

U.S. EPA Soil Fumigant Training
Course for Oregon OSHA Inspectors
April 1, 2010

Introductions and Welcome

Overview - Presentation Outline

- Overview of Soil Fumigant Reregistration
- Implementation Schedule
- Summary of Label Requirements
- Summary of Handler Protection Measures
- Summary of Registrant Requirements
- Brief Summary of 2011 Measures
- Next Steps

Overview - Key Points

- Amended REDs issued June 2009
- Include measures to mitigate risks from fumigant pesticides
- Measures will be implemented through product labels
- Revised labels with new measures will appear in the field in 2010 and 2011.

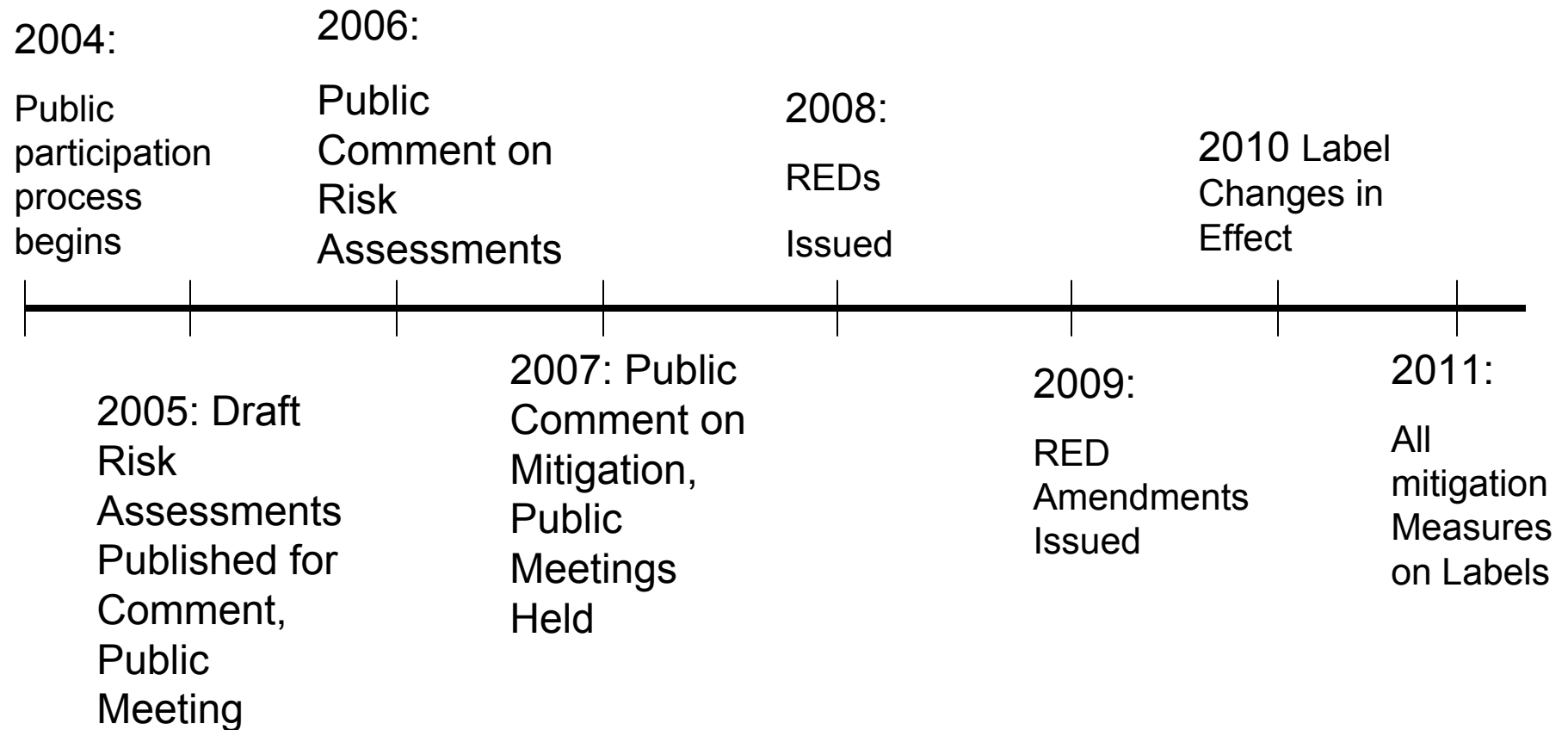
Overview – Reregistration Eligibility Decisions “REDs”

- Re-licensing decisions for chemicals used as soil fumigants
 - Methyl Bromide
 - Chloropicrin
 - Metam Sodium/Metam Potassium
 - Dazomet
- First comprehensive reevaluation since products first registered

Overview - Goals

- Protect workers and bystanders while maintaining key benefits of use
- Ensure a level playing field across all soil fumigants
- Risk management decisions that are protective and reflect real-world outcomes

Overview - Regulatory Process Timeline



Overview of Soil Fumigant Uses

Types of Pests Controlled

Fumigant	Major Types of Pests Controlled		
	Nematodes	Plant Pathogens	Weeds
Methyl Bromide	●	●	●
Chloropicrin		●	
1,3-Dichloropropene	●		
Dazomet	●	●	●
Metam sodium	●	●	●
Metam potassium	●	●	●

Note: Level of control of a pest type is variable between chemicals.

