with the owners and/or responsible employees of the structure and/or area to be fumigated to develop and follow a Fumigation Management Plan (FMP). State, county and local authorities may also have specific requirements. The FMP must be written PRIOR TO EVERY treatment. The FMP must address characterization of the structure and/or area, and include appropriate monitoring and notification requirements, consistent with, but not limited to, the following:

1. Inspect the structure and/or area 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.
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 area 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 a FMP together. It is important to note that some plans will be more comprehensive than others. All plans should reflect the experience and expertise of the applicator and circumstances at and around the structure and/or area.

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

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

STEPS FOR PREPARATION OF THE REQUIRED WRITTEN FUMIGATION MANAGEMENT PLAN

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 structure and/or area.

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, which allow for flexibility, a 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 BERNARDO CHEMICALS INC. for assistance. Finally, before any fumigation begins you must be familiar with and comply with all applicable federal, state and local regulations. The success of the fumigation is not only dependent on your ability to do your job but also upon carefully following all rules, regulations, and procedures required by governmental agencies.

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

250239

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. However, it is understood that each fumigation is different and not all items will be necessary for each fumigation site.

A. PRELIMINARY PLANNING AND PREPARATION

1. Determine the purpose of the fumigation.
 - a. Elimination of insect infestation
 - b. Plant pest quarantine.
2. Determine the type of fumigation, for example
 - a. Space; tarp, mill, warehouse, food plant, or outdoor area
 - b. Transport Vehicle; railcar, truck, van, container
 - c. Commodity; raw agricultural or processed foods or non-food
 - d. Type of Storage: vertical silo, farm storage, flat storage, etc.
 - e. Vessels; ship or barge. In addition to the Applicator's Manual, read the US Coast Guard Regulations 46CFR 147A.
3. Fully acquaint yourself with the structure 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 a drawing or sketch of structure to be fumigated, delineating features, hazards, and other structural characteristics.
 - 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. 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 the entire label which includes both the container label and Applicator's Manual.
 - l. Exposure time considerations.
 1. Product (tablets, pellets and sachets) to be used.
 2. Minimum fumigation period, as defined and described by the label use directions.
 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. Maximum allowable label dosage rates
 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 and/or area 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. Fumigation personnel must be trained in the proper method of application, the hazards that may be encountered, and 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 phosphine concentrations 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 change significantly.
- 2. Efficacy
 - a. For stationary structures, phosphine readings MUST be taken from within the fumigated structure to insure proper gas concentrations. If the phosphine concentrations have fallen below the targeted level the fumigators, following proper entry procedures may re-enter the structure and add additional product.
 - b. All phosphine concentration readings must be documented.

D. NOTIFICATION

- 1. Confirm the appropriate local authorities (fire departments, police departments, etc.) have been notified as per label instructions, local ordinances if applicable, 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 and/or domestic animals.
- 3. Confirm that the receiver of in-transit vehicles under fumigation have been notified and are trained according to Section 12 of this applicator manual.

E. SEALING PROCEDURES

- 1. Sealing must be adequate to control the pests. Care should be taken to insure that sealing materials would remain intact until the fumigation is complete.
- 2. If the structure 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 structure.

F. APPLICATION PROCEDURES & FUMIGATION PERIOD

- 1. Plan carefully and apply all fumigants in accordance with the 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 the possibility of entry into the fumigated 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 vehicles fumigated in-transit has been notified.
- 7. Turn off any electric lights in the fumigated area of the structure as well as all non-essential electrical motors.

G. POST-APPLICATION OPERATIONS

- 1. Provide watchmen when the fumigation structure cannot be secured from entry by unauthorized persons during the aeration process.
- 2. Aerate in accordance with structural limitations.
- 3. Turn on ventilating or aerating fans where appropriate.
- 4. Use a suitable gas detector before re-entry 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 that 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 re-enter the aerated structure.

22. APPLICATION PROCEDURES

A FMP must be written PRIOR to all applications.
 A 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 exposure to phosphine and to help assure adequate control of the insect pests.

22.1 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.

