Module 3
Soil Fumigant RED Requirements

Overview of Risk:

The Need for New Requirements

EPA
United States
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Agency

Risk Assessments for Soil Fumigants









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Focus = Acute Risks to Bystanders

Wind

Wind blows emissions from an application to a receptor of concern (e.g., house or school)

Hazard Identification

- Chloropicrin
  - *Eye, nose, throat, and upper respiratory irritation*
  - Completeness of Database: Moderate-High
- Methyl Isothiocyanate (MITC) generators (Metam sodium/potassium and Dazomet)
  - *Eye irritation, systemic, and respiratory effects*
  - Completeness of Database: Low
- Methyl Bromide
  - *Odorless and colorless*
  - *Developmental and neurological effects*
  - *Skin cancer resulting from ozone-depletion*
  - Completeness of Database: High

Target Air Concentration Risks for Bystanders

- Methyl Bromide

  0.33 ppm (developmental rabbit study)

- Chloropicrin

  0.15 ppm (human study)

- MITC

  0.022 ppm (human study)

Exposure Assessments

- Monitoring studies
  - *Concentrations measured in/around fields and within handler breathing zone*
- Modeling
  - *Predict concentrations under different weather and field conditions*
- Information from exposure incidents
  - *Effects observed are consistent with risk assessment predictions*
  - *Causes of exposure*

Overview of Incidents

- Low incident rate, but some with severe effects
  - Major incidents involved many people
    - *Most causes: equipment failure, applicator error, or atmospheric conditions*
  - Workers more than bystanders

- Difficult to “reconstruct” incidents to determine exact factors involved

Data on Acute Illnesses

- Data obtained from Sentinel Event Notification System for Occupational Risks (SENSOR) - Pesticides Program and the CDPR (1998–2006)
- Cases
  - 11 states
  - 2,945 illnesses
  - 643 “drift” events (included volatilization)
- Fumigants
  - Small percent of events (8%)
  - Largest proportion (44%) of illness cases
  - Common factors: weather issues, improper measures to prevent fumigant from escaping, and applicator carelessness

2006-2008 Florida Incidents

- 3 incidents involving workers applying methyl bromide-chloropicrin products were caused by equipment failure, human error, and/or poor planning

  Case 1: Hose disconnected from shank during application - repaired while operation continued. Handler working behind rig later hospitalized with chest pain.

  Case 2: Handler kneeled in fumigant puddle while repairing disconnected hose - waited to change clothing before leaving site. Treated at hospital for swollen, blistered knee.

  Case 3: After application, handler opened drain line to rig located in barn - unaware line was pressurized. Fumigant splashed on floor. Workers exposed.

2006-2008 Florida Incidents

Relevant mitigation

- Safe handler information
- Certified applicator training
- Mandatory good agricultural practices (GAPs)
- Fumigant management plans

2007 Nevada Incident

- 100% chlorpicrin formulation applied at 200 lbs ai/A to adjacent 42 and 31 acre fields by shank injection (untarped at 12” depth)
- 121 workers harvesting onions in two fields 1/3 mile away experienced respiratory irritation - 12 needed emergency room care
- Nevada Dept. of Agriculture – contributing factor was temperature inversion 1-day after application
- Workers unaware of application - WPS requires notifying workers within ¼ mile

2007 Nevada Incident
Relevant Mitigation

- The maximum rate for untarped chloropicrin applications will be 175 lbs ai/A
- The buffer zone would have prohibited the workers from being in the nearby field.
- Buffer zones for multiple blocks can not overlap if they are both treated within 12 hours
- Buffer zones must be posted at usual points of entry and along likely routes of approach
- Registrants will be required to work through community outreach and education programs to ensure that emergency responders have the information and training they need to respond to fumigant incidents.

2008 Washington Incident

- In 2008; 35 gallons/A of Metam 42% CLR product applied to 150 acres field using center pivot after harvest
- Family of 17 lived 380 ft from field
- 19 reported symptoms (including sheriff deputy)
- 12 sought medical attention (including 2-week old infant)

- WA. Dept. of Health - contributing factors were:
  - Inversion conditions
  - Low wind speed (< 2 mph)
  - Home down gradient (150 ft drop down slope) of field
  - Inadequate field preparation (crop residues in field)
  - Residents unaware of application
  - Improper emergency response

2008 Washington Incident
Relevant Mitigation

- Home located with 380 ft would be in the buffer zone and application scenario from incident would be prohibited unless occupants provided written agreement to voluntarily vacate home during buffer zone period
- New labels have specific requirements related to wind speed, weather, and indentifying unfavorable weather conditions
- Depending on size of buffer and proximity to homes, applicator is required to either monitor the air between the buffer zone and homes or provide response information to the neighbors

Review Questions

True or False?

1. The route of exposure that is of primary concern is acute inhalation.

2. EPA based the risk assessments on a few severe incidents.

3. It is difficult to pinpoint all factors involved in an incident.

Summary

- Assessments based on
  - Best available data and information
  - Multiple lines of evidence
    - *Human and animal toxicity studies*
    - *Exposure based on monitoring and modeling*
    - *Incidents – distances, causes, and effects observed*
- EPA's Conclusion
  → *Risk to workers and bystanders are a concern*

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EPA United States Environmental Protection Agency