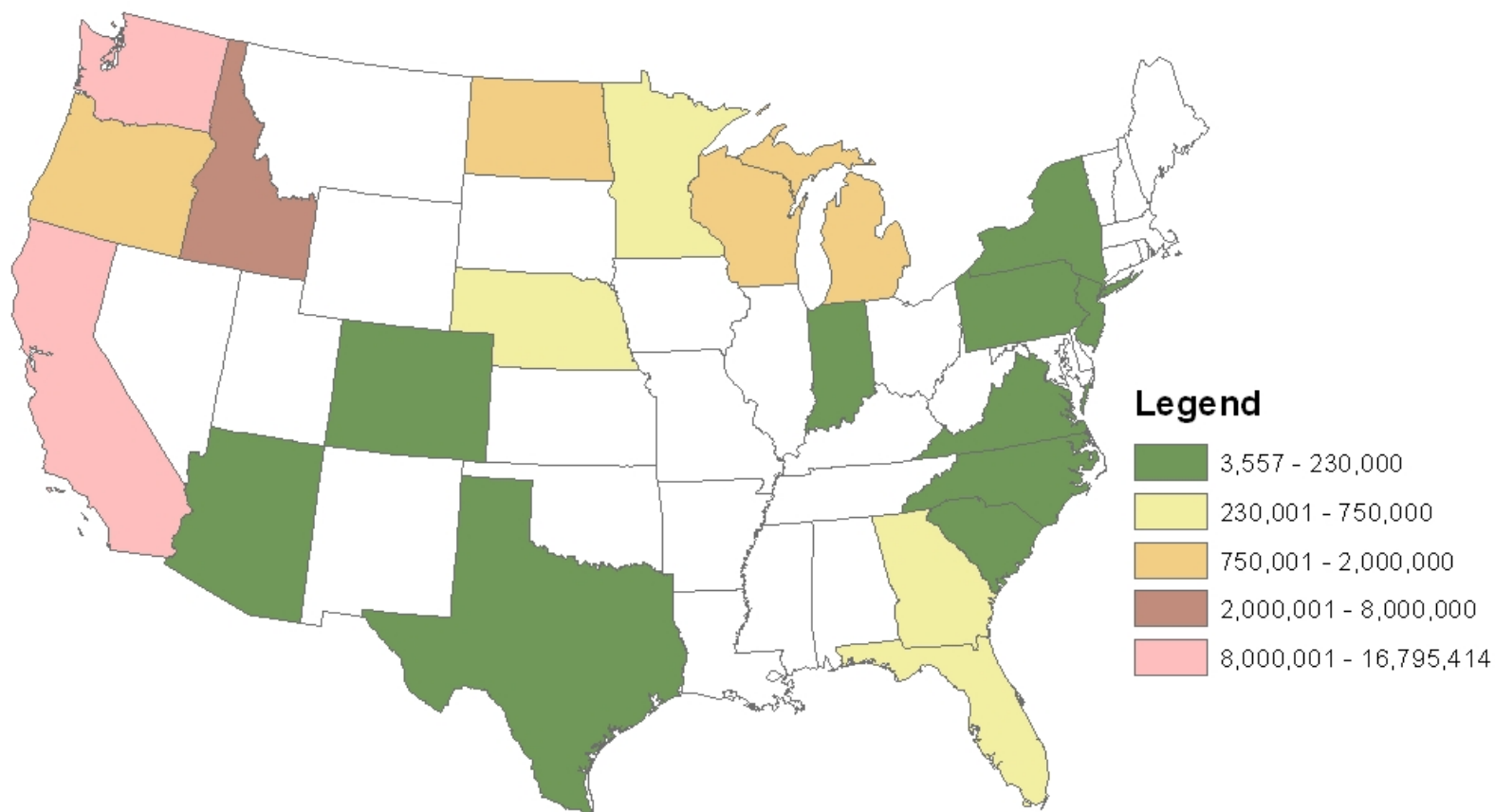
Soil Fumigant Use By Crop

Crop	Chloropicrin		Metam Sodium Metam Potassium		Methyl Bromide		1,3- Dichloropropene		Total Pounds
	Pounds	PCT	Pounds	PCT	Pounds	PCT	Pounds	PCT	
Potatoes	300,000	2	32,500,000	20			12,700,000	10	45,500,000
Strawberries	3,500,000	60	200,000	2	4,400,000	50	500,000	5	8,600,000
Tomatoes	1,400,000	10	3,100,000	10	3,700,000	10	200,000	<1	8,600,000
Carrots			7,400,000	50			1,100,000	10	8,500,000
Tobacco	1,600,000	20			60,000	<1	4,800,000	20	6,460,000
Onions	300,000	5	3,400,000	15			1,400,000	5	5,100,000
Peppers	1,100,000	20	1,900,000	15	1,300,000	15	600,000	10	4,900,000
Watermelons	400,000	5	1,600,000	10	700,000	5	600,000	10	3,300,000
Cotton	20,000	<1	60,000	<1			2,900,000	<1	2,980,000
Cucumbers	500,000	5	200,000	2	300,000	2	1,200,000	15	2,200,000
Peanuts	50,000	<1	300,000	<1			1,700,000	5	2,050,000

