This addendum updates the Field Fumigation Study Guide with recent US EPA changes to soil fumigant pesticide labeling that affect soil fumigant applications.
The *Addendum to the Field Fumigation Study Guide* was published by the California Department of Pesticide Regulation
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It can be downloaded as a PDF file from the Licensing and Certification web site:
http://www.cdpr.ca.gov/docs/license/liccert.htm

**MISSION**

DPR’s mission is to protect human health and the environment by regulating pesticide sales and use and by fostering reduced-risk pest management. DPR’s strict oversight begins with pesticide product evaluation and registration and continues through statewide licensing of commercial applicators, dealers, consultants, and other pesticide professionals; evaluation of health impacts of pesticides through illness surveillance and risk assessment; environmental monitoring of air, water, and soil; field enforcement (with the county agricultural commissioners) of laws regulating pesticide use; residue testing of fresh produce; and encouraging development and adoption of least-toxic pest management practices through incentives and grants. DPR is one of five boards and departments within the California Environmental Protection Agency.

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INTRODUCTION

This document, *Addendum to the Field Fumigation Study Guide* (Addendum), updates the primary study guide *Field Fumigation Study Guide (Volume 9 in the Pesticide Application Compendium)* written by Susan Cohen and Tunyalee Martin of the University of California Davis. The US Environmental Protection Agency’s (US EPA) new fumigant labeling safety requirements are described in detail in this Addendum.

The knowledge expectations for license holders, the Field Fumigation Study Guide, and this Addendum will help you prepare for the Department of Pesticide Regulation’s (DPR) Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC) exam in pest control Category O, Field Soil Fumigation (see Table 1.).

BACKGROUND

US EPA changed safety requirements on soil fumigant labels to better protect applicators/handlers, agricultural workers, and bystanders against fumigant exposure. All of the new safety requirements are being implemented through fumigant product labeling, not by regulation. A sample label with the new safety measures highlighted has been included as Figure 1. Refer to the sample label for examples of the new fumigant labeling protective measures.

SOIL FUMIGANT ACTIVE INGREDIENTS AFFECTED BY LABEL CHANGES

- Chloropicrin
- Dazomet
- 1,3-Dichloropropene with chloropicrin
- Metam sodium
- Metam potassium
- Methyl bromide
- Methyl isothiocyanate (MITC)
SAFETY MEASURES ON THE LABEL

The US EPA fumigant safety measures are addressed in use directions, requirements, and prohibitions related to the topics listed below. Attachment 1 of this Addendum includes US EPA Fact Sheets that describe the safety measures.

- Buffer zones
- Posting requirements
- Agricultural worker protections
- Applicator training requirements and safety information for handlers
- Good agricultural practices
- Application method, practice, and rate restrictions
- Emergency preparedness and response requirements
- Compliance assistance and assurance measures
- Community outreach and education programs
- Site-specific fumigant management plans
- Restricted use pesticides

STUDY MATERIALS AND US EPA FACT SHEETS

Below is a list of the study material that you should review to prepare for the QAL or QAC exam.

Table 1 Field Fumigation Exam Study Materials

<table>
<thead>
<tr>
<th>Study Material</th>
<th>Where to Obtain Materials</th>
</tr>
</thead>
</table>
| *Field Fumigation Study Guide* *(Pesticide Compendium 9)* | University of California Agriculture and Natural Resources sale publication code #9005  
Order online: [http://anrcatalog.ucdavis.edu/Items/9005.aspx](http://anrcatalog.ucdavis.edu/Items/9005.aspx) |
| *Addendum to the Field Fumigation Study Guide* (this document) | No cost • Review online: [www.cdpr.ca.gov/docs/license/pubs/fieldfum_studyguide_adde ndum.pdf](http://www.cdpr.ca.gov/docs/license/pubs/fieldfum_studyguide_adendum.pdf) |
| Knowledge Expectations: Field Fumigation Pest Control | No cost • Review online: [www.cdpr.ca.gov/docs/license/knwldg_expecnts_subcat_o.pdf](http://www.cdpr.ca.gov/docs/license/knwldg_expecnts_subcat_o.pdf) |

DPR has incorporated the US EPA Soil Fumigant Fact Sheets as study material in this Addendum. The US EPA Fact Sheets describe the labeling protective measures in an easy to understand format. They can be viewed and downloaded from DPR’s Licensing Web site at, [www.cdpr.ca.gov/docs/license/pubs/fact_sheets_soilfum.pdf](http://www.cdpr.ca.gov/docs/license/pubs/fact_sheets_soilfum.pdf). In addition, more information can be viewed at the Web site, “US EPA’s Implementation of Risk Mitigation Measures for Soil Fumigant Pesticides”
at, www.epa.gov/oppsrrd1/reregistration/soil_fumigants/. The Web site includes supplemental information for applying a specific fumigant and for training fumigant applicators and workers.

