Pest Management Workshop

Wichita, KS

May 14th, 2004

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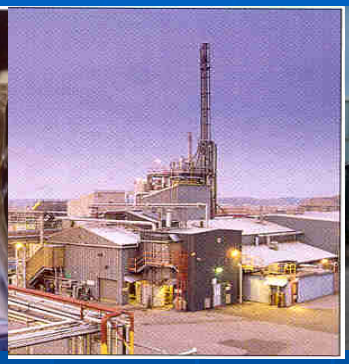
Product Stewardship Summary

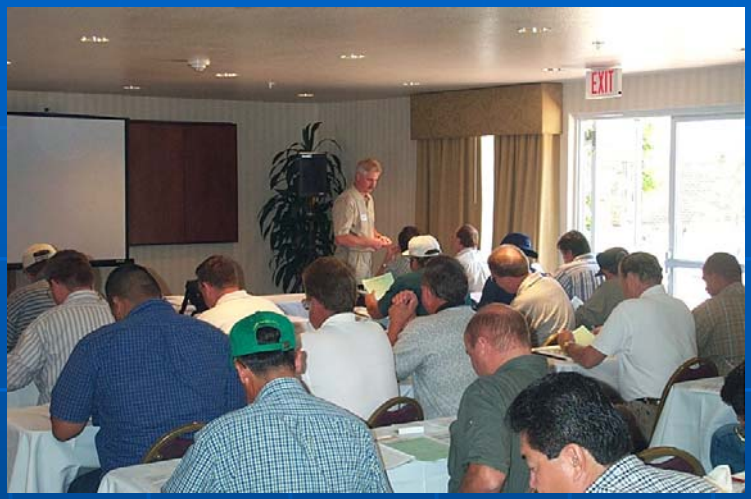




Inception Production Transportation Use Disposal

Responsible and ethical management of health, safety
and environmental aspects of a product
from its inception through production to its ultimate use and disposal

A thrust of the Chemical Industry around the world
as manufacturers adopt a regional version of Responsible Care®

Product Stewardship



- One day session
- 4-5 hour in-class presentation which includes lunch and quiz
- 2 hour off-site demonstration of the use of CYTEC fumigant products
- Certificates are issued to participants
- Training required to purchase and use CYTEC fumigant products

Cytec's Phosphine Fumigant Gases

ECO$_2$FUME®

2% PH_3 (wt) in 98% CO_2

VAPORPH$_3$OS™

100% PH_3 for on-site dilution

Product Comparison

ECO_2FUME

- Pre-mixed, Ready to Use
- Simple Dispensing Equipment
- Fast Dispensing (up to 45 lbs/hr Phosphine)
- Storage and Transportation Capabilities
- 68 lbs Product/Cylinder (1.34 lbs Phosphine)
- 29 ECO_2FUME = 1 $VAPORPH_3OS$

$VAPORPH_3OS$

- On-site Blending
- Approved Blending Equipment
- Slower Dispensing (up to 7.5 lbs/hr Phosphine)
- Reduced Cylinder Handling Requirements
- 39.68 lbs of Phosphine/Cylinder (18 kg)
- 1 $VAPORPH_3OS$ = 29 ECO_2FUME