EPA proprietary data, Average usage 2006 through 2008

Metam Sodium

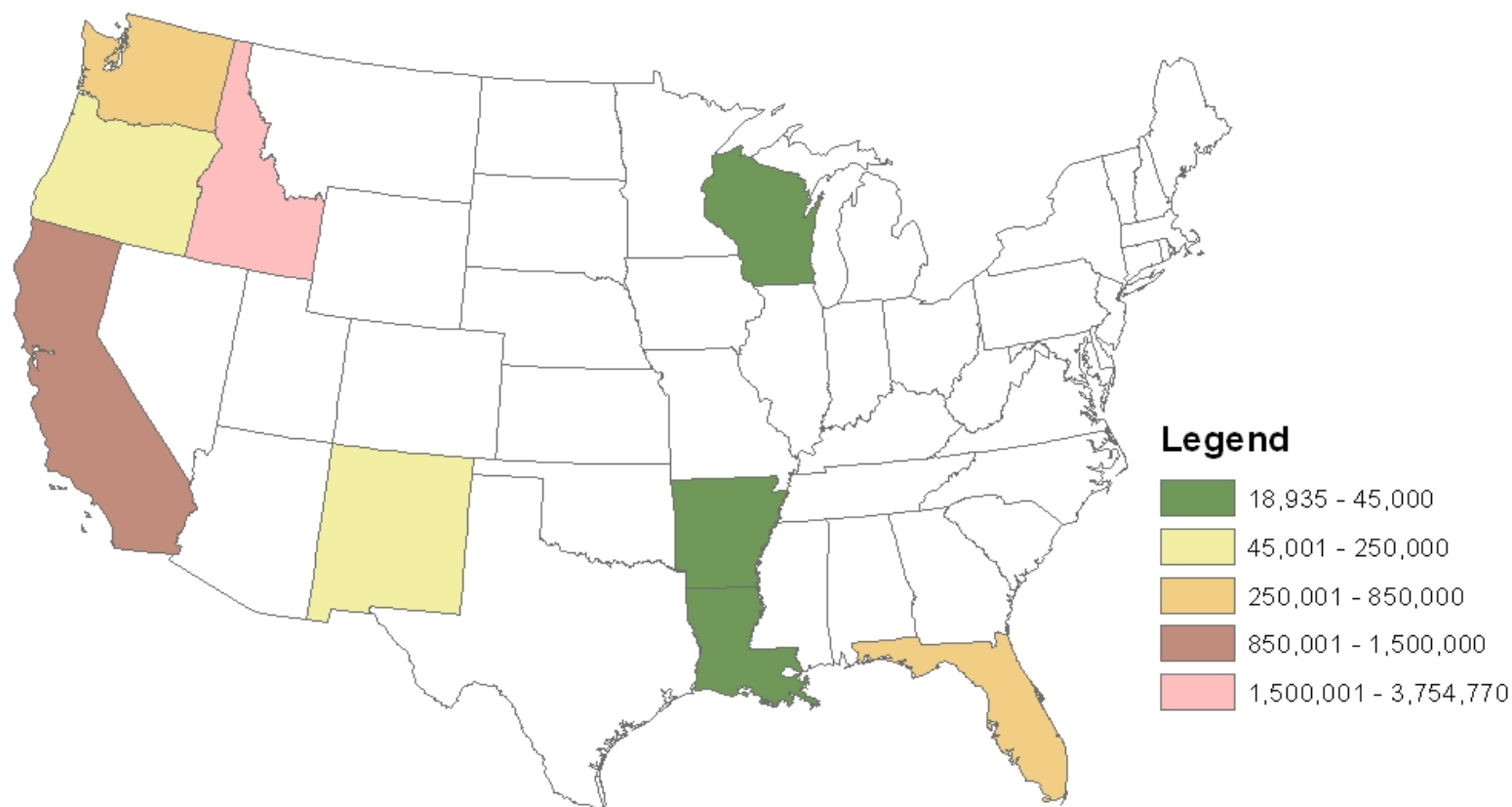
Metam 426, Vapam, HL, Busan 1236, Nemason, Metam CLR, Sectagon 42