The US EPA Fact Sheets contain general information about the new protective measures. Below is a summary.

- **Buffer zones and posting requirements** – New labeling includes buffer zone distance and posting requirements. Buffer zones will be determined by fumigant application rate, acreage treated, application method and depth, and soil sealing method. To determine the buffer zone for your application, review the fumigant labeling, California pesticide use regulations, and local county restricted material permit conditions for more details and to determine the most restrictive requirements. Follow the most restrictive requirements when it appears there are conflicts between labeling, regulations, and permit conditions.

- **Restricted use pesticides** – US EPA has recently re-classified metam sodium, metam potassium, and dazomet as Federal restricted use pesticides. This action has no impact on DPR-certified fumigant applicators as these fumigants had already been designated as California restricted materials, requiring applicator/handler certification, restricted material permits, and notices of intent before fumigating.

- **Agricultural worker protections** – These labeling requirements focus on handler activities, requiring additional information for non-certified applicators/handlers, and adding requirements for respirator use, tarpaulin removal, and the entry-restricted period.

- **Applicator training programs and safety information for handlers** – US EPA required registrants to develop and implement training programs for fumigant applicators. The training is fumigant specific and includes work practices and good agricultural practices for reducing exposure and improving safety for workers and bystanders. Note that DPR category O holders meet the training requirement as long as they passed the category O certification exam after January 1, 2012 or read the Addendum and return the verification postcard to DPR. Additional soil fumigation resources can be found at the EPA developed training materials and safety information web site, www.epa.gov/fumiganttraining. Fumigant applicators can also access DPR’s ‘Fumigant Resource Center’ at, www.cdpr.ca.gov/docs/emon/methbrom/mb_main.htm for updated labels, templates for fumigant management plans, and additional safety information.
• **Good agricultural practices and information on application rates, methods, and practices** – Good Agricultural Practices (GAPs) are now required to reduce off-gassing and improve safety. These GAPs include proper soil preparation and moisture, air and soil temperature, soil sealing methods, equipment calibration, and weather criteria. The labeling will also include restrictions or prohibition of certain methods, practices, and rates for difficult to address risks, unless stricter regulations or permit conditions prevail.

• **Fumigant management plans and post-application summaries** – Fumigant labeling has been revised to include fumigation management plan (FMP) requirements. The management plan requires applicators to walk through a step-by-step list of tasks in preparation for the fumigation. The purpose of the list is to assure that the application is made in compliance with the label and for taking actions in case of an emergency. DPR makes available FMP templates and guidance in completing them at their website, [www.cdpr.ca.gov/docs/emon/methbrom/mb_main](http://www.cdpr.ca.gov/docs/emon/methbrom/mb_main). FMPs have to be completed prior to the fumigation and made available upon request to DPR or county agricultural commissioner (CAC) enforcement staff. Post-application summaries are intended to describe any deviations from the FMP, and must be completed within 30 days of the application.

• **Compliance assistance and assurance measures** – Fumigant labeling now requires users to contact DPR or their local CAC prior to making fumigant applications to assure that fumigators are in compliance with field soil fumigant use requirements. DPR-certified fumigators meet this requirement when they submit to the local CAC a notice of intent to apply these California-designated restricted materials.

• **Community outreach and education programs** – The product registrants are required to develop and implement community outreach programs. The programs are to include safety information available to community members to address bystander exposure risks. The information is intended to educate the public about fumigants, buffer zones, recognizing early signs of exposure, and how to respond appropriately in case of an incident. These requirements are aimed at registrants, not the fumigant user, but it is important to be aware of this requirement.

• **Emergency Preparedness and Response, and Difficult to Evacuate Site Requirements** – To reduce risks to people near a buffer zone (e.g. at their home or working in a nearby field), the label requires applicators to provide on-site monitoring of the buffer zone near occupied structures or
provide emergency response information directly to neighbors. In addition, difficult to evacuate sites like schools, child care centers, and hospitals will require additional safety measures.

**SUMMARY**

The *Field Fumigation Study Guide*, the Addendum (particularly the US EPA Fact Sheets), and the knowledge expectations can be used to prepare for the QAL or QAC exam for Field Soil Fumigation Category O. The knowledge expectations are a guide to the specific material to focus on during exam preparation. All applicators/handlers must follow the strictest regulatory requirements and read labels carefully before an application. If possible, certified individuals should seek continuing education with a fumigant focus for their renewal requirements in order to remain informed.

*Figure 1 Sample Fumigant Label*

Follows after this page
FIGURE 1. SAMPLE SOIL FUMIGANT LABEL

The following sample soil fumigant label is included for illustrating the US EPA safety related requirements that are being implemented through product labeling. It is only for use in this study guide and shall not be considered a registered pesticide label for any other purposes. Be aware of possible conflicts between use requirements in fumigant labeling, California regulations, and restricted material permit conditions. Applicators must always follow the most restrictive requirements.