Advantages of Cytec's Fumigant Gas

External application

Eliminate Confined Space Entry

No waste by-products or residues

No waste deactivation or disposal

Ease of Application and Control

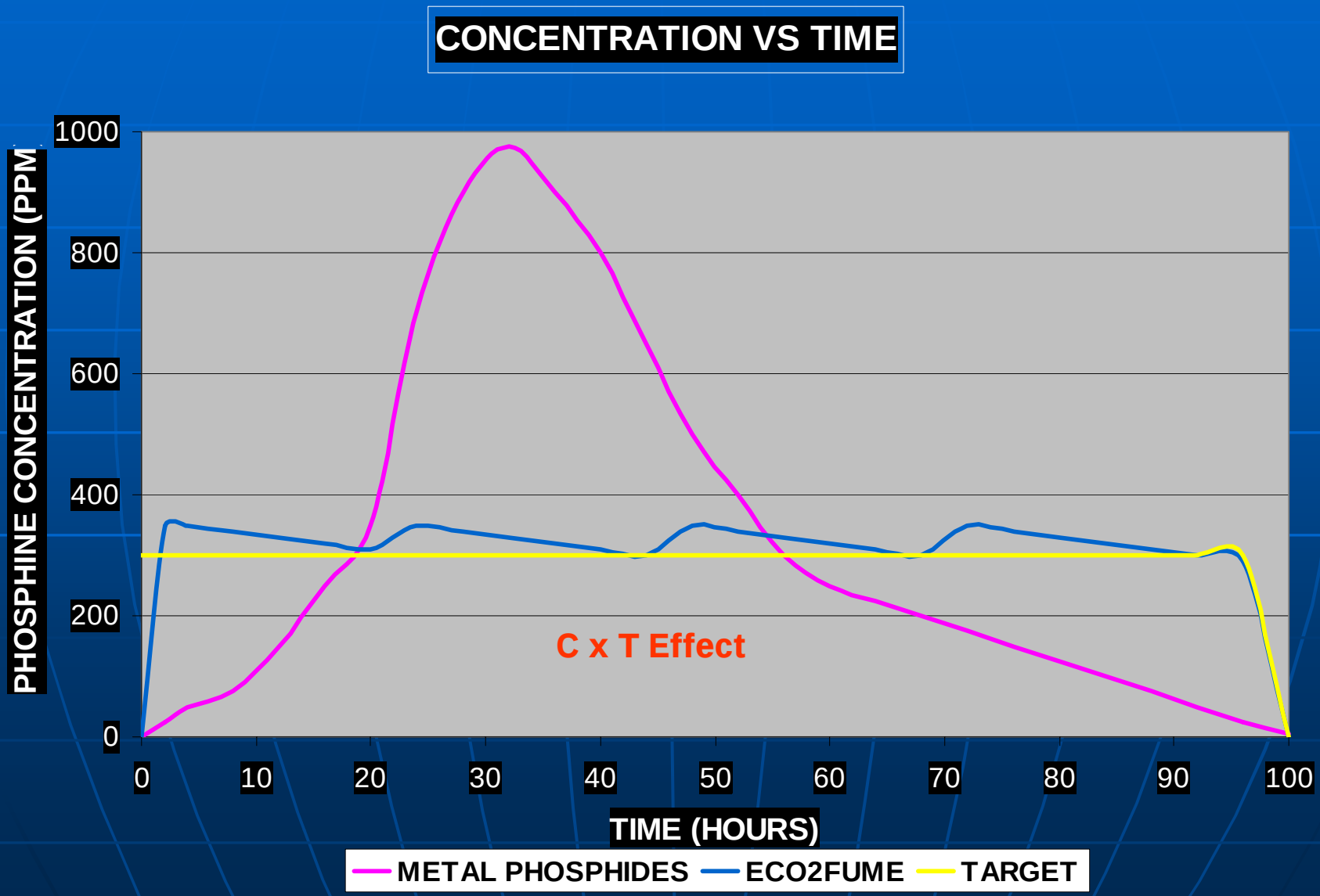
Effective control of target insects

Environmentally friendly

Non Ozone Depleting

Decreased amount of phosphine applied

Reduce PH_3 Usage and Control



Eliminate removal and deactivation of partially spent fumigants

What's New?

Label Changes

- Recent Past - 2003
- Current - 2004

ECO_2FUME

- In-transit applications
  - Rail

$VAPORPH_3OS$

- Application options
- PH_3/Air Demo

Label Changes

- New in 2003
  - Railcars: in-transit
  - Containers: in-transit
  - Ships: in-transit, excludes barges
  - Rewording of reentry requirements:
    - One certified applicator and 2 persons trained in SCBA –Section IV. A.3

Label Changes

- New in 2004
  - Canadian registration of ECO_2FUME
  - MOA compliant label for $VAPORPH_3OS$ – April, 2004
    - Fumigation Management Plan
    - Rodents (structural) 1-4 hour exposure
    - New maximum dosage range (200-1000ppm)
    - 24 hour exposure period (80^oF and above)
  - Increased fill density - $VAPORPH_3OS$ 18kg (~40lbs)
    - 29:1 ratio of ECO_2FUME : $VAPORPH_3OS$