EPA proprietary data, Average usage 2006 through 2008

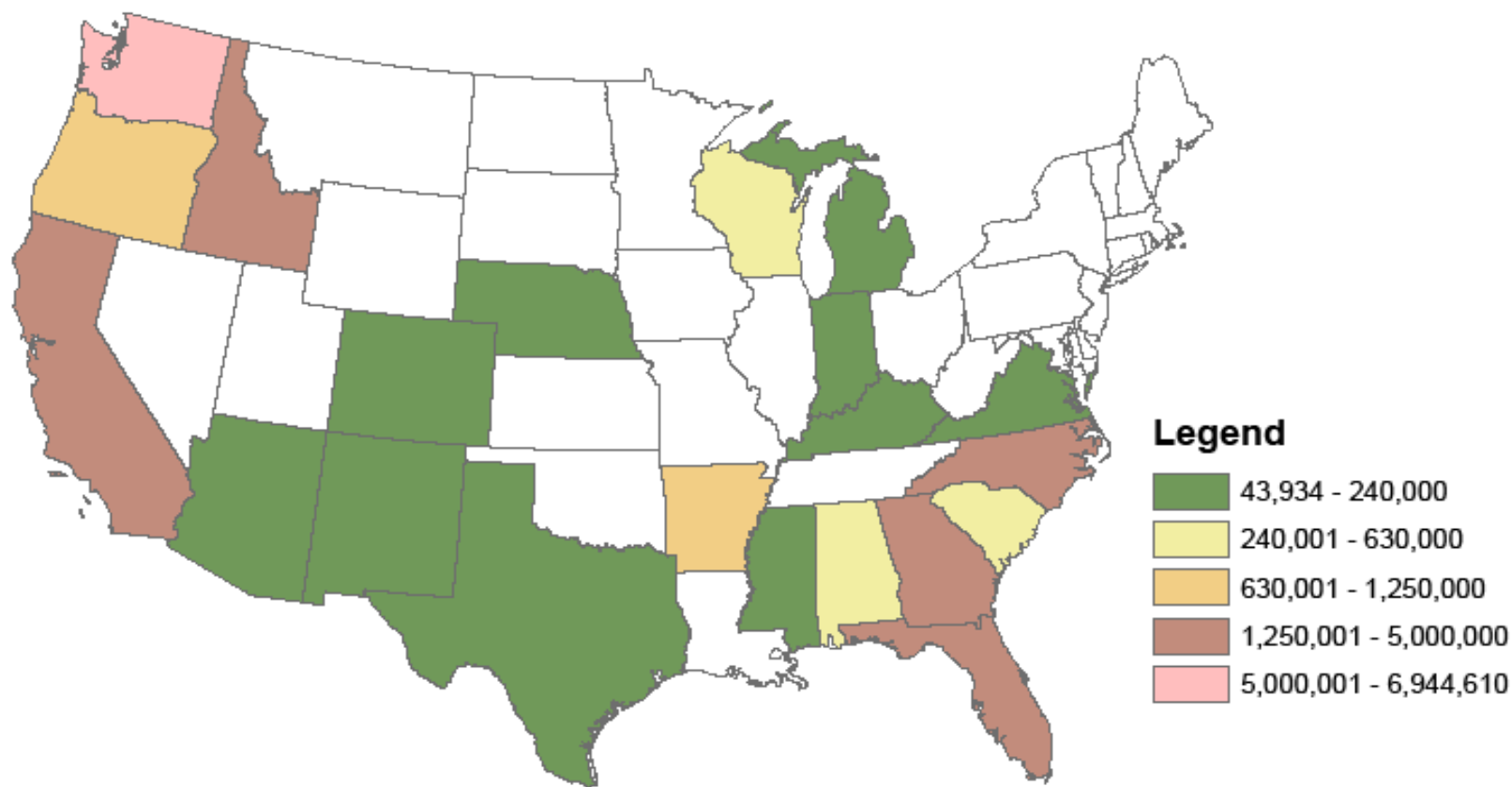
Metam Potassium

Curtin, Metam KLR, K-Pam HL, Raisan K-50, Sectagon K-54



1,3-Dichloropropene

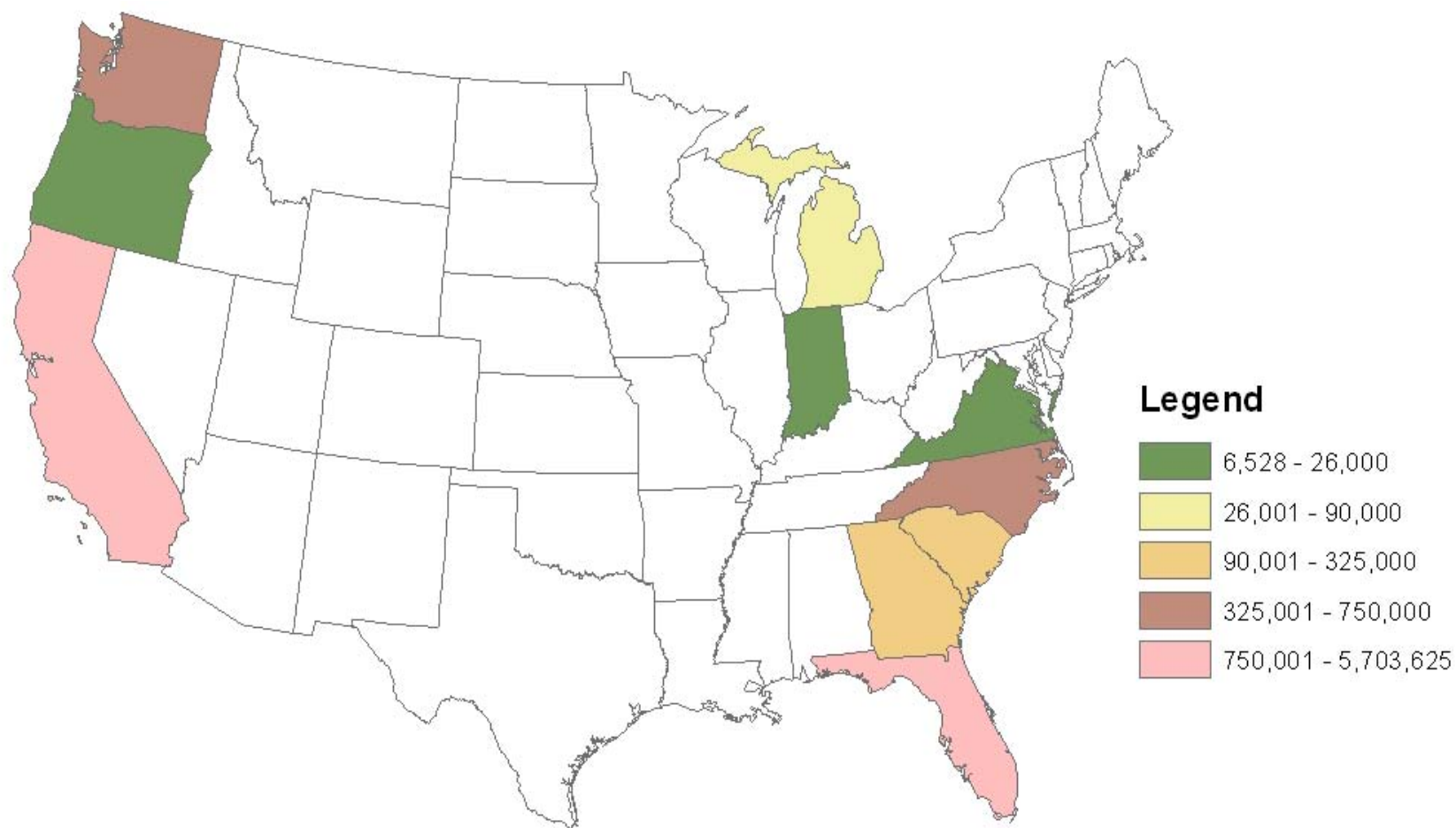
1,3-D, DD-92, Inline, Telone II, Telone, C-17, C-35