![Restricted Use Pesticide]

Each soil fumigant pesticide is classified as a restricted use pesticide.

**SOIL FUMIGANT**
For pre-planting control of most weeds, nematodes, and soil diseases of turfgrass and ornamental plants

**ACTIVE INGREDIENT:**
Diazemut (Tetrahydro-3,6-dimethyl-2H-1,3,5-triazine-2-thione) .................. 99.0%
**OTHER INGREDIENTS:**
.......................................................... 1.0%
**TOTAL:**
.......................................................... 100.0%

**KEEP OUT OF REACH OF CHILDREN**
**WARNING/AVISO**
Si usted no entienda lo etiquetado, busque a alguien para que se lo explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)
See inside booklet for complete Precautionary Statements, Directions For Use, and Warranty.

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4. **PRECAUTIONARY STATEMENTS**
   - Hazards to Humans and Domestic Animals
     - **WARNING:** May be fatal if inhaled. Do not breathe vapor or dust. Do not get in eyes, on skin, or on clothing. Extended exposure may cause irritation to skin, eyes, and mucous membranes.
     - Personal Protective Equipment (PPE)
     - Pesticides that are chemical-resistant to this product are Buthyl Rubine, Buthyl Rubine, and Diuron. Natural Rubine, 14 mls. Poly-ethylene, Poly-ethylene, Poly-ethylene, Poly-ethylene.
   - Precautionary Statements
   - Pesticides Listed on this Label
   - Storage and Disposal
   - Limited Warranty and Disclaimer

Each soil fumigant pesticide is classified as a restricted use pesticide.
Agricultural use requirements for entry restricted period, notification and applicator training

Certified applicator training

Entry restricted period and notification

Definitions of terms in labeling
Protection for Handlers:

Descriptions of handler activities and protections, fumigant training for not-certified handlers,
and protecting non-handlers

For any handler performing a handling task (except for fumigant site monitoring outside of the application block), the following activities must be performed:

1. **Provisioning:** Providing the handler with the appropriate PPE.
2. **PPE:** Ensuring the handler is wearing the correct PPE.
3. **Training:** Providing the handler with the necessary training.
4. **Observation:** Observing the handler for any signs of exposure.
5. **Monitoring:** Monitoring the handler for any adverse reactions.

For any handler performing a handling task in the application block, the following activities must be performed:

1. **PPE:** Ensuring the handler is wearing the correct PPE.
2. **Training:** Providing the handler with the necessary training.
3. **Observation:** Observing the handler for any signs of exposure.
4. **Monitoring:** Monitoring the handler for any adverse reactions.

For any handler performing a handling task in the non-application area, the following activities must be performed:

1. **PPE:** Ensuring the handler is wearing the correct PPE.
2. **Training:** Providing the handler with the necessary training.
3. **Observation:** Observing the handler for any signs of exposure.
4. **Monitoring:** Monitoring the handler for any adverse reactions.

R epiratory protection, stop work triggers and tarp handling

Mandatory good agricultural practices
Application method, practice, and rate restrictions
Application method, practice, and rate restrictions

Physical/Mechanical Incorporation for Combined Disease, Nematodes, and Weed Control
1. Apply Basanil® G in the soil.
2. After applying, incorporate the granules into the soil as uniformly as possible to the desired depth. This is best accomplished with an L-shaped furrow cultivator or spading fork.
3. Following incorporation, seal the soil surface by smoothing or rolling to impede fumigant escape.
4. The treatment is more successful if the incorporation and sealing is followed by thorough watering the soil, keeping it moist (but not waterlogged) for 24 hours. Alternatively, the soil can be covered with a tarp (e.g., burlap tarps) or other material to retain fumigant vapor.

Water Incorporation with Drip Irrigation for Disease and Weed Control
1. Drip irrigation tape or tubing can be applied prior to or, following, the Basanil® G application.
2. Apply Basanil® G to the soil.
3. After applying, cover with a tarp (e.g., plastic mulch).
4. Activate the Basanil® G using drip irrigation, waiting until the margins of the treated area (such as bed shoulders) are moist.
5. The soil must be kept moist (but not waterlogged) for 24 hours.

Preparation Prior to Planting
Before seeding, planting, or transplanting, all the soil residues must be gone from the soil. The time between treatment and planting depends on soil temperature, moisture, and texture, and the method of seeding. Do not plant any crop until all fumigant colors have dissipated from the soil and can no longer be detected. For cases following sodium azide, the following table is not applicable. If the soil colors persist, the seed must be kept moist and free of sodium azide. This may be determined by the presence of sodium azide test strips.

| Temperature (°F) | Test Strip | Sodium Azide | Treatment Time
|------------------|------------|--------------|-----------------
| 77°F (25°C)      | Positive   | Yes          | 4 days
| 50°F (10°C)      | Negative   | No           | 12 days

APPLICATION INSTRUCTIONS

Preparation Prior to Application
1. From seed trails, the soil can be treated with a pre-planting soil drench by mixing the granules into the soil at a rate of 1 lb/100 ft² and thoroughly incorporating the soil into the planting area. This treatment can be repeated 2-3 times, if necessary, to achieve the desired level of control.
2. From seed trails, the soil can be treated with a pre-planting soil drench by mixing the granules into the soil at a rate of 1 lb/100 ft² and thoroughly incorporating the soil into the planting area. This treatment can be repeated 2-3 times, if necessary, to achieve the desired level of control.
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Methods of Application

Apply Basanil® G to the soil by broadcasting the granules evenly across the targeted area. Ensure the entire planting area is covered to achieve the desired level of control. After applying the Basanil® G, cultivate the soil to incorporate the granules into the soil. Cultivation can be done using a cultivator or hand tillage, ensuring that the soil is thoroughly mixed to achieve the desired level of control. Following cultivation, ensure that the soil is thoroughly moist to facilitate fumigant incorporation and ensure effective disease control. The application area should be thoroughly watered to promote fumigant activity and ensure effective disease control. The application area should be thoroughly watered to promote fumigant activity and ensure effective disease control. The application area should be thoroughly watered to promote fumigant activity and ensure effective disease control.

Table 1. Basanil® G Application Rates

<table>
<thead>
<tr>
<th>Application Rates for Crop Control</th>
<th>Application Rate (lb/acre)</th>
<th>Granules Per Acre</th>
<th>Packets Per Acre</th>
<th>Pounds Per Acre</th>
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</thead>
<tbody>
<tr>
<td>Weed control</td>
<td>1.0</td>
<td>85</td>
<td>1</td>
<td>0.06</td>
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<tr>
<td>Nematode control</td>
<td>1.0</td>
<td>85</td>
<td>1</td>
<td>0.06</td>
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<tr>
<td>Soil fumigation</td>
<td>1.0</td>
<td>85</td>
<td>1</td>
<td>0.06</td>
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</tbody>
</table>

Table 2. Planting Recommendations: Soil Temperature and Waiting Period without Tarp

<table>
<thead>
<tr>
<th>Soil Temperature (°F)</th>
<th>Case-Average</th>
<th>Aeration Time (Days)</th>
<th>Dormancy Test (Days)</th>
<th>Recommended Waiting Period from Treatment to Planting (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70°F (21°C)</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>60°F (16°C)</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>50°F (10°C)</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>40°F (4.4°C)</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>30°F (-1°C)</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 3. Planting Recommendations: Soil Temperature and Waiting Period with Tarp

<table>
<thead>
<tr>
<th>Soil Temperature (°F)</th>
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<td>4</td>
<td>2</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>60°F (16°C)</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>50°F (10°C)</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>40°F (4.4°C)</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>30°F (-1°C)</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>
Buffer zone requirements

A buffer zone must be established for every permit application. The general buffer zone requirements include:

- The buffer zone must extend outward from the edge of the application block perpendicular equally in all directions.
- All non-handlers, including field workers, residents, pedestrians, and other bystanders, must be excluded from the buffer zone during the buffer time period except for transit (see Buffer Zone Exemptions for Transit on Roadsides).
- Local, state, or federal officials conducting inspection, sampling, or other similar official duties are not excluded from the application block or the buffer zone by this labeling. The certified applicator supervising the application and the owner of the establishment where the application is taking place are not authorized to, or responsible for, evacuating those officials from the application block or the buffer zone.
- The buffer zone begins at the start of the application and lasts for a minimum of 48 hours after the application is complete.

Buffer Zone Exemptions

- Before the start of application, the certified applicator must determine whether their buffer zone will overlap with any other buffer zones (other buffer zones are designated by the term “buffer zone” in parenthesis).
- The buffer zone begins 12 hours after the start of application, and it lasts for the duration of the buffer zone period, and it ends upon completion of the buffer zone period.

Buffer zones under the control of the owner of the application block:

- Buffer zones must not include buildings used for storage (e.g., sheds, barns, garages), unless:
  - The buildings are not occupied during the buffer zone period, and
  - The buffer zone is not needed due to a specific need.

Buffer zones under the control of the owner of the application block:

- Buffer zones must not include residential areas (e.g., employee housing, private property), unless:
  - The buffer zone is not needed due to a specific need.

Areas not under the control of the owner of the application block:

- Buffer zones must not include agricultural areas owned and/or operated by persons other than the owner of the application block, unless:
  - The buffer zone is not needed due to a specific need.

- Buffer zones must not include roadways and rights of way unless:
  - The area is not occupied during the buffer zone period, and
  - Entry by non-handlers is prohibited during the buffer zone period.

- Buffer Zone Exemptions for Transit on Roadsides:
  - Vehicular and bicycle traffic on public and private roads through the buffer zone is permitted, unless:
    - Buffer zones are not permitted to include bus stops or other locations where persons wait for public transit.
  - For all other publicly owned and/or operated areas such as parks, sidewalks, permanent walking trails, playgrounds, and athletic fields, buffer zones must not include these areas, unless:
    - The area is not occupied during the buffer zone period.
  - Entry by non-handlers is prohibited during the buffer zone period.
  - Written permission to include the public area in the buffer zone is granted by state and/or local authorities responsible for maintenance of the area.

Certified applicators must comply with all local laws and regulations. See the posting of additional requirements that may apply.

Buffer Zone Distances

Buffer zone distances must be calculated using the application rate and the size of the application block.

Buffer zone requirements

- Buffer zone distances are specified in the application block label (26 feet is the minimum distance regardless of site-specific application block)
- If application applies to all buffer zones, the buffer zone is greater than 1/4 mile (2,040 ft), then the buffer zone is prohibited.
- Tables 1-4 must be used to determine the minimum buffer distances. Rounded up to the nearest mile and block size, where applicable. Applications are prohibited for blocks or block sizes that exceed what is presented in the buffer zone tables.
Calculating buffer zone distances

<table>
<thead>
<tr>
<th>Buffer Zone Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1: Buffer zone distances (in feet) for mechanically incorporated dazomet soil applications except golf course fertilizers and greenhouse applications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application Rate</th>
<th>Black Size (square feet)</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
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<tr>
<td>400 lbs/acre</td>
<td>100</td>
<td>160</td>
<td>240</td>
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<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
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<tr>
<td>800 lbs/acre</td>
<td>120</td>
<td>192</td>
<td>288</td>
<td>384</td>
<td>480</td>
<td>576</td>
<td>672</td>
<td>768</td>
<td>864</td>
</tr>
<tr>
<td>1600 lbs/acre</td>
<td>160</td>
<td>256</td>
<td>384</td>
<td>512</td>
<td>640</td>
<td>768</td>
<td>904</td>
<td>1024</td>
<td>1152</td>
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</table>

| Table 2: Buffer zone distances (in feet) for dazomet greenzone applications |

<table>
<thead>
<tr>
<th>Black Size (square feet)</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
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<tbody>
<tr>
<td>100 ft/acre</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>200 ft/acre</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
<td>1000</td>
<td>1200</td>
<td>1400</td>
<td>1600</td>
</tr>
<tr>
<td>400 ft/acre</td>
<td>400</td>
<td>800</td>
<td>1200</td>
<td>1600</td>
<td>2000</td>
<td>2400</td>
<td>2800</td>
<td>3200</td>
</tr>
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</table>

| Table 3: Buffer zone distances (in feet) for chemically incorporated dazomet soil applications to golf course fertilizers |

<table>
<thead>
<tr>
<th>Application Rate (lb/acre)</th>
<th>Black Size (square feet)</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>100</td>
<td>160</td>
<td>240</td>
<td>320</td>
<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
</tr>
<tr>
<td>400</td>
<td>100</td>
<td>160</td>
<td>240</td>
<td>320</td>
<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
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<td>240</td>
<td>320</td>
<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
</tr>
</tbody>
</table>

| Table 4: Buffer zone distances (in feet) for mechanically incorporated dazomet soil applications to golf course fertilizers* |

<table>
<thead>
<tr>
<th>Application Rate (lb/acre)</th>
<th>Black Size (square feet)</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
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<td>160</td>
<td>240</td>
<td>320</td>
<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
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<td>100</td>
<td>160</td>
<td>240</td>
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<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
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<td>300</td>
<td>100</td>
<td>160</td>
<td>240</td>
<td>320</td>
<td>400</td>
<td>480</td>
<td>560</td>
<td>640</td>
<td>720</td>
</tr>
</tbody>
</table>

*This table may only be used if the length of the application area is twice the distance of the width (i.e., the length is 83 feet and the width is no greater than 40 feet). If the application area does not meet these requirements, see the buffer zone distances in Table 1.

Buffer Zone Credits

The buffer zone distances for biomass/PF applications may be reduced by the percentages listed below. Credits may be added, but credits cannot exceed 20%. Also, the minimum buffer zone distance is 25 feet regardless of buffer zone credits available:

- 10% reduction in buffer zone distance, if the organic content of the soil in the application block is 1% - 6%
- 20% reduction in buffer zone distance, if the organic content of the soil in the application block is 7% - 12%
- 30% reduction in buffer zone distance, if the organic content of the soil in the application block is 13% - 14%

Buffer Zone warning signs

- Posting of buffer zone signs is required unless there is a physical barrier that prevents bystander access to the buffer zone.
- Buffer Zone signs must be placed along or outside the perimeter of the buffer zone, at all usual points of entry and along their routes of approach from areas where people not under the owner's control may approach the buffer zone.
- Some examples of points of entry include, but are not limited to, roadways, sidewalks, paths, and bike trails.
- Some examples of likely routes of approach include, but are not limited to, the area between a buffer zone and a roadway, or the area between a buffer zone and a housing development.
- When posting the certified applicator supervising the application must ensure compliance with all local laws and regulations.
- Buffer Zone signs must meet the following criteria:
  - The printed side of the sign must face away from the application block toward areas from which people could approach.
  - Sigma must remain in place during the entire posting period and must meet the general standards outlined in the WTP5 for size, text size, and legibility (see 40 CFR §179.120).
  - Sigma must be posted no sooner than 24 hours prior to the start of the application and removed by the end of the buffer zone period has elapsed.
  - Sigma must be removed within 14 days after the end of the buffer zone period.

Buffer Zone signs which meet the criteria must be obtained from the Department of Environmental Quality. A template is available for download from http://www.epa.gov/pennsylvanieregistration/activities Sage/Signs.html.

(continued)
Site-specific fumigant management plan

Emergency preparedness and response measures

Notification to lead agency (CAC) for compliance assistance and assurance
Post-application summary

Compliance data (if applicable):
- Person filing complaint (e.g., on-site handler, person off-site), if applicable.
- If off-site person, name, address, and phone number of person filing complaint, and Description of contact measures or emergency procedures followed (if applicable).

Air monitoring results:
- When sensory irritation was experienced:
  - Date, time, location, and handler activity where irritation was observed and respiratory action (e.g., close respirators, continue operations with air-purifying respirators).
- When using a direct read detector device:
  - Sample date(s), time(s), location(s), and concentration(s).
- Handler task activity monitored (if applicable), and Hazard action (e.g., close operations).
- Residual action (e.g., close operations).

Fumigant Treatment Area and Buffer Zone Signs:
- Dates of posting and removal.
- Any deviations from the FMP (e.g., changes in emergency response actions, changes in handler information, changes in record keeping for completing emergency tasks, changes in communication between certified applicator, owner, and other handlers).

Record-keeping Procedures:

The owner of the applicator block, as well as the certified applicator supervising the application, must keep a signed copy of the Post-application Summary for 2 years from the date of application.

GENERAL INFORMATION

Important Notes to User:
1. Read the entire label carefully before use.
2. This product is toxic to all plants.
3. Heat treatment with a plug or recharger is recommended when applications will be made adjacent to large material.
4. If fumes are treated with this product, take precautions to prevent the oxygen from reaching the treated location. Do not store treated plants in rooms, under containers, and other containers that may release gas or release fumes into the treated area. Cover drums in the treated area that may release gas or release fumes into the treated area.
5.WARNING: This material is toxic to all plants.

Pesticide Product Labels and Material Safety Data Sheets (MSDS):
- All pesticides and MSDS are on file and readily available for employees to review.

Record-keeping Procedures:

The owner of the applicator block as well as the certified applicator supervising the application must keep a signed copy of the site-specific FMP for 2 years from the date of application.

Post-application summary

The Post-application Summary must contain the following elements:
- Date and time of application.
- Application rate.
- Weather Conditions:
  - Summary of the National Weather Service weather forecast during the application and the 48-hours after the application is complete, including:
    - Wind speed.
    - Air stagnation index (if applicable).
  - Forecast must be checked on the day of, but prior to the start of the application, and at least once a day during the application and the 48-hours after the application is complete, if the application is completed.
- Total damage and repair information.
- Date of asphalt damage recovery.
- Location and state of asphalt damage.
- Description of asphalt damage, equipment failure, and damage.
- Date and time of repair completion.
- Post-application summary:
  - Site of water damage.
  - Water damage details (if applicable).
  - Date and time leaks were identified.
  - Date and time leaks were repaired.
  - Plant injury caused by temporary field barriers and removed.

Clean-up:
- Decontaminate all equipment and after applying this product.

Clearance:
- Detergent or commercial sprayer is used.
Table 5. Germinal Seeds of Annual and Perennial Weeds

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird's-base</td>
<td>Schizachyrium scoparium</td>
</tr>
<tr>
<td>Blackgrass</td>
<td>Agropyron repens</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>Lolium perenne</td>
</tr>
<tr>
<td>Timothy</td>
<td>Phleum pratense</td>
</tr>
<tr>
<td>Clover</td>
<td>Trifolium spp.</td>
</tr>
<tr>
<td>Wildrye</td>
<td>Elymus repens</td>
</tr>
<tr>
<td>Spikesedge</td>
<td>Carex spp.</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>Poa annua</td>
</tr>
<tr>
<td>Dandelion</td>
<td>Taraxacum officinale</td>
</tr>
<tr>
<td>Thistle</td>
<td>Cirsium spp.</td>
</tr>
<tr>
<td>Cheesebur</td>
<td>Chrysanthemum segetum</td>
</tr>
<tr>
<td>Sugarplum</td>
<td>Melilotus officinalis</td>
</tr>
<tr>
<td>White Clover</td>
<td>Trifolium repens</td>
</tr>
</tbody>
</table>

Table 6. Plant-parasitic nematodes

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candy corn</td>
<td>Pratylenchus thornei</td>
</tr>
<tr>
<td>Sweet corn</td>
<td>Helicotylenchus zea</td>
</tr>
<tr>
<td>Grape</td>
<td>Xiphinema italicum</td>
</tr>
<tr>
<td>Tomato</td>
<td>Xiphinema index</td>
</tr>
<tr>
<td>Canola</td>
<td>Tylenchulus semipenetrans</td>
</tr>
<tr>
<td>Potato</td>
<td>Globodera rostochiensis</td>
</tr>
<tr>
<td>Carrot</td>
<td>Globodera ritzemobosi</td>
</tr>
<tr>
<td>Strawberry</td>
<td>Xiphinema index</td>
</tr>
<tr>
<td>Celery</td>
<td>Xiphinema index</td>
</tr>
</tbody>
</table>

Table 7. Root Propagated Weeds

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnip</td>
<td>Brassica rapa</td>
</tr>
<tr>
<td>Carrot</td>
<td>Daucus carota</td>
</tr>
<tr>
<td>Parsley</td>
<td>Petroselinum crispum</td>
</tr>
<tr>
<td>Celery</td>
<td>Apium graveolens</td>
</tr>
<tr>
<td>Fennel</td>
<td>Foeniculum vulgare</td>
</tr>
<tr>
<td>Leek</td>
<td>Allium porrum</td>
</tr>
<tr>
<td>Onion</td>
<td>Allium cepa</td>
</tr>
</tbody>
</table>

Table 8. Soil-borne Fungi

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straggler</td>
<td>Sclerotinia rolfsii</td>
</tr>
<tr>
<td>Sclerotinia</td>
<td>Sclerotinia minor</td>
</tr>
<tr>
<td>Rhizoctonia</td>
<td>Rhizoctonia solani</td>
</tr>
<tr>
<td>Phytophthora</td>
<td>Phytophthora cactorum</td>
</tr>
<tr>
<td>Verticillium</td>
<td>Verticillium dahliae</td>
</tr>
<tr>
<td>Fusarium</td>
<td>Fusarium oxysporum</td>
</tr>
<tr>
<td>Pythium</td>
<td>Pythium arrhenomanes</td>
</tr>
<tr>
<td>Rhizopus</td>
<td>Rhizopus stolonifer</td>
</tr>
<tr>
<td>Alternaria</td>
<td>Alternaria brassicicola</td>
</tr>
</tbody>
</table>

Table 9. Soil-borne Bacteria

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erwinia</td>
<td>Erwinia carotovora</td>
</tr>
<tr>
<td>Pseudomonas</td>
<td>Pseudomonas solanacearum</td>
</tr>
<tr>
<td>Xanthomonas</td>
<td>Xanthomonas campestris</td>
</tr>
<tr>
<td>Rhizobium</td>
<td>Rhizobium leguminosarum</td>
</tr>
</tbody>
</table>

Table 10. Soil-borne Viruses

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco mosaic</td>
<td>Tobacco mosaic virus</td>
</tr>
<tr>
<td>Tomato spotted wilt virus</td>
<td>Tomato spotted wilt virus</td>
</tr>
<tr>
<td>Cucumber mosaic virus</td>
<td>Cucumber mosaic virus</td>
</tr>
<tr>
<td>Tobacco etch virus</td>
<td>Tobacco etch virus</td>
</tr>
<tr>
<td>Alfalfa mosaic virus</td>
<td>Alfalfa mosaic virus</td>
</tr>
<tr>
<td>Tobacco rattle virus</td>
<td>Tobacco rattle virus</td>
</tr>
<tr>
<td>Potato virus Y</td>
<td>Potato virus Y</td>
</tr>
<tr>
<td>Potato virus N</td>
<td>Potato virus N</td>
</tr>
<tr>
<td>Potato virus X</td>
<td>Potato virus X</td>
</tr>
</tbody>
</table>

Note: *Not approved for use in California*
Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal.

PESTICIDE STORAGE: Store this product in a dry, cool place below 86°F (30º C) — it will decompose at higher temperatures. This material reacts non-voluntarily with moisture, releasing fuming vapors. Keep the container tightly sealed when not in use. Do not re-use the empty container. Keep this product and its vapors away from degradable plants, seeds, fertilizers, pesticides, and other agricultural chemicals as plant injury or loss may result from contamination.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or an approved waste disposal facility.

Container Handling: Nonrefillable container. Do not reuse or refill this container. Completely empty bag into appropriate equipment. Then offer for recycling, if available, or dispose of empty bag in an auxiliary landfill or by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Steps to be taken if material is released: Keep the spill out of all sewers and open bodies of water. Remove contaminated clothing, and wash affected skin areas with soap and water. Wash clothing before re-use.

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Attachment 1
US EPA Fact Sheet Compendium
EPA is requiring important new safety measures for soil fumigant pesticides to increase protections for agricultural workers and bystanders – people who live, work, or otherwise spend time near fields that are fumigated. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium/potassium, and methyl bromide.

This fact sheet summarizes the soil fumigant product label changes that are going into effect during each of two phases. For detailed information on these new requirements for soil fumigants, visit EPA’s Soil Fumigant Toolbox, www.epa.gov/oppsrrd1/reregistration/soil_fumigants/.

Phase 1 Changes that Went Into Effect December 31, 2010:

Agricultural Worker Protection: Persons engaged in any of a number of activities that are part of the fumigation process are considered “handlers.” New restrictions address respiratory protection, tarp handling and an entry-restricted period.

Handler Training Information: Labels require fumigant registrants to develop and disseminate training information and materials for fumigant handlers (those working under the supervision of the certified applicator in charge of fumigations).

Good Agricultural Practices: Many good agricultural practices recommended on older fumigant labels became mandatory on the new labels to minimize inhalation and other risks from fumigant applications. Examples of good agricultural practices include proper soil preparation/tilling, ensuring optimal soil moisture and temperature, and appropriate use of sealing techniques.

Application Method, Practice and Rate Restrictions: Labels restrict certain fumigant application methods that lead to risks that are difficult to address. These include certain untarped applications for some fumigants. The label also lowers the maximum application rate, thereby reducing the potential for inhalation exposure and risk.

Restricted Use Pesticide Classification: EPA determined that all of the soil fumigants undergoing reregistration meet the criteria for restricted use. Therefore, EPA has reclassified metam sodium/potassium and dazomet, which had not been restricted, as restricted use pesticides.

Site-Specific Fumigant Management Plans (Partial): Labels require fumigant users to prepare a written, site-specific fumigant management plan (FMP) before fumigations begin. In Phase 1, FMPs do not need to address any of the requirements that go into effect during Phase 2. These written plans will help prevent accidents and misuse, and will capture steps to take in case an accident occurs. EPA is developing FMP templates for each fumigant.
Phase 2 Changes that Go into Effect December 1, 2012:

Buffer zones: New labels will require fumigant users to establish a buffer zone around treated fields to reduce risks from acute inhalation exposure to bystanders. Buffer zone distances are scenario-based using applicable site conditions, and will be provided in look-up tables on product labels. EPA is also giving “credits” to encourage users to employ practices that reduce emissions (for example, use of high-barrier tarps). Credits will reduce buffer distances. Some credits will also be available for site conditions that reduce emissions (e.g., high organic or clay content of soils).

Posting requirements: For buffer zones to be effective, bystanders need to be informed about the location and timing of fumigations. New labels will require buffer zones be posted at usual points of entry and along likely routes of approach to the buffer unless a physical barrier prevents access to the buffer. The signs must include a “do not walk” symbol, fumigant product name, and contact information for the fumigator.

Site-Specific Fumigant Management Plans (Complete): In addition to the FMP requirements listed above, FMPs will need to include those requirements that go into effect in Phase 2.

Emergency Preparedness and Response Requirements: New labels will require registrants to provide information to first responders in high fumigant use areas. In addition, EPA is requiring site-specific measures in areas where bystanders may be close to fumigant buffer zones. Fumigators may choose either to monitor the buffer perimeter or to provide emergency response information directly to neighbors.

- If the applicator chooses to monitor, the emergency response plan stated in the FMP must be implemented if the person monitoring experiences sensory irritation or if air concentrations reach action levels on labels. This monitoring must be done four times per day during the buffer zone period at times when the greatest potential exists for fumigants to move off-site.
- If the applicator chooses instead to provide emergency response information directly to neighbors, the certified applicator supervising the fumigation must ensure that nearby residents and business owners/operators have been provided the response information at least one week prior to the fumigant application. The method for distributing information to neighbors must be described in the FMP.

Applicator Training Programs: EPA has required fumigant registrants to develop and implement training programs for certified applicators in charge of soil fumigations.

Information for Handlers, Communities, and First Responders: EPA has required fumigant registrants to develop and disseminate safety information for fumigant handlers (those working under the supervision of the certified applicator in charge of the fumigations). EPA has also required fumigant registrants to develop and implement community outreach programs and information for first responders to ensure that information about fumigants and safety is available within communities where soil fumigation occurs.

Compliance Assistance and Assurance Measures: In states that require notification of fumigant applications, applicators must notify State and Tribal Lead Agencies for pesticide enforcement about fumigant applications they plan to conduct. This information will aid those states in planning compliance assistance and assurance activities.
EPA is requiring important new safety measures for soil fumