Module 7
Soil Fumigant RED Requirements

Buffer Zones
Distances, Credits & Posting
(2011)
What is an application block?

- The perimeter of the application block is the border that connects the outermost edges of total area treated with the fumigant product within any 24-hour period (except for center pivot chemigation that occurs over several days).
- The size of the application block is the area within the perimeter of the field where the fumigant is applied.
What is a Buffer Zone?

- Area around application block
  - Bystanders and pedestrians must be kept out during buffer zone period

- Buffer zone period
  - begins when application begins
  - ends 48 hrs after application ends
Residential Areas within Buffer Zones

- Buffer zones may include residential areas if occupants provide written agreement to voluntarily vacate.

- For methyl bromide products with <20% chloropicrin, air monitoring inside residences is required after buffer zone period ends.
Roads and Rights-of-Ways within Buffer Zones

Buffers may include roads or rights-of-way only IF

- Area is *unoccupied* during buffer zone period
- Entry by non-handlers is *prohibited*
- Applicators *comply with all* local laws & regulations
Publicly Owned/Operated Areas within Buffer Zones

Buffers may include public areas only *IF*

- Area is *unoccupied* during buffer zone period
- Non-handlers prohibited from entering
- Applicators comply with all local laws and regulations

*AND*

- Have written permission from state/local authorities responsible for management & operation of area
Transit Through Buffer Zones

- **Allowed:**
  - Vehicular and bicycle traffic on public and private roadways

- **Prohibited:**
  - Pedestrians
  - Bus stops or places where people wait for public transit
Other Agricultural Areas within Buffer Zones

May include agricultural areas owned/operated by another person IF

- buffer zones will not overlap, and
- owner/operator provides written agreement that nobody will enter
Overlapping Buffer Zones

- Buffer zones of multiple application blocks may overlap IF
  - at least 12 hours have passed between end of 1\textsuperscript{st} and beginning of 2\textsuperscript{nd} application*, and
  - emergency preparedness/response measures implemented if homes, businesses, property are within 300 feet of each buffer zone

*exception: metam sodium/potassium low release height-solid stream center pivot applications
Distances for Buffer Zones

- Product labels will display distances in tables based on:
  - application rate
  - application block size
  - application equipment & methods

- Buffer zone “credits”
  - Earned for certain site conditions or application practices that reduce emissions (e.g., certain tarps)
# Buffer Zone/Application Method Scenarios

<table>
<thead>
<tr>
<th>Shank injection</th>
<th>Methyl Bromide</th>
<th>Chloropicrin</th>
<th>Metam Sodium/Potassium</th>
<th>Dazomet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedded Tarped</td>
<td>●²</td>
<td>●²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedded Untarped</td>
<td>●²</td>
<td>●²</td>
<td>●²</td>
<td></td>
</tr>
<tr>
<td>Broadcast Tarped</td>
<td>●²</td>
<td>●</td>
<td>●²</td>
<td></td>
</tr>
<tr>
<td>Broadcast Untarped</td>
<td>●</td>
<td>●</td>
<td>●²</td>
<td></td>
</tr>
</tbody>
</table>

## Chemigation, Drip

<table>
<thead>
<tr>
<th></th>
<th>Methyl Bromide</th>
<th>Chloropicrin</th>
<th>Metam Sodium/Potassium</th>
<th>Dazomet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarped</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Untarped</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Chemigation, Center Pivot

<table>
<thead>
<tr>
<th></th>
<th>Methyl Bromide</th>
<th>Chloropicrin</th>
<th>Metam Sodium/Potassium</th>
<th>Dazomet</th>
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</thead>
<tbody>
<tr>
<td>Low Release</td>
<td></td>
<td></td>
<td>●²</td>
<td></td>
</tr>
<tr>
<td>Med Release</td>
<td></td>
<td></td>
<td>●²</td>
<td></td>
</tr>
<tr>
<td>High Release</td>
<td></td>
<td></td>
<td>●²</td>
<td></td>
</tr>
</tbody>
</table>

## Chemigation, other

<table>
<thead>
<tr>
<th></th>
<th>Methyl Bromide</th>
<th>Chloropicrin</th>
<th>Metam Sodium/Potassium</th>
<th>Dazomet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand held probe for tree holes</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor tiller</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Spray Blade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Hot gas

<table>
<thead>
<tr>
<th></th>
<th>Methyl Bromide</th>
<th>Chloropicrin</th>
<th>Metam Sodium/Potassium</th>
<th>Dazomet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor</td>
<td>●²</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grenhouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The only untarped application permitted for MeBr is CA orchard replant
2. New flux studies have been submitted to EPA that may result in change in buffer distances or credits applied
## Buffer Zone Credits