280439

2. Inspect the bin to determine if you can fumigate effectively.
3. Develop an appropriate Fumigation Management Plan.
4. 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.
5. If the bin is in an isolated area on private property (i) and (ii) above are not required.
6. Seal the bin as tightly as possible. It is recommended that the surface of the grain be covered with poly after GASTOXIN® has been applied. Tarping the grain surface will greatly reduce the leak rate of the gas as well as reduce the amount of GASTOXIN® 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.
7. GASTOXIN® sachets may be scattered over the surface or probed into the grain.
8. Use about 8-16 sachets per 1000 bu. Or 6-13 sachets per 1000 cu.ft. Probe the dosage uniformly over the surface.
9. Immediately cover the surface of the grain with a plastic tarpaulin.
10. 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 GASTOXIN®. Addition of GASTOXIN® to water in an aeration duct may result in a fire.
11. Seal the aeration fan with 4-mil plastic sheeting.
12. Place fumigation warning signs on entrances to the bin and near the ladder.
13. 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, an approved canister respirator must be worn during application from within an enclosed area.

22.2 Flat storages

Treatments of these types of storages often require 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 the sections on Applicator and Worker Exposure and 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 manual, determine the length of the fumigation and calculate the dosage of sachets to be applied based upon volume of the building, contents, air and/or commodity temperature and the general tightness of the structure.
6. Apply sachets by surface application, shallow probing, or deep probing. It is advisable to place about 25 percent of the dosage in the floor level aeration ducts. Check the ducts prior to addition of **GASTOXIN®** 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.
9. Bins need not be aerated unless re-entry into the storage is required.
10. Remove and dispose of sachets prior to emptying bin or during emptying if the sachets cannot be retrieved otherwise.
11. **SACHETS:** The "Sachet Chain" is particularly well suited for the larger bulk storages due to the ability of being able to roll it out onto the grain surface. As earlier noted each "Sachet Chain" contains 100 sachets. The "sachet chain" may tend to slide off the surface of the grain when the grain is packed. This tendency can be effectively prevented by placing the "Sachet Chains" into shallow trenches and covering them with the commodity. Locator cords attached to the "Sachet Chains" will aid in their retrieval when the fumigation is complete. An eyelit is provided, for this purpose, at each end of the "Sachet Chain". The efficient application and retrieval techniques, that may be employed with the "Sachet Chain" minimizes applicator phosphine exposures. For this, and other reasons, the "Sachet Chain" is ideal for the fumigation of the larger bulk commodity storage. If necessary, the "Sachet Chain" may be subdivided, but do not attempt to retain any segments for use at a later date.

22.3 Vertical storages (concrete upright bins and other silos in which grain can be rapidly transferred)

GASTOXIN® SACHETS may be added to the commodity as the bin is filled, but must be removed as the bin is emptied. **GASTOXIN® SACHETS** are most suited to this application since they can be automatically added to the commodity and are not removed after fumigation. Refer to this applicator's manual for instructions.

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, and any openings which connect to adjacent bins.
5. Determine the length of the fumigation and calculate the dosage of sachets to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure (See Section 8.2).
6. Sachets may be applied continuously by hand on the headhouse/gallery belt or into the fill opening as the commodity is loaded into the bin. All Sachets must be removed when the bin is emptied. Monitoring must be conducted during application to determine the need for respiratory protection.
7. Keep an accurate count of sachets added since the sachets must be removed when the bin is emptied. Sachets can be removed by transfer of the commodity through a screen or scale operator.
8. Seal the bin deck openings after the application has been completed.
9. 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 GASTOXIN® has not been applied uniformly throughout the commodity mass.
10. Place warning placards on the discharge gate and on all entrances.

22.4 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 FMP guidelines.)
4. Determine the length of the fumigation and calculate the dosage of sachets to be applied based upon volume of the building, air and/or commodity temperature and the general tightness of the structure (See Section 8).
5. Read the directions found in 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 that would effect the fumigation. Carefully seal and placard the space to be fumigated.
7. Place sachets on floor in a systematic manner, beginning at the point furthest from the exit door. Do not toss sachets into inaccessible areas. Do not pile sachets. Spread sachets so they are not touching.

- 8. **GASTOXIN**[®] sachets are not to be placed in or attached to commodity packages containing processed food. If sachets cannot be placed on the floor, attach to walls or other support. Sachets may be taped to a cardboard disc and disc attached to commodity packaging.
- 9. The "Sachet Chains" can be easily rolled out onto the floor and retrieved following the fumigation. The Sachet Chain is particularly well suited for large fumigations. If necessary, the Sachet Chain may be subdivided, but do not retain segments for fumigations at any later date, use immediately. After application, check to see that the chains have been spread evenly and are completely unrolled. Also insure that piling of the chains has not occurred. When fumigating multiple story buildings, each floor is considered a separate enclosure. Application should begin with the top floor and end with the ground floor.
- 10. 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.
- 11. Upon completion of the exposure period, open windows, doors, vents, etc. Allow the fumigated structure to aerate. Do not enter the structure without proper Personal Protective Equipment (PPE) until 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 re-enter the treated structure.
- 12. Collect the spent **GASTOXIN**[®] sachets and dispose of it, with or without further deactivation. Refer to Disposal Instructions in this manual.
- 13. Remove fumigation warning placards from the aerated structure.

22.5 Railcars, Containers, Trucks, Vans and Other Transport Vehicles

Develop an appropriate Fumigation Management Plan.

Railcars and containers, trucks, vans, and other transport vehicles shipped piggyback by rail may be fumigated intransit. 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 **GASTOXIN**[®] sachets may be added directly, are treated in essentially the same way as any other flat storage facility. **GASTOXIN**[®] may be added as the vehicle is being filled. The dose may be scattered over the surface after loading has been completed or the sachets 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 16 of this Applicator's Manual for recommendations on placarding.

***GASTOXIN**[®] Sachets are recommended for the treatment of transport vehicles or similar storages containing processed foods for which no direct contact is allowed with tablets or pellets.*

Procedures for Processed Foods

GASTOXIN[®] sachets must not come into contact with processed foods. Sachets must be applied in such a way as to prevent contact with the commodity or its packaging.

Bulk Rail Cars:

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 as far as possible.
4. Open sachet containers and tape sachets to a cardboard disc. Be sure to only tape across the sachet ends only.
5. Place the disc into position, sachet side up, and secure with masking tape.
6. Lower the cover into place and secure. Tape "Warning"/"Danger" placards securely to the hatch cover.

Procedures for Boxcars:

1. Close and secure one of the doors from the inside. Seal all openings and joints. If possible, caulk joints and drape entire doorway with polyethylene film, securing the edges to the inner wall, floor and ceiling with masking tape.
2. Inspect the roof, floor and walls for holes and/or cracks. Seal all openings.
3. If possible, 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 polyethylene, it may not be necessary to seal the door from the outside. If door is not draped, seal all cracks, openings and joints from the outside.
4. Open containers of sachets and tape sachets to cardboard discs. Be sure to tape across the sachet ends only.
5. Place the loaded discs inside the boxcar and secure, sachet side up, with tape or nail to the wall.
6. Post "Warning"/"Danger" placards on each door.

Procedures for Containers"

1. Procedures for trucks, vans and other transport containers are essentially the same as boxcars, except their doors tend to be more gas tight, and they often have only a rear door, which must be sealed after application is completed.

The shipper and/or the fumigator must provide written notification to the receiver of railcars, railroad boxcars, shipping containers and other vehicles, which are being fumigated in-transit. A copy of the applicator's manual must precede or accompany all transportation containers or vehicles. If the applicator 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.

Do not use GASTOXIN sachets in cars or other personal vehicles.

22.6 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. 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 must 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 must 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 if concentrations were above the permitted exposure levels.
3. Develop an appropriate Fumigant Management Plan. (Refer to 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 sachets to be applied based upon volume of space under the tarp, air and/or commodity temperature.
5. Sachets 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 **GASTOXIN®** at any one point. **GASTOXIN®** 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 the introduction of water from rain. **GASTOXIN® Sachets and Sachet Chains are recommended for the treatment of bagged commodities** and processed foods although sachets taped to cardboard discs may be used. Care should be taken to see that the poly is not allowed to cover the **GASTOXIN®** 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.

22.7 In-Transit Shiphold Fumigation

22.7.1 General Information

1. 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:

34 of 39

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

22.7.2 Pre-Voyage Fumigation Procedures - A FMP must be written for all fumigations PRIOR TO ACTUAL TREATMENT.

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 vessel does not meet these requirements, then the vessel must not be fumigated unless all crew members are removed from the vessel. The crew members are not permitted to reoccupy the vessel until it has been properly aerated and the master of the vessel and the certified applicator have 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. Placard all entrances to the treated spaces with fumigation warning signs.
5. 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.
6. 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.

7. Review with the master, or his representative, the precautions and procedures to follow during the voyage of a shiphold in-transit fumigation.

22.7.3 Application Procedures for Bulk Dry Cargo Vessels and Tankers

1. **Sachets and Sachet Chains:** Calculate dosage on the basis of cargo hold volume. Dosage is always calculated for total hold volume irrespective of the commodity tonnage in the hold. After hold has been filled or completed, open containers and distribute sachets uniformly onto the commodity surface with spacing between each. Do not place sachets with 10 feet of side walls. For addition of **GASTOXIN®** Sachet chains, after a hold has been filled and completed, dig a shallow trench approximately 15 feet long and 2 feet wide for each chain being use. Maintain at least a 2 foot space between trenches and do not trench closer than 10 feet from the side walls. Open the Sachet Chains one at a time, remove the chain, unroll it until fully extended and position it into the trench. Cover with the commodity.
2. Immediately after application of the fumigant, observe the closing of all hatch covers, tank tops, butterworth valves, manways, etc. Stop the closing if the cover snags an individual sachet. Reposition the sachet and resume closing.

22.7.4 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(h) 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 Section 22.5 of this manual.

22.7.5 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. Never enter fumigated areas alone. At least one other person, wearing personal protection equipment, should be available to assist in case of an emergency.

22.7.6 Precautions and Procedures During Discharge

1. 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.

23. 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 GASTOXIN® 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.

24. DISPOSAL INSTRUCTIONS

24.1 General

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

Unreacted or partially reacted GASTOXIN® 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 applicator 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 Section 29 of this manual, Spill and Leak Procedures.

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 Container Disposal

The containers are non-refillable. Do not reuse or refill this container. Offer for recycling, if available. Triple rinse tins with water if they have been contacted with spent or partially reacted dust from GASTOXIN® SACHETS. Then offer for recycling or reconditioning, or puncture and dispose 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 expose empty tin to atmospheric conditions until residue in the tin 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. If properly exposed, the residual dust remaining after a fumigation with GASTOXIN® will be a grayish-white powder. This will be a non-hazardous waste and contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed GASTOXIN® (so called "green dust") requires special care.

24.3 Residual Dust

General:

If properly exposed, the residual dust remaining after a fumigation with GASTOXIN® will be a grayish-white powder. This will be a non-hazardous waste and contain only a small amount of unreacted aluminum phosphide. However, residual dust from incompletely exposed GASTOXIN® (so called "green dust") requires special care. Do not confine spent or partial spent sachets in a closed containers as this may result in a fire hazard. Small amounts of hydrogen phosphide may be given off from the unreacted aluminum phosphide, and confinement of the gas may result in a flash. Unless it can be determined with certainty that the sachets are spent, they must be deactivated as described below prior to disposal.

24.4 Disposal of Unreacted or Partially Reacted GASTOXIN® sachets: (From spills, leaking containers or other sources)

Unreacted or partially reacted GASTOXIN® sachets are acutely hazardous. Improper disposal of this product is a violation of federal law. If this product cannot be disposed of by ordinary use or according to the instructions that follow, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance. Do not contaminate water by disposal. Some local and state waste disposal regulations may vary from the following recommendations. Disposal procedures should be reviewed with appropriate authorities to ensure compliance with local regulations.

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

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 self-contained breathing apparatus (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 GASTOXIN®. Water in contact with unreacted GASTOXIN® will greatly accelerate the production of phosphine gas which could result in a toxic and/or fire hazard. Wear dry gloves of cotton or other material when handling aluminum phosphide. Return all intact tins to the cases or other suitable packaging which has been properly marked according to DOT regulations. Notify consignee and shipper of damaged cases.

If the tins have been punctured or damaged so as to leak, the product may be immediately used, the container may be temporarily repaired with aluminum tape, the intact tins of sachets may be transferred from the damaged case to a sound metal container which should be sealed and properly labeled as aluminum phosphide. Any sachets from damaged tins may be deactivated and disposed. Further instructions and recommendations may be obtained, if required, from BERNARDO CHEMICALS INC.

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

If the age of the spill is unknown or if the sachets 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 to transport to a secure site for deactivation. Alternatively, small amounts of spillage may be spread out in an open area away from inhabited buildings to be deactivated by atmospheric moisture.

26 DEACTIVATION PROCEDURES

The methods below may be used for deactivating used or unused **GASTOXIN® sachets** regardless of the extent to which the aluminum phosphide has decomposed.

26.1 **Dry Deactivation**

Collect sachets and place them into a well ventilated holding container such as wire cage or other similar devices. Store the sachets in one of these devices until the sachets are spent. Unused or partially spent sachets can be spread out on the ground in a secure open area away from occupied buildings to be deactivated by atmospheric moisture. Care should be taken so that they are not carried away by the wind. Dry deactivation is the recommended procedure for unused or partially spent sachets. If in doubt, as to whether the sachets are spent, contact BERNARDO CHEMICALS INC.

Ignition may occur if large numbers of incompletely reacted sachets are contacted by liquid water. This can occur in open or perforated storage containers. Therefore, such storage should be out of doors in a relative isolated area protected from rain.

26.2 **Wet Deactivation - Method One:**

Fill an appropriate sized container with water a few inches from the top. Submerge sachets for 36 hours. A metal grid works well to keep sachets submerged. **Do not cover container.** Wear NIOSH/MSHA approved full-face gas mask - hydrogen phosphide canister combination (if exposed to levels up to 15 ppm) or a Self-Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 25 ppm). This should be done outdoors. The water may be disposed of in a storm sewer or by pouring it out on the ground.

26.3 **Wet Deactivation - Method Two:**

Fill an appropriate sized metal container 2/3 full with water. For each gallon of water add ¼ cup of low sudsing detergent or surfactant. Use no less than 1 gallon of water/detergent solution for 60 **GASTOXIN®** sachets. Open each sachet and dump contents into the container as the water is stirred. Wear a NIOSH/MSHA approved full face gas mask - hydrogen phosphide canister combination (if exposed to levels up to 15 ppm) or a Self-Contained Breathing Apparatus (SCBA) (if exposure is unknown or above 25 ppm). **Do not cover container at any time.** This should be done outdoors.

27. DISPOSAL PROCEDURES

In open areas small amounts (up to 7.0 kg) of the spent sachets may be disposed of on site by burial of the sachets or by opening the sachets and spreading the dust over the land surface away from inhabited buildings.

Spent sachets may also be collected and disposed of at a sanitary landfill, approved pesticide incinerator or other approved sites or by other procedures approved by federal, state and local authorities.

Do not dispose of dust in a toilet.

Dispose of water/dust mixture (slurry) (with or without preliminary pouring out of excess water) in a sanitary landfill or other suitable burial site approved by local authorities. Where permissible, the slurry may be poured out on the ground. If it is held 36 hours it may be poured into a storm sewer.

Caution: Wear a NIOSH/MSHA approved full-face gas mask - hydrogen phosphide canister combination if exposed to levels between 0.3 to 15 ppm or a Self-Contained Breathing Apparatus (SCBA) if exposure is unknown or above 15 ppm during wet deactivation of unexposed or incompletely exposed GASTOXIN®. Never place Sachets or their dust in a closed container such as a dumpster, sealed drum, plastic bag, etc., as flammable concentrations and a flash of hydrogen phosphide gas are likely to develop.

FOR ASSISTANCE, CONTACT:

BERNARDO CHEMICALS INC.
P.O. Box 1632
Turlock, CA 95381
Tel: (209) 634-1191 / 1-800-743-4599
Fax: (209) 634-1192

or

For information on this pesticide product (including health concerns, medical emergencies, or pesticide incidents), call the National Pesticide Information Center at 1-800-858-7378.

For All Other Chemical Emergencies: CHEMTREC: 800-424-9300

WARRANTY

Seller warrants that the product conforms to its chemical description and when used according to label directions under normal conditions of use, it is reasonably fit for the purposes stated on the label. To the extent consistent with applicable law, the seller makes no other warranty, either expressed or implied, and Buyer assumes all risks should the product be used contrary to label.