EPA proprietary data, Average usage 2006 through 2008

Methyl Bromide

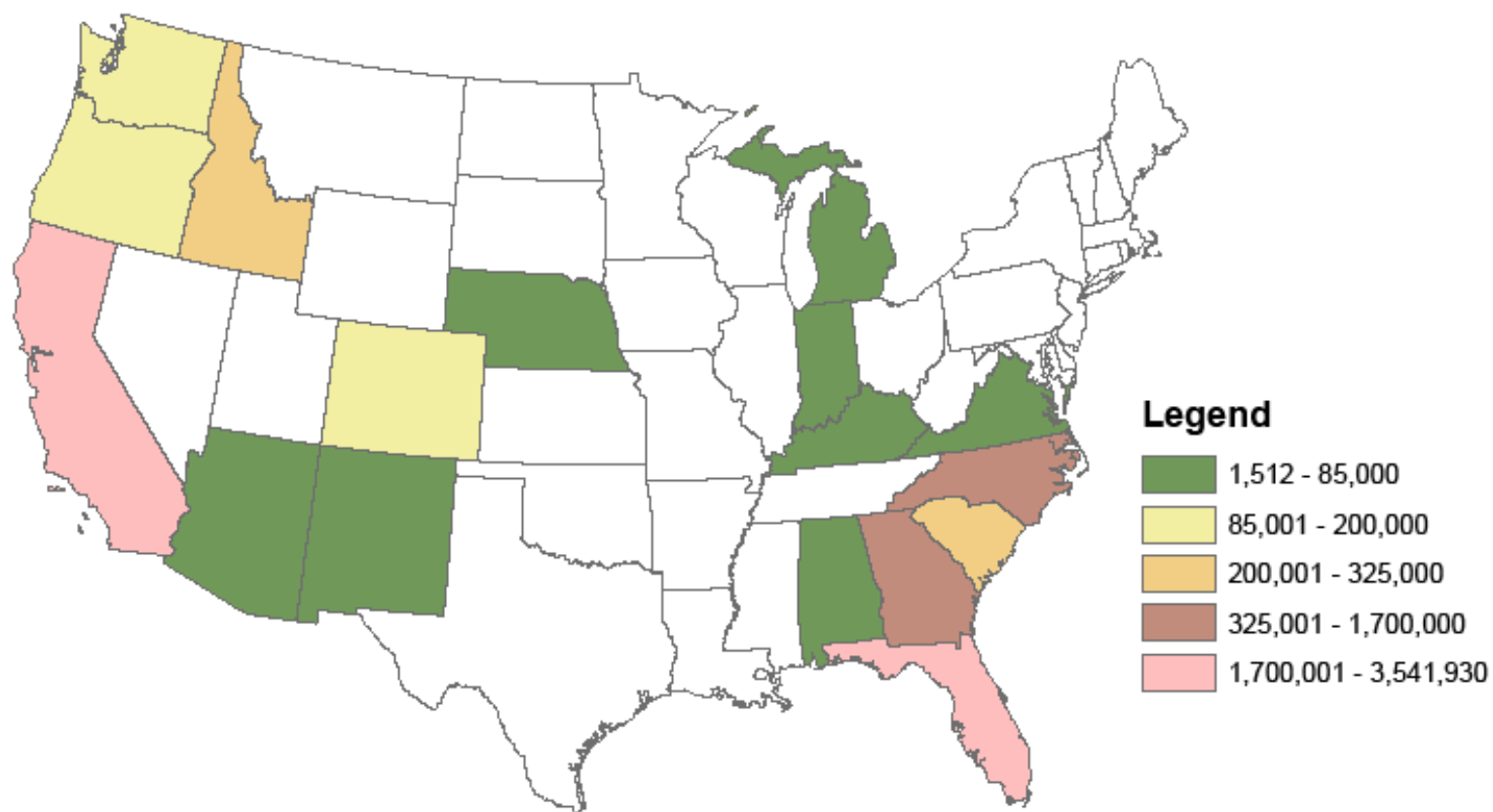
Bromocoop, Brom-O-Gas, Terr-O-Gas, Tri-con



EPA proprietary data, Average usage 2006 through 2008

Chloropicrin

Telone, C-17, C-35, Bromocoop, Bromo-O-Gas



Risk Overview

Risk Overview - Focus Is Acute Residential Bystander Risks



Wind

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



Risk Overview - Soil Fumigant Risk Assessments

- Hazard Identification and Assessment
 - Chloropicrin
 - Eye, nose, throat, and upper respiratory irritation
 - Methyl Isothiocyanate (MITC) generators (Metam sodium/potassium and Dazomet)
 - Eye irritation, systemic, and respiratory effects
 - Methyl Bromide
 - Odorless and colorless
 - Developmental and neurological effects
 - Skin cancer resulting from ozone-depletion

Risk Overview - Soil Fumigant Risk Assessments

- Exposure assessments
 - Monitoring studies
 - Measure concentrations in and around fields and in the breathing zone of handlers that show concentrations that can cause adverse effects
 - Modeling
 - Predict concentrations under differing weather and field conditions
 - Information from exposure incidents
 - Effects observed are consistent with the Risk Assessment predictions
 - Causes of exposures

Risk Overview – Risk Conclusions

- Assessments based on best available data and information
- Multiple lines of evidence

→ *Risk to workers and bystanders are of concern*

Risk Overview - Mitigation Summary

Package of measures that work together to

- Reduce potential for direct exposure to toxic concentrations
- Reduce likelihood of accidents and errors
- Foster planning and compliance
- Assure appropriate response to exposures that occur

Implementation Schedule 2010 & 2011

2010 Mitigation

- ☐ Good Agricultural Practices (GAPs)
- ☐ RUP classification
- ☐ Handler respiratory protection
- ☐ Tarp perforation and removal restrictions
- ☐ Reentry restrictions
- ☐ Fumigant Management Plans (FMPs)
- ☐ Registrant-provided handler information

2011 Mitigation

- ☐ Buffers and buffer posting
- ☐ Emergency preparedness and response
- ☐ Restrictions near difficult to evacuate sites
- ☐ Registrant-provided training and community outreach programs

Current Implementation Schedule: 2010 Labeling

- | | |
|--------------------|-------------------|
| • Outreach | Ongoing |
| • Label Submission | January 2010 |
| • Label Approvals | Early Spring 2010 |
| • Labels in Field | Late 2010 |

Planned Implementation Schedule: 2011 Labeling

- | | |
|--------------------|------------|
| • Outreach | Ongoing |
| • Label Submission | Late 2010 |
| • Label Approvals | Early 2011 |
| • Labels in Field | 2011 |

New Label Requirements (2010)

Restricted Use Product

RUP Classification

- All products containing methyl bromide, 1,3-dichloropropene, and chloropicrin are currently restricted-use pesticides.
- Many soil fumigant products containing metam sodium/potassium and dazomet *are not currently* restricted use pesticides.

RUP Classification

- The Agency has determined that all of the soil fumigants undergoing reregistration meet the criteria for restricted use.
- EPA will reclassify metam sodium/potassium and dazomet as restricted use pesticides.

New Label Requirements (2010)

Good Agricultural Practices

Good Agricultural Practices (GAPs)

- Developed by registrants
 - Based on input from growers
- Reviewed by EPA
 - Based on input from growers
- Many GAPs on current labels
 - Presently as recommendations
 - GAPs will be mandatory
- Compliance with GAPs will be captured on FMP

Good Agricultural Practices (GAPs)

- EPA believes GAPs:
 - Reduce the potential for bystander exposure to soil fumigants emissions.
 - Reduce the potential for handler exposure to soil fumigant emissions.
 - Reduce the potential for accidents.
 - Improve the efficacy of soil fumigation.

Good Agricultural Practices (GAPs)

- Current labels recommend and require some practices to reduce off gassing, improve safety and effectiveness.
- Revised labels will include mandatory steps to protect workers, bystanders and improve effectiveness.
- GAPs will be captured on FMP.

Good Agricultural Practices (GAPs)

- GAPs are chemical specific
 - GAPs & Labels are consistent when possible across all soil fumigants
- Examples
 - Wind speed restrictions
 - Soil conditions
 - Soil temperature
 - Soil moisture

GAPs – Product Labeling

- *“The following GAPs must be followed during all fumigant applications.”*
- *“All measurements and documentation to ensure the mandatory GAPs are achieved must be recorded in the FMP and/or the post-application summary report.”*

GAPs – Soil Temperature

- Ground Rig with Soil Incorporation:
 - *“At beginning of application, maximum soil temperature at injection depth is 90°F.”*
- Chemigation:
 - *“At beginning of application, the maximum soil temp is 90 degrees, measured at 3 inches in depth.”*

Fumigant Handler Protection Measures (2010)

Who is a handler?

- A person:
 - in the application block from the start of the application until the entry restricted period ends, and/or
 - in the buffer zone from the start of the application until the buffer zone period ends

AND

- A person performing “handler activities”

Handler activities include:

- Participating in the application as supervisors, loaders, drivers, tractor co-pilots, shovelers, cross ditchers, or as other direct application participants;
- Using devices to take air samples to monitor fumigant air concentrations;
- Cleaning up fumigant spills (this does not include emergency personnel not associated with the fumigation application);
- Handling or disposing of fumigant containers;
- Cleaning, handling, adjusting, or repairing the parts of fumigation equipment that may contain fumigant residues;
- Installing, repairing, operating, or removing irrigation equipment in the application block or surrounding buffer zone during the buffer zone period;
- Entering the application block or surrounding buffer zone during the buffer zone period to perform scouting, crop advising, or monitoring tasks;
- Installing, perforating, removing, repairing, or monitoring tarps
- Performing any handling tasks as defined by the WPS.

Handler Respiratory Protection

- Handlers must stop work or use respirators if air concentrations exceed acceptable limits or if they experience sensory irritation
- For methyl bromide formulations with $< 20\%$ chloropicrin, handlers must use respirators and monitor with devices to determine the air concentrations to ensure the upper working limit of the respirator is not exceeded.

Handlers who use respirators must be:



- fit-tested



- trained



- physically fit to wear a respirator

On-site Respirator Availability

Fumigant	Min # of Handlers On-site	Min # of Air Purifying Respirators	Min # of Air Rescue Devices
Methyl bromide	2	2	1
Chloropicrin	2	2	1
Metam sodium/ potassium	1	1	0
Dazomet	1	1	0

Tarp Perforation and Removal (2010)

Tarp Perforation and Removal

Perforation

- 5 days after fumigant application is complete

Removal

- 2 hours after perforation is complete

Planting

- Less than 14 days after application:
 - Plant 48 hours after tarp perforation is complete
- 14 days or more after application:
 - Perforate and plant simultaneously

Early Tarp Removal and Perforation Exceptions

- Early removal (before 5 days) for broadcast applications allowed
 - if adverse weather conditions (e.g., high wind, hail, storms) have compromised the integrity of the tarp and the tarp poses a safety hazard
- Early perforation (before 5 days) for flood prevention activities
 - Tarps must be retucked and packed after soil removal

Entry Restricted Period (2010)

Entry Restriction Period

- Current labels allow reentry after 48 hours
- Fumigant dissipation rate highly variable (soil conditions, application method, tarp type, etc.)
- Reentry time lengthened

Entry Restricted Period $\neq$ REI

Entry Restricted Period: Untarped Applications

5 days

Drip



Shank Untarped



Center Pivot



Entry Restricted Period: Tarped Applications



- For broadcast fumigation:
 - If tarps are perforated and removed less than 14 days after application
 - entry into the treated area is prohibited until tarps are removed



- For bedded fumigation:
 - If tarps will not be removed for at least 14 days but they will be perforated
 - entry into the treated areas is prohibited until 48 hours after tarps are perforated.
- For either bedded or broadcast fumigation:
 - If tarps are perforated and/or removed **after** 14 days
 - entry into the treated area is prohibited for 5 days

(Note: If people are manipulating tarps within 14 days after application, they are handlers)

Fumigant Management Plans (2010)

Fumigant Management Plans (FMPs) Implementation

FMPs will be implemented in 2 phases:

- 2010 - FMPs capture only current and first phase label requirements
- 2011 - FMPs will also capture second phase requirements

Fumigant Management Plans (FMPs)

- Fumigant users must prepare a written, site-specific plan before fumigation begins
- FMPs help
 - Ensure fumigators successfully plan all aspects of a safe and effective fumigation
 - Prevent accidents, ensure label compliance, and identify appropriate procedures in case of accidents or unforeseen events
 - Demonstrate compliance with label requirements and are a tool for verifying compliance.

Major Elements of FMPs

First Phase - 2010

- General site and applicator information
- Application procedures
- Measurements taken to verify compliance with GAPs
- Handler protection information
- Air monitoring and hazard communication procedures
- Posting (treated area) and record-keeping procedures
- Emergency plans and procedures
- Handler training information provided
- Post-application summary report

Post Application Summary

- Documents any deviations from the FMP
 - E.g., date of application, procedures, personnel, etc.
- Summary of weather, site conditions
- Description of problems or complaints
- Actual dates of tarp activities, sign removal, etc.
- Completed within 30 days of the application; keep with FMP

Fumigant Management Plans (FMPs) Availability

FMP must be available:

- For viewing on site by handlers involved in the application
- To enforcement personnel, upon request
- To emergency response personnel, in case of an emergency

Fumigant Management Plans (FMPs)

Record Keeping

- FMPs and Post-Application Summaries must be kept for 2 years by
 - The certified applicator and
 - The owner/operator (if not the certified applicator)
- Along with other records required for application of RUPs

FMP Sample Template

FUMIGANT MANAGEMENT PLAN

Certified Applicator Supervising the Fumigation		
Name and phone number:	License number and/or certificate number:	☐ Commercial applicator ☐ Private applicator
Employer name and address:		Date of completing registrant training program:
General Site Information		
Application block location (e.g., county, township-range-section quadrant), address, or global positioning system (GPS) coordinates:		
Name, address, and phone number of owner/operator of application block:		
General Application Information		
Target application date/window:	Brand name of fumigant:	EPA Registration Number:

Figure 1. Example of Introductory Screen



2010 Fumigant Management Plan

Enter your User Name:

drewesk

Enter Your Password:

Submit User Name and Password

Navigate To:

Applicator And General Information ▼

Check all boxes below that are applicable to your plan. You can click the "Applicator And General Information Screen" button below to continue or select a screen from the "Navigate To" drop down list to go to a specific screen

List of Sections on This Entry

Applicator and General Information

☐ Tarps

Soil And Weather Conditions

PPE For Handlers

Emergency Response Plan

Posting Signs/Commnuications

Site Map

Handler Information

Air Monitoring Plan

☐ For Handlers without Respiratory Protection

☐ For Handlers with Respiratory Protection

Air Monitoring Plan for Methyl Bromide

Formulation with > 80% Methyl Bromide

Methyl Bromide Checklist

General Site Information

Supervision of Handlers

Weather Conditions

Soil Conditions

☒ Shank Applications

☐ Hot Gas Applications

☒ Tree Replant (non-shank) Application

PPE For Handlers

Hazard Communication

Record Keeping

Post Application Summary

General Application Information

Weather Conditions

☒ Soil Conditions

☐ Tarp Damage and Repair

☐ Tarp Removal

☒ Complaints

☐ Description of Incidents

☒ Elevated Air Concentration Levels

Posting Signs - Treated Area

Other

Air Monitoring Results

☐ When Respiratory Protection is Not in Use – Sensory Irritation Experienced

☐ When Respiratory Protection is in Use – Direct Read Instrument Air Monitoring

Continue to Applicator And General Information Screen -->

Registrant Requirements (2010 & 2011)

Safe Handling Information for Handlers
Information for First Responders
Training for Certified Applicators
Information for Communities

Safe Handling Information for Handlers (2010)

- Registrants must develop and disseminate basic safety information for handlers
 - Increase fumigant handlers' safety awareness
- Must include information on
 - Safe handling practices
 - Respiratory protection
 - Early signs of exposure
 - What to do in case of exposure or emergency
- Certified applicators must ensure handlers have received the information within the last year

Information for First Responders (2011)

- Registrants provide first responders in high-fumigant use areas with information to help ensure appropriate responses to incidents to which they may respond
- Information includes
 - How to recognize fumigant exposure incidents
 - How to treat exposures
 - How fumigant exposure differs from other types of chemical exposures
 - Material safety data sheets for fumigants
- In development 2010; implemented 2011

Training for Certified Applicators (2011)

- Registrants must develop and disseminate training for certified applicators in charge of fumigations
 - Increase knowledge and skill
- Must include information on
 - How to apply correctly
 - How to protect workers and others
 - How to comply with new label requirements

Information for Communities (2011)

- ☐ Registrants will develop and programs to provide information to communities where use is high
- ☐ Programs will include information on:
 1. What soil fumigants are and how they work
 2. What buffer zones are meaning of posted signs
 3. Early signs and symptoms of exposure
 4. Appropriate steps to take to mitigate exposures
 5. What to do in case of an emergency
 6. How to report an incident
 7. What buffer zone warning signs mean
 8. Means to evaluate effectiveness of programs
- ☐ EPA encourages registrants to work with existing community resources to implement programs

2011 Measures

Buffer Zones - (2011)

- ☐ The area around the application block or greenhouse where bystanders must be excluded during the buffer zone period, except for people in transit.
- ☐ The “buffer zone period” starts when a fumigant is first delivered to the soil and is in effect for 48 hours after the fumigant has stopped being delivered to the soil.

Buffer Zones - (2011)

Example Buffer Table Based On New Data

Metam Sodium Buffer Table Distance in Feet Rotary Tiller and Spray Blade Applications			
Block Size In Acres	Application Rate (pounds of active ingredient per Acre)		
	280	300	320
5	25 ft	25 ft	25 ft
7	32 ft	36 ft	39 ft
9	39 ft	47 ft	53 ft

Buffer Zone Posting – (2011)

Buffer Zone Posting – (2011)

- ❑ Buffer zones must be posted at usual points of entry and along likely routes of approach to the buffer unless a physical barrier such as a fence prevents access to the buffer
- ❑ Examples of points of entry include roads, sidewalks, walking paths, and bike trails
- ❑ Examples of routes of approach include the area between a buffer and a road or a residential area

Buffer zone sign must include:



- ➡ “Do Not Walk” symbol
- ➡ "DO NOT ENTER/NO ENTRE,"
- ➡ "[Name of fumigant, name of product] Fumigant BUFFER ZONE”
- ➡ certified applicator contact information

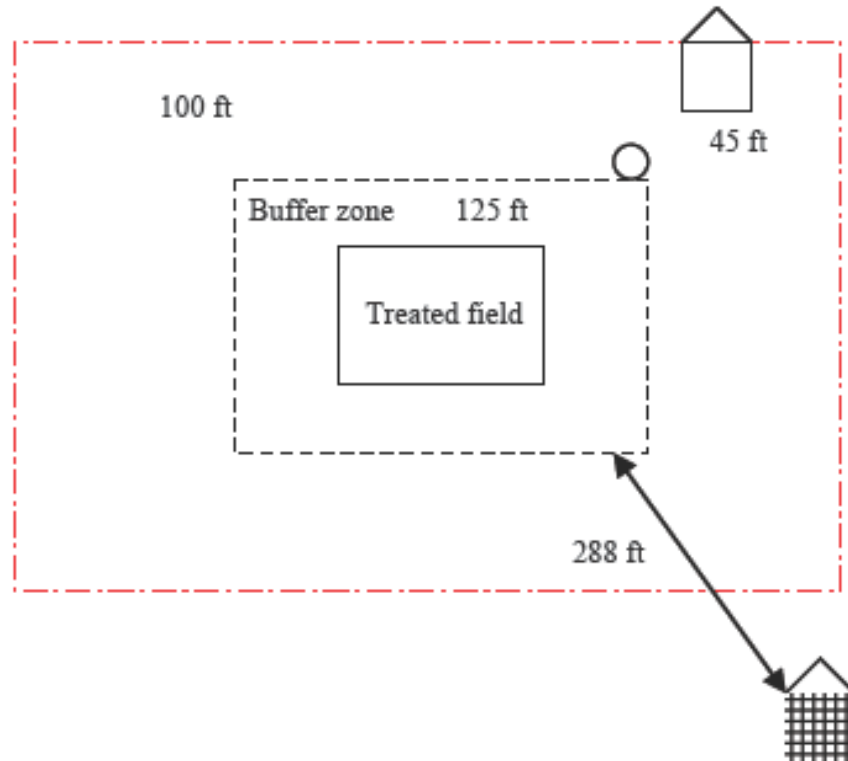
Emergency Preparedness and Response – (2011)

Emergency Preparedness and Response

If occupied structures are in close proximity to a buffer zone, the certified applicator must choose either

- ☐ “Fumigant Site Monitoring” or
- ☐ “Response Information for Neighbors”

Example Site Map - Emergency Response Measures



- If the buffer zone is **125 feet**, then these requirements apply to residences within 100 feet of the buffer zone.
- Either the applicator must monitor the area between the plain house and the buffer zone or residents of the plain house must be provided emergency response information.
- The location of the cross-hatched house would not prompt any action.

Difficult to Evacuate Sites – (2011)

Difficult To Evacuate Sites – (2011)

- If the buffer zone is **> 300 feet**
 - Then “Difficult To Evacuate Site” must not be within **$\frac{1}{4}$ mile (1320 feet)** of the treated area
- If the buffer zone is **≤ 300 feet**
 - Then “Difficult To Evacuate Site” must not be within **$\frac{1}{8}$ mile (660 feet)** of the treated area

The difficult to evacuate site cannot be occupied during the application and, for 36-hours after application.

EPA has defined *difficult-to-evacuate sites* as:
schools (preschool-12), state licensed daycare centers, nursing homes,
assisted living facilities, hospitals, in-patient clinics, and prisons

Next Steps

2010

- **Training and outreach, Registrants, EPA, States**
- **Revised labels with 2010 mitigation measures appear in the field**
- **New emissions studies submitted, reviewed**
- **Registrants submit amended labels that include measures for 2011**
- **EPA reviews labels for 2011 use season**

2011

- **EPA completes reviews of 2011 labels**
- **Full implementation of label requirements and registrant training and outreach programs**

2013

- **EPA initiates Registration Review for soil fumigants**

EPA Soil Fumigant Contacts

- General Contact:
 - John Leahy (703) 305-6703
- Chemical Managers:
 - Methyl bromide: Susan Bartow (703) 603-0065 and Steven Weiss (703) 308-8293
 - Metam sodium: Dana Friedman (703) 347-8827 and Dirk Helder (208) 378-5749
 - Dazomet: Dana Friedman (703) 347-8827 and Cathryn O'Connell (703) 308-0136
 - 1,3-D & Chloropicrin: Andrea Carone (703) 308-0122
 - Iodomethane Product Manager: Mary Waller (703) 308-9354

E-mail: lastname.firstname@epa.gov

ADDITIONAL INFORMATION

Respirator fit testing, medical qualification, and training

“Employers must verify that any handler who uses a respirator is:

- Fit-tested and fit-checked using a program that conforms to OSHA’s requirements (see 29 CFR Part 1910.134)
- Trained using a program that conforms to OSHA’s requirements (see 29 CFR Part 1910.134)
- Examined by a qualified medical practitioner to ensure physical ability to safely wear the style of respirator to be worn. A qualified medical practitioner is a physician or other licensed health care professional who will evaluate the ability of a worker to wear a respirator. The initial evaluation consists of a questionnaire that asks about medical conditions (such as a heart condition) that would be problematic for respirator use. If concerns are identified, then additional evaluations, such as a physical exam, might be necessary. The initial evaluation must be done before respirator use begins. Handlers must be reexamined by a qualified medical practitioner if their health status or respirator style or use-conditions change. Upon request by local/state/federal/tribal enforcement personnel, employers must provide documentation demonstrating how they have complied with these requirements”

OSHA Respirator Medical Evaluation Questionnaire

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9783

Proximity Triggers for Site-Specific Measures

Buffer zones of 25 feet do not require any additional action.

If the buffer zone is:	AND there are residences and businesses:
> 25 feet and $\leq$ to 100 feet	50 feet from the edge of the buffer zone
> 100 feet and $\leq$ 200 feet	100 feet from the edge of the buffer zone
> 200 feet and $\leq$ 300 feet	200 feet from the edge of the buffer zone
> 300 feet	300 feet from the edge of the buffer zone

Then the applicator must either: monitor the air (Option 1) or provide information to neighbors (Option 2).