<table>
<thead>
<tr>
<th>Condition</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MeBr</td>
</tr>
<tr>
<td>Use of high barrier tarp</td>
<td>30 or 60</td>
</tr>
<tr>
<td>Organic matter content</td>
<td>10</td>
</tr>
<tr>
<td>&gt; 1% -2%</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 2% -3%</td>
<td>30</td>
</tr>
<tr>
<td>&gt; 3%</td>
<td>10</td>
</tr>
<tr>
<td>Clay content &gt; 27%</td>
<td>10</td>
</tr>
<tr>
<td>Soil Temp</td>
<td>10</td>
</tr>
<tr>
<td>≤ 50 F (center pivot and shank)</td>
<td>NA</td>
</tr>
<tr>
<td>&gt; 50-70 F (center pivot and shank)</td>
<td>NA</td>
</tr>
<tr>
<td>&gt; 50-70 F (drip irrigation, flood irrigation, and rotary tiller and spray blade applications)</td>
<td>NA</td>
</tr>
<tr>
<td>Symmetry application system, high barrier tarp, &lt;100 lb ai/A</td>
<td>NA</td>
</tr>
<tr>
<td>Potassium thiosulfate seal with water applied over tarp</td>
<td>15</td>
</tr>
<tr>
<td>Water seal applied over tarp</td>
<td>NA</td>
</tr>
<tr>
<td>Max reduction</td>
<td>80</td>
</tr>
</tbody>
</table>
## Flux Studies Under Review by EPA

<table>
<thead>
<tr>
<th>Study Sponsor</th>
<th>Fumigant(s)</th>
<th>Location</th>
<th>Application Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Wasco, CA</td>
<td>Strip, VaporSafe TIF tarped</td>
</tr>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Wasco, CA</td>
<td>Broadcast, LDPE tarped</td>
</tr>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Wasco, CA</td>
<td>Broadcast, VaporSafe TIF tarped</td>
</tr>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Wasco, CA</td>
<td>Broadcast, VaporSafe TIF tarped, KTS under tarp</td>
</tr>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Wasco, CA</td>
<td>Deep 18&quot;Broadcast, VaporSafe TIF tarped</td>
</tr>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Plant City, FL</td>
<td>Raised Bed, TIF</td>
</tr>
<tr>
<td>MBIP</td>
<td>MeBr, Pic</td>
<td>Plant City, FL</td>
<td>Hot Gas, TIF</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Metam, Pic, DMDS</td>
<td>Tifton, GA</td>
<td>Bedded, Blockade Tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Metam, Pic, DMDS</td>
<td>Tifton, GA</td>
<td>Bedded, LDPE tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Metam, Pic, DMDS</td>
<td>Tifton, GA</td>
<td>Bedded, LDPE tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Metam, Pic, 1,3-D</td>
<td>Duette, FL</td>
<td>Bedded, Metallized tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Metam, Pic, 1,3-D</td>
<td>Duette, FL</td>
<td>Bedded, Guardian VIF tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Pic, 1,3-D</td>
<td>Ft. Pierce, FL</td>
<td>Broadcast, low disturbance rig with surface compaction, HDPE tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Pic, 1,3-D</td>
<td>Ft. Pierce, FL</td>
<td>Broadcast, back swept shanks, HDPE tarped</td>
</tr>
<tr>
<td>USDA Areawide</td>
<td>Metam, Pic, 1,3-D</td>
<td>Duette, FL</td>
<td>Bedded, Metallized tarped</td>
</tr>
<tr>
<td>WI Potato Growers</td>
<td>Metam</td>
<td>Coloma, WI</td>
<td>Broadcast (Dual Injection at 5.5 and 9.5&quot;), water seal (0.1&quot;)</td>
</tr>
<tr>
<td>WI Potato Growers</td>
<td>Metam</td>
<td>Coloma, WI</td>
<td>Broadcast (Dual Injection at 5.5 and 9.5&quot;), water seal (0.1&quot;)</td>
</tr>
<tr>
<td>MI Potato Growers</td>
<td>Metam</td>
<td>Howard City, MI</td>
<td>Broadcast (Injection at 12&quot;)</td>
</tr>
<tr>
<td>MI Potato Growers</td>
<td>Metam</td>
<td>Howard City, MI</td>
<td>Broadcast (Injection at 12&quot;), water seal (0.33&quot;)</td>
</tr>
<tr>
<td>WA Potato Growers</td>
<td>Metam</td>
<td>Kennewick, WA</td>
<td>Broadcast (Injection at 9&quot;)</td>
</tr>
<tr>
<td>WA Potato Growers</td>
<td>Metam</td>
<td>Kennewick, WA</td>
<td>Broadcast (Injection at 9&quot;), water seal (0.25&quot;)</td>
</tr>
<tr>
<td>Metam Alliance</td>
<td>Metam</td>
<td>Bakersfield, CA</td>
<td>Broadcast (daytime), double water seal (0.4&quot; after app, 0.4&quot; at sunset)</td>
</tr>
<tr>
<td>Metam Alliance</td>
<td>Metam</td>
<td>Bakersfield, CA</td>
<td>Broadcast (nighttime), double water seal (0.4&quot; after app, 0.4&quot; at sunset)</td>
</tr>
<tr>
<td>Metam Alliance</td>
<td>Metam</td>
<td>Modesto, CA</td>
<td>Drench, triple water seal (0.2&quot; after app, 0.2&quot; at sunset of Day 1 and 2)</td>
</tr>
<tr>
<td>WSU</td>
<td>Metam</td>
<td>Pasco, WA</td>
<td>Broadcast</td>
</tr>
<tr>
<td>WSU</td>
<td>Metam</td>
<td>Pasco, WA</td>
<td>Center Pviot Irrigation-Drizzle Boom</td>
</tr>
<tr>
<td>CMTF</td>
<td>Pic</td>
<td>Elkton, FL</td>
<td>Bedded,untarped</td>
</tr>
<tr>
<td>CMTF</td>
<td>Pic</td>
<td>Elkton, FL</td>
<td>Bedded,untarped</td>
</tr>
<tr>
<td>WI Potato Growers</td>
<td>Pic</td>
<td>Coloma, WI</td>
<td>Bedded, untarped, water seal (0.1 in)</td>
</tr>
</tbody>
</table>
Testing the Permeability of Tarps