- Presently before EPA
  - MOA compliant label for ECO_2FUME – expected end of April, 2004
    - Will include same changes as $VAPORPH_3OS$

Major Changes to PH_3 Labels

- Revised Restricted Use Statement
- Confer with state regulatory agencies concerning specific state requirements and restrictions for use
- Training and documentation requirements for receipt of in-transit vehicles under fumigation
- Specifications as to when a certified applicator must be physically present at the application site
- Notification and development of a Fumigation Management Plan

Fumigation Management Plan

- EPA will soon require everyone using Phosphine to have a FMP
- FMP is an organized, written description of the required steps to ensure a safe and effective fumigation
- Responsibility of certified applicator to work with client to develop a FMP

FMP Checklist

- Preliminary Planning and Preparation
- Personnel
- Monitoring
- Notification
- Sealing Procedures
- Application Procedures and Fumigation Period
- Post-Application Operations
- Sample Fumigation Notice

Dosage Guide

Current Label Dosage Guide

Recommended Dosages for VAPORPH$_3$OS®		
Temperature	**Phosphine Concentration Maintained**	**Duration**
Below 32°F (0°C)	Do not fumigate	Do not fumigate
32-39°F (0-4°C)	200-500 ppm	6-14 days
40-53°F (5-12°C)	200-500 ppm	4-10 days
54-59°F (12-15°C)	200-500 ppm	3-5 days
60°F - above (16°C)	200-500 ppm	2-3 days

Dosage Guide

New Label Dosage Guide

New Recommended Dosages for VAPORPH$_3$OS®		
Temperature	**Phosphine Concentration Maintained**	**Minimum Duration**
Below 32°F (0°C)	Do not fumigate	Do not fumigate
32-39°F (0-4°C)	200-1000 ppm	6 days
40-53°F (5-12°C)	200-1000 ppm	4 days
54-59°F (12-15°C)	200-1000 ppm	3 days
60-79°F (16-°26C)	200-1000 ppm	2 days
80oF–above (26.7°C)	200-1000 ppm	36hrs
80°F-above (26.7°C)	500-1000 ppm	24hrs

ECO_2FUME and Railcar Fumigations

2003 Field Efforts

- Conducted 2 trials
  - Trial 1: 7 flour cars, 7-12 days in-transit
  - Trail 2: 8 hopper cars, 5-8 days in-transit
  - Headspace readings after transit >100 ppm in all cases (range 100-300 ppm)
- Established application procedures
- Developed prototype dispensing equipment

Equipment Required

Field Application

Field Application

Advantages

- No waste by-products or residue
- No removal or deactivation of spent fumigant
- Eliminates risk of product contamination
- Eliminate risk of receiving “off-gassing” fumigant (short haul, cool conditions etc.)
- Simple, inexpensive equipment
- Quick and simple dosing

VAPORPH$_3$OS

- Where does this technology make sense?
  - Not practical or economical to transport, store or handle large number's of cylinders
  - Price sensitive applications- e.g. GRAIN
  - Locations that conduct frequent fumigations
    - In-house - daily or weekly
    - Regional - service contract (seasonal)

VAPORPH$_3$OS Application Methods

PH_3 & CO_2 Blender

Produces 2 % PH_3 Blend

PH_3 & Air Blender

Produces 1 % PH_3 Blend

VAPORPH$_3$OS/Air Demo - Rice Bin

VAPORPH$_3$OS/Air Demo - HDS Equipment

VAPORPH$_3$OS/Air Demo - Fumigation Conditions

- 275,000 cu ft corrugated metal bin
- Added gas into recirculation system
- Diluted PH_3 stream with 2 J-Fans
- Target: 300 ppm
- Applied: 3300g in <3hrs (HDS80)
- Monitored PH3 conc. at various locations in bin
- Obtained lethal doses at top in 12 hrs

VAPORPH$_3$OS/Air Demo Recirculation Setup

VAPORPH$_3$OS/Air Demo Conclusions

- HDS equipment very easy to operate
- Recirculation accelerated gas distribution
- Equipment robust and portable
- Eliminated cylinder related logistic issues
- Use HDS200 Model for faster addition (1hr vs. 3 hrs)

Thanks for your attention!