

Fumigants & Pheromones

Issue 86
Winter 2008

Routing:



A Newsletter for the Insect Control & Pest Management Industry

Department of Homeland Security and Fumigants

by John Mueller

On April 9, 2007, the Department of Homeland Security (DHS) published the **Chemical Facility Anti-Terrorism Standards Interim Final Rule** (6 CFR, Part 27). This ruling gave manufacturers, distributors, users, and sites where fumigants are used notice that these operations may come under notification and compliance standards. Meaning—anyone making, selling, using, or having fumigants used on their site will need to report these activities formally.

In April 2007, it looked like all fumigants would be included in this assessment by DHS but the November final rule EXCLUDED methyl bromide and sulfuryl fluoride. Appendix A, "Chemicals of Interest" DID INCLUDE Phosphine fumigants (Aluminum/Magnesium Phosphide and Cylinderized Phosphine).

On November 22, 2007, DHS issued Appendix A, "Chemicals of Interest." This list provided final ruling on which chemicals DHS wished to track. If you handle any chemical designated in this list you would be required to register with DHS using an online **Chemical Security Assessment Tool** (CSAT) "Top Screen" by January 22, 2008.

More recently Robert B. Stephen, the Assistant Secretary Homeland

Security, exercised his right to extend the deadline for submitting Top-Screen. This extension applies to facilities such as farms (e.g., crop, fruit, nut, and vegetables); ranches and rangeland; poultry, dairy and equine facilities; turf grass growers; golf courses; nurseries; floriculture

operations; and public and private parks. The rule specifically refers to the preparation and application of crops, feed, land, stock (including poultry), or other areas of an agricultural facility. The extension does not apply to chemical distribution facilities, or commercial chemical application services.

The US government has a growing concern that terrorists or other extreme groups may break into chemical storage areas and steal potentially dangerous fumigants to harm innocent people.

To be very clear, DHS rulings currently do not affect those fumigators treating their own agricultural products (Licensed "Not For Hire" or "Private Applicator"). It would be wise to review

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these rulings as this is listed as a time extension and not a total exclusion.

If you have any questions about the above extension or want to keep in contact with the progress of this extension, contact Dennis Deziel, Deputy Director, DHS Compliance Security Compliance Division. Dennis.Deziel@dhs.gov or the CSAT help desk at 866-323-2957 or CSAT.dhs.gov.

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Sulfuryl Fluoride

by David K. Mueller, BCE

Sulfuryl fluoride (Vikane™ fumigant) has been used to kill termites in homes in the US since the 1950's. In 2002 it received registration by the US EPA for structures, dried fruits and nuts and other stored product commodities. Sulfuryl fluoride (SF) is a wide spectrum insecticide gas used to penetrate structures, commodities, machinery, and wood. SF kills all life stages of insects including eggs, larvae, pupae, and adults in 24 hours or less if used properly. ProFume™* gas fumigant is the brand name from Dow AgroScience for food processing structures, grain, seed, food, and other labeled commodities.

Where ProFume can be used:

Temporary and permanent fumigation chambers, storage structures, food handling establishments (including pet food facilities, bakeries, food production facilities, mills, warehouses), stationary transportation vehicles, (railcars, shipping containers, and trucks (excluding aircraft).

SF is an excellent penetrating fumigant. It is similar to phosphine in penetrating about 10 feet (3 m) per day. Methyl bromide was an organic gas with a carbon atom that attached to other carbon atoms. SF has a fluorine molecule instead of a carbon atom. SF is not corrosive and is an inorganic compound. This makes it a good fumigant for museum items that contain organic materials like furs or metals like silver, copper, or gold. Churches have been fumigated with SF in Germany for many years.

Precision Fumigation: The EPA label for ProFume is a computer

software program. Its purpose is to "maximize effectiveness and minimize risk." This means that the dosage rate is determined by entering data into a computer program. Variables like time, temperature, concentration, and insect species have a relationship in determining the proper dosage rate for a SF fumigation.

Half Loss Time: HLT

is the time it takes to lose half of the gas concentration. A high half loss time means that more SF fumigant is retained for the fumigation and the cost will

ProFume is registered for:

Cereal grains
Seed
Popcorn
Dried fruits and nuts
Herbs and spices
Processed foods
Dried vegetables
Hams
Cheese
Coffee beans
Food enrichments
Cocoa beans (new)

be reduced. This may change with each fumigation. Sealing a structure well is important. The building should be sealed as if it was turned upside down and filled with water, it would not leak the water. Wind can ruin a well planned fumigation and sealing can help prevent fumigation failures. The amount of fumigant saved from a well sealed structure could offer thousands of dollars in savings in fumigant cost and shutdown time.

Mode of action: SF attacks the glucoses process in the cell and prevents proteins from producing



David Mueller, Insects Limited and Sebastian Hardy of Henry Hardy Svc. of Mauritius on January 1, 2008 fumigating a flour mill with ProFume gas fumigant as a methyl bromide alternative project sponsored by the United Nations/ GTZ. Mauritius is an island country of 1.4 million people located in the Indian Ocean. Mauritius is now one of over one hundred countries that has completely phased out of methyl bromide.

energy and systems like respiration fail when enough SF is inhaled.

Resistance management:

Resistant insects to phosphine (Phostoxin™ fumigant) will show no cross resistance to SF. SF could be an important tool to manage phosphine resistance throughout the world in the future.

Methyl Bromide alternatives:

ProFume is registered in certain countries in Europe, Africa, Latin America, the Caribbean, Europe, and pending registration in Asia. Hundreds of successful SF fumigations have been performed globally in the last six years. Experiences with SF have led to improving safety and risk prevention while offering control of pest populations. Most experiences have shown that SF is available and an economic alternative to MB. University studies have compared the lethal effect of SF to be equal to MB. Purdue University studies showed that SF was 97-99% effective on moth or beetle bioassays and none of the surviving insects were able to reproduce.

**ProFume is a registered trademark of Dow AgroScience LLP*

Dave's Soapbox

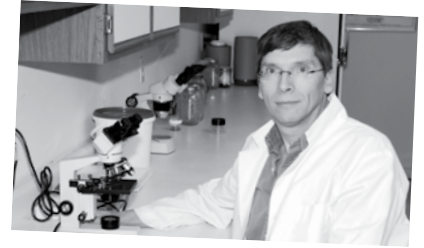
...for what it's worth

Consulting has become a big part of what we do. This includes a lot of different things, but the real key is that we try to solve problems that occur on stored products. This could be a simple insect ID, a packaging issue, a court case involving product contamination or personal injury or even death. The experiences that we have accumulated help determine the best way to protect food attack from pests. It is an exciting field to work in. We want you to hire us to help you solve your pest problems when they occur. Here is our resume and we hope you will consider us for the job when that time comes, or pass our name on to others as a reference.

Go to www.InsectsLimited.com or call 1-800-992-1991 to find out how we can help you and your company solve tough pest problems.

D. K. Mueller

EMPLOYMENT RESUME



To Whom It May Concern,

We want to work for companies that need to solve problems with insects and other pests in food, grain, food processing, wood, pest management, museums, organics, and where stored products are produced and held prior to reaching the consumer.

Objective: We want to use our knowledge and experiences to work for you.

Educational Background: University trained entomologists.

Experience: Insects Limited's trained board certified entomologists have years of experience with pest management and stored product problem solving. We have domestic and international experience with major brand named companies that grow, harvest, process, and distribute food products. We have traveled to over 60 countries to help solve stored product insect problems. Our services range from in-house pest identification and advanced training, to in-field inspections, audits, expert legal assistance, museum pest management set up and evaluation.

1981-present: Insects Limited manufacturers pheromone traps, program evaluation, product development, custom pheromone synthesis, contracted new product field evaluation, educational training, mite detection programs, and consultation.

1995-present: Insects Limited consults with the United Nations as experts on methyl bromide alternatives and integrated pest management. (Europe, Africa, Latin America, North America, Asia).

Awards: 1995, 1997, 2006, 2007—EPA Stratospheric Ozone Protection Award, "Best of Best"; 1999, 2001—Purdue University, Distinguished Alumni Award, John V. Osmun Alumni Award for Professionalism; 2005—Testified before Congress; 2007—United Nations' Environmental Programme (UNEP) Innovator Award

Publications and Books: *Fumigants & Pheromones Newsletter*, *Stored Product Protection...A Period of Transition*, *Mallis Handbook of Pest Control* (5 chapters; Pheromones, Fumigants, Stored Product Insects), popular articles, book chapters, and refereed journal articles.

Insects Limited's Educational Programs:

1981-present: Organized and presented continued education programs domestically and international for over 10,000 professional pest managers.

1993-present: Organized eight International Fumigants & Pheromones Conferences and Workshops for 2000 people from 60 countries (2009, Argentina, 2010, Spain).

Legal Issues: Experts for product liability, fumigation, and personal injury cases.

References upon request.



Organic Pest Management *Part 2*

*What's Green?
What's Natural, &
What's Organic?*



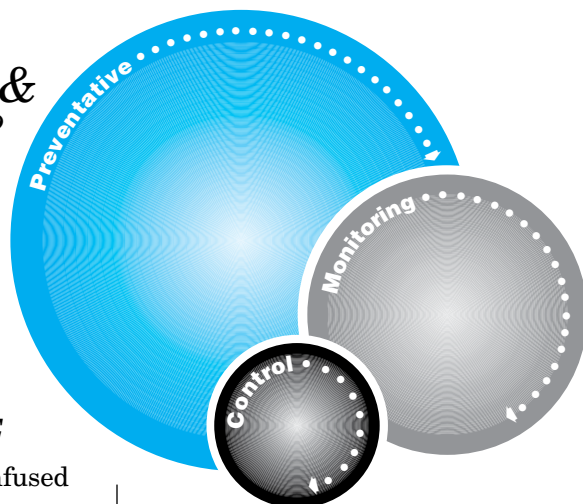
by David K. Mueller, BCE

Consumers today are confused by these various terms that point to a change in thinking about how we control pests. Pesticide-free products are being requested by customers without a full understanding or expectation of how these low impact 'Green' products control pests while leaving no harmful residues on the product. The list of products listed as *organic certified* by the USDA is relatively small and limited. However, the use of these products in combination with true IPM strategies like Prevention, Monitoring and Control will suppress pest populations and help prevent outbreaks.

Pest Control Tools for Organic Products

Insect Control:

- Biological gels for fly breeding sites
- Boiling water (*drain cleaner*)
- Boric acid
- Botanicals (*non-synergized pyrethrins, mint oil, wintergreen oil, other essential oils, clove oil*)
- Carbon dioxide, fumigant (*inert gas, 45% at 72°F for seven days*)
- Clove oil (*insecticide, granular, dust, herbicide, contact insecticide*)
- Cold (0° core temperature for six days)
- Diatomaceous Earth (*Insecto™, MotherEarth™*)
- Dipel™ (*Bacillus thuringiensis, grain treatment*)



These three circles are a simple but effective model of how a true organic pest management program should be viewed.

- Fruit fly traps (*SmartWay™ Fruit Fly traps for home and commercial use*)
- Heat (*130–160°F for 2–24 hours*)
- Insect growth regulators (*insect juvenile hormones including: Precor™, Gentrol™, Point Source™, Nylar™, Fenoxycarb*)
- Insect light traps (*flying light attract insects captured in a glue board*)
- Insecticidal soaps
- Moth Suppression™ (*female moth attractant*)
- MotherEarth 2% Py Contact™ aerosol (*pyrethrum only*)
- Neem (*oil repellent and grain treatment*)
- Pheromone traps (*stored product beetles and moths, 1 trap per 2000-3000 sq. ft.*)
- Predator insects (*egg parasitoids, predaceous wasps*)
- PyGanic™ (*insecticide, non-synergized pyrethrin, fogging, grain protectant, or spot application*)
- Sticky traps and barriers

Rodent Control:

- Copper mesh (*plugging mouse and insect entrances*)
- Glue traps for rodents
- Mechanical mouse traps (*multiply catch*)
- Rodent non-toxic census baits

First Step:

Facility's Pest Management standards MUST use practices in organic operations:

- Removal of pest habitats, food sources, and breeding areas
- Exclusion to prevent access to the operations and handling areas
- Management of temperature, lighting, humidity, air circulation to prevent the pest reproduction
- Control of pests with: Mechanical or physical controls (traps, light, sound), lures and repellents with substances consistent with the National List
- A pesticide consistent with the National List only if the non-chemical steps are not effective or sufficient

For a complete list of acceptable organic certified products, go to: National List: Pesticide active ingredients exempt from EPA Registration under 40 CFR - 125.25 "Minimum Risk Pesticides".

- Snap traps for mice (*bait with peanut butter*)

PROHIBITED Substances for Organic Facilities Include:

- Anticoagulant rodent baits
- Methyl bromide
- Moth balls and moth crystals
- Nicotine
- Petroleum solvents
- Piperonyl butoxide, common synergist
- Sulfur dioxide fumigant
- Synthetic pyrethroids

IPM Practices:

- 30 inches of crushed stone around the exterior
- Bird netting (*exclude birds from areas*)
- Powerful flashlight (*detection of pests*)
- Sodium vapor lights (*lighting is crucial*)
- Vacuum sweeper (*with long attachments*)

New & Improved Websites

With a new year comes a *new* website look for Fumigation Service & Supply. The Home Page of the website has received a 'face lift' and the information within the pages has been updated. We have added the Grain Guide, Fumigation Management Plan Form, and information about those whom you communicate with from our company. (It is always nice to put a face with the name!) So, next time a MSDS/label, information, products/services, training is needed, please visit the *new and improved* www.FumigationZone.com.



How well do you know your insect biology and behavior? The new stored product insect videos found at www.InsectsLimited.com and www.FumigationZone.com are a tremendous training and educational tool to help understand these small beetles and moths. Many times we identify insects by their shape but these videos from the German Professor Dr. Wyss of The University of Kiel in Northern Germany, ENTO Films, and his associates will show the complete biology, life cycle, and natural predators to some of the most popular stored product insects. You will learn to identify insects, like the Saw-toothed grain beetle (*Oryzaephilus surinmensis*), by its fast and erratic movement and not so much by its detailed shapes. This series of videos are a good training aid for your technical staff to watch and discuss. Five more videos will be added this year, so stay tuned and visit our websites often.

InsectsLimited.com and www.FumigationZone.com

Future Product:

A new product for organic applications is presently stuck in a regulatory 'traffic jam' in Japan. Spinosad™ from Dow AgroScience LLP, was registered by the US EPA in 2006 for traditional and organic labeling. This long protein chain natural compound is highly effective on beetles and moths when ingested. Spinosad will be a popular product to use in an organic pest management program when, and if, it gets past the Japanese tolerance review.

Take Home Message

A pest management program cannot work if the owner is always putting out fires or implementing 'Band-Aid' solutions. Continued excuses can only hurt the reputation of the company and cause a

loss of profits. Pest management starts with considerable time and resources invested into an all out preventative effort and is complimented by a thorough monitoring and inspection program. Finally, the safest control measures should be used, not according to the calendar, but when they are necessary.

This organic pest management program has a very important message: *Instead of relying on traditional pest control tools, organic pest management is proactive instead of reactive. It takes patience, perseverance, and a good working knowledge of pest biology and behavior "Start with the insect first" by finding out what the pest(s) like and what they don't like and offer them the things they don't like and they will leave or they will die.*

Sharing Through Education

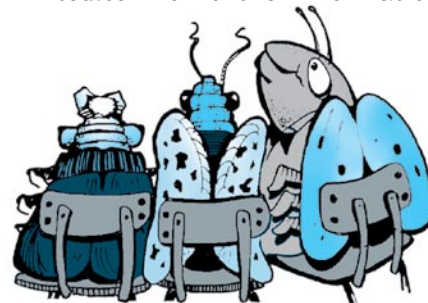
by *Kalah Stocker*

Fumigants & Pheromones Workshops will teach about the many changes that have occurred in the past decade due to the loss of methyl bromide and other products. With new products, treatment methods, and equipment, now is the time to re-tool your knowledge and gain credit for continuing education points, if needed.

Museum and Historic House Pest Management is essential to protect and preserve our historical treasures. These buildings store objects that are vulnerable to pest attack while in storage. They also have many people visiting these buildings each year. The type of monitoring and pest control methods used in these special storage areas are much different than other types of facilities. Hear from experts that perform special pest management on large and small museums and historical houses.

Advanced Uses of Pheromones for Monitoring and Control will introduce a new concept of pheromones. Today, pheromones are being developed to do more than monitor for the presence of absence of pest populations. Recent EPA labeling allows the control of Indian meal moths with large doses of pheromones. This seminar brings together pioneer pheromone researchers that have been working in the field to discover how insect communication can be used to manipulate these insects with environmentally friendly products and methods.

Please contact Kalah Stocker at 800-992-1991 or k.stocker@insects-limited.com for further information.



Preserving Our History

LOOK A LITTLE BIT CLOSER



by **Patrick Kelley, ACE**

The use of sticky blunder traps to monitor for pests in museums and libraries has become an integral part of an IPM program. Early detection of damaging insect pests is one of the best ways to prevent damage on priceless and irreplaceable collection items. The librarians, curators and registrars who regularly check the traps are usually quite good at identifying dermestid beetles, clothes moths and silverfish. What is often overlooked, though, is the dark speckled material around the edge of the traps. Often mistaken for dust and debris, this pepper-looking material can usually provide valuable information for pest management.



Museum pest expert Dave Pinniger closely examines a sticky trap with a hand lens.

Here are some of the common culprits that are too small (~1 mm) to identify with the naked eye;

1. **Psocids, common name—booklice:** Some Psocids can have wings and others will not. In large numbers they can do damage to books, papers, and even fur. Their soft bodies need lots of moisture. Drawing down the humidity in the storage area only by a few percentile can often eliminate this pest
2. **Rove Beetles Family Staphylinidae:** Although there are over 45,000 species of rove beetles, even the smallest species are attracted to light and will feed on detritus. Look at your outdoor lighting and entry points into the building as well as an increase in sanitation to eliminate these pests.
3. **Thief Ants, Solenopsis molesta:** These ants are so small, they live undetected within the colonies of other ants, killing and eating the immature forms of the host. Removal of a food source for the larger ants will help solve the problem.
4. **Springtails order Collembola:** These small insects feed on microscopic molds and are thus associated with damp environments. Look for water leaks or increase ventilation in problem areas.
5. **Actual Dust & Debris:** (Sometimes dirt is dirt!)

Next time you check your traps bring along a hand lens or use a microscope to identify what is in your trap. These little guys may be your biggest pest!

Well Deserved Promotion



Nathan Stocker

We are proud to announce the promotion of Nathan Stocker to: General Manager / Director of Operations for Fumigation Service & Supply, Inc.

John Mueller, President of FSS stated: *"Fumigation Service & Supply, Inc. has enjoyed tremendous growth. This growth is directly related to the outstanding and successful drivers in our company. Nathan is one of those driving great success in our larger scale service and fumigation area.*

We are excited to expand Nathan's role and responsibility with FSS. We are confident that his skills and abilities will help us continue to improve and broaden products and services to our customers."

Quotable Quotes

"Traveling is like a book, if you don't travel it's like being stuck on the first page."

— Anonymous

"Are we prepared to make difficult choices on behalf of children not yet born? We cannot let the children of the developing world become canaries in the coal mine... The poorest will be hit first and hardest by climate change."

— Bono

A Record Harvest Prompts a Record Fumigation



by *Pete Mueller*

In Central Illinois, about 100 miles south of Chicago, I was asked to look at a commodity storage facility filled with corn. They asked about the possibility of a fumigation. Fumigation Service & Supply has traditionally fumigated several large flat storages in the Midwest and several large grain fumigations each year usually averaging between one to three million bushels (30,000–90,000 tons).

Upon arrival to this storage site, I was amazed at its overall size. The building was 660 feet long by 330 feet wide and 80 feet at the peak of the grain, with a volume over 11.5 million cubic feet (383,000 m³). This building is large enough to place two NFL sized football fields side-by-side with room to spare. The technique we used on this fumigation stayed the same as the other smaller flat storage structures: Carefully seal the building, Release the gas, Monitor gas concentrations throughout. There may have been bigger grain fumigations somewhere, but this was the largest single fumigation, under one roof, that FSS has performed in the last 26 years.

The real obstacle in this fumigation, we found, was moving the fumigant from high concentrations to hidden infestations. This was accomplished by using a technique that is commonly used during large grain silo fumigations called



11.5 million cubic foot corn flat storage fumigated with phosphine.

recirculation (J-System™ by Jim Cook). This was done by using four inch corrugated plastic drain tile (normally we use 250 feet and one small fan). However, for this large ‘flat’ we used **over one and a half miles** of drain tile and 10 fans.

The next challenge was the fumigant itself. This fumigation required 100 cases (4300 lb.) of Phosphine tablets and we needed to apply them safely and evenly throughout the grain mass using the fumigation crew of 32 people. By pre-staging the fumigant, we could save time when we walked 32 abreast probing the tablets into the grain from one end to the other. We were really tired when we sealed the last door behind us on the way out.

After almost two days, the Phosphine fumigant gas concentration was evenly distributed throughout the grain mass and the fans were turned off to allow the fumigant to do its work. Every 12 hours gas readings were taken in various locations of this 11.5 million cu. ft. building. Over 320 gas readings were taken during the course of this fumigation to ensure safety around the property and effectiveness on the grain insects. Even though the gas concentrations

reached high levels inside the building, the detection monitors never once indicated a ‘wisp’ of fumigant outside the structure.

“This is a true testament to how a safe and successful fumigation is co-dependent on cooperation with the customer, careful preparation and sealing, and detailed measures taken before the fumigation even started. This is important on a fumigation no matter how small or massive the structure is.”

After a number of days under gas, the building was opened and aired to a Phosphine concentration of 0.0 PPM. It has been about 75 days since we had the opportunity to do this fumigation and I am pleased to hear after careful sampling that not a single live insect has been found. I am grateful to the team of coworkers that helped insure the safety and success of this fumigation to perform this historic fumigation. It is my belief that their professionalism and skills are unmatched anywhere in the world.



Insects Limited / Fumigation Service & Supply will be speaking, attending, or organizing the following. We hope to see you there.

February 6-8

Indiana Hardwood Lumberman's Association, Indianapolis, IN

February 7-9

Kentucky Feed and Grain, Louisville, KY

February 17-19

Grain & Feed Association of Illinois, Peoria, IL

February 23-26

GEAPS Exchange, Omaha, NE

September 21-26

8th International Conference on Controlled Atmosphere and Fumigation in Stored Products, Chengdu, China

Do you need continuing education credits?

A series of continuing education seminars and workshops have been organized by Insects Limited and Fumigation Service & Supply for the winter of 2008. These continuing education seminars will discuss updates and review current pest management and fumigation techniques and offer credits for re-certification. Visit our website, www.InsectsLimited.com for more information and registration. Continuing Education credits have been applied for in the following states: IN, IL, KY, OH, and MI. If there are others states that you are interested in credits, contact k.stocker@insectslimited.com.

TRAINING DATES

March 12

Fumigants & Pheromones Cont. Education Workshop, Kankakee, IL

March 19

Fumigants & Pheromones Cont. Education Workshop, Dayton, OH

March 25

Museum and Historic House Pest Management, Westfield, IN

April 1

Advanced Uses of Pheromones for Monitoring & Control, Westfield, IN

PHEROMONES

Insects Limited

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2nd Latin America Fumigants & Pheromones CONFERENCE & WORKSHOP



March 8-10, 2009

Mar de Plata, Argentina

NEWSLETTER

Fumigants & Pheromones is published by Fumigation Service & Supply, Inc. and Insects Limited, Inc. We hope that the information that you receive from this newsletter will help you in your business, and you, in turn, will support our business efforts. If you have an associate who would be interested in receiving this newsletter, please contact the address below. We would welcome any comments or suggestions for topics. Address correspondence to: David K. Mueller, Fumigation Service & Supply, Inc., 16950 Westfield Park Rd., Westfield, IN 46074 USA.



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Fumigation Service & Supply, Inc.

16950 Westfield Park Road
Westfield, IN 46074-9374 USA
(1) 317-896-9300
e-mail: insectsltd@aol.com
websites: www.insectslimited.com
www.fumigationzone.com

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