- Determine mass transfer coefficient (MTC) for 1,3-D, MeBr, MeI, MITC, chloropicrin, DMDS, sulfuryl fluoride, and PPO

- MTC data may result in additional/revised buffer zone credits for 2011 labels

- Potential performance based credits (in lieu of credits for specific tarp names) with a standard tarp testing protocol
Tarps Received and Tested by EPA

- FilmTec VIF
- MidSouth VIF
- Guardian VIF
- Raven VaporSafe
- AEP Sun Film High Barrier
- AEP-ONE
- Pliant Regular Black
- Pliant Black Blockade
- Pliant Black/White Blockade
- Pliant Black Metallized
- SARANEX A
- SARANEX B
- Canslit LDPE
- Canslit HDPE
- Canslit Metalized Black
- Canslit Metalized White
- EVOH (High Barrier w/Improved toughness)
- EVOH (Supreme Barrier)
- EVOH (High Barrier)
- Cadillac HDPE
- Cadillac VIF
- Ginegar, Black, Ozgard
- Ginegar VIF, Embossed
- Hytibar
Web Based Buffer Zone Calculator

- Tool to determine buffer zone distances required by label
- Internet accessible
- Ability to save, retrieve, edit, and print
- Optional; no information collected by EPA
- May integrate into EPA’s web-based program for FMPs
Buffer Zone Calculator (sample screen)

Terms of Use:
This buffer zone calculator was developed by the US EPA and intended to be used as a tool to aid applicators, growers, enforcement personnel and others determine the buffer zones distances required by soil fumigant labels. The certified applicator supervising the fumigant application must read the product label and verify that the inputs for the application methods, rates, block sizes, buffer zone credits, and calculated results are consistent with the specific product label that is going to applied before the application begins. If there any discrepancies between the results of the calculator and the label, the label must be followed.

Accept Terms of Use

Enter User Name: JoeApplicator1
Enter Password: *

Submit User Name and Password

Enter a file name for your run (max 16 characters) OR Select from a list of prior runs
Block A

Select:
Block A
Block B
test

Continue To Product Info Screen -->

Module 7: Buffer Zones
Buffer Zone Calculator (sample screen)

<table>
<thead>
<tr>
<th>EPA reg number:</th>
<th>11220-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name:</td>
<td>Tri-Con 50/50</td>
</tr>
<tr>
<td>Company name:</td>
<td>Trical</td>
</tr>
</tbody>
</table>
| Active ingredients: | methyl bromide - 50%  
|                  | chloropicrin - 49.5% |
| Application method: | Tarped bedded  
|                   | Tarped broadcast  
|                   | Deep untarped  
|                   | Outdoor tarped hot gas  
|                   | Greenhouse tarped hot gas  
|                   | Tree hole replacement with hand held probe |

Note: User must verify that the application methods selected are allowed by product label.

| Soil moisture: | Soil moisture is ≥ 70% and measured with instrument or ≥75% using the USDA Feel and Appearance Method  
|               | Soil moisture is 50 to 69% and measured with instrument or 50 to 75% using the USDA Feel and Appearance Method |

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Module 7: Buffer Zones
Buffer Zone Calculator

Module 7: Buffer Zones

Application rate: 240 lbs product/acre
Application block size: 20 acres

Enter broadcast equivalent rate IF the application method is bedded or strip

Tarps/high barrier films used:
- Canslit Heatstrip (30% reduction)
- Canslit Metalized (30% reduction)
- Olefinas Embossed VIF (60% reduction)
- Klerks VIF (60% reduction)
- Pliant Blockade (60% reduction)
- Bromostop (1.38 mil) (60% reduction)
- Eval/Mitsui TIF (1.38 mil) (60% reduction)
- Hytiblock 7 Black (0.00125”) (60% reduction)
- XL Black Blockade (0.00125”) (60% reduction)
- Hytibar (1.5 mil) (60% reduction)
- IPM Clear VIF (1.38 mil) (60% reduction)

☐ Tarp is not listed above (no credit)

☐ Potassium thiosulfate (KTS) applied with 1/4 to 1/2 inch of water over a tarp (15% reduction)

Organic content of the soil in the application block:
- < 1% (no credit)
- > 1% to 2% (10% reduction)
- > 2% - 3% (20% reduction)
- > 3% (30% reduction)

Clay content of the soil in the application block:
- < 27% (no credit)
- > 27% (10% reduction)
Buffer Zone Calculator Results

Date and time of calculation: 7/28/2010 9:31:56 AM
Product name: Tri-Con 50/50
EPA reg no: 11220-10
Active ingredients:
  - methyl bromide - 50%
  - chloropicrin - 49.5%
Application method: Tarped bedded
Soil moisture:
  Soil moisture is >= 70% and measured with instrument or >= 75% using the USDA Feel and Appearance Method

Application rate: 240 lbs product/acre
Application block size: 20 acres

Buffer zone without credits: 323 feet
Buffer zone credits applied:
  - Pliant Blockade (60% reduction)

Total percent of reduction with credits: 60 % reduction
Buffer zone with credits: 130 feet
Posting Buffer Zones

- At usual points of entry
  - roads, sidewalks, walking paths, and bike trails

- Along likely routes of approach
  - area between a buffer and road or residential area

- Unless a physical barrier such as a fence prevents access
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
Signs for Posting Buffer Zones

- Must be:
  - facing in the direction people approach the area
  - legible
  - posted before application and remain until end of buffer zone period
  - removed within 3 days after end of buffer zone period
  - Signs will be available at points of sale
Treated Area Posting Signs
(already required on labels)
True or False?

1. The “buffer zone period” starts after the fumigant has stopped being delivered to the soil and is in effect for 48 hours.
Review Question:

2. The occupants of the home located in the buffer zone has provided a written agreement that they will *voluntarily* vacate the buffer zone during the entire buffer zone period. Is this permitted?
Review Question #3:
Block A: starts Monday/noon and ends same day at 8:30 pm
B: “ Tuesday/7:00am “ “ 5:00pm
C: “ Monday/9:00am “ “ 4:00pm
The buffer zones for each block are marked below. Is this permitted?
Review Questions

True or False?

4. In 2011, labels will have new requirements for posting treated areas.

5. EPA may revise buffer zone distances and credits on 2011 labels based on new data.
Summary

- Buffer zone
  - is the area around application block
  - ends 48 hours after application ends
  - is based on application rate, equipment & method, and size of block

- Can
  - calculate buffer zone area using table on label, or EPA web-based tool
  - earn credits to decrease buffer zone size
  - include residential & public property, roads, rights-of-way
  - allow transit, but pedestrians & areas such as bus stops are prohibited

- May overlap with another buffer zone if conditions are met
- Area must be posted before application; signs are removed 3 days after end of buffer zone period
- Posting treated areas is not a new requirement!
EPA Contact Information

- **Leader:**
  - John Leahy (703) 305-6703

- **Team Leaders:**
  - Steven Weiss (703) 308-8293
  - Cathryn O’Connell (703) 308-0136

- **Chemical Review Managers:**
  - Methyl bromide: Susan Bartow (703) 603-0065
  - Metam sodium: Dana Friedman (703) 347-8827 and Jose Gayoso (703) 347-8652
  - Dazomet: Dana Friedman (703) 347-8827
  - 1,3-D & Chloropicrin: Andrea Carone (703) 308-0122

E-mail: lastname.firstname@epa.gov

www.epa.gov/oppsrrd1/reregistration/soil_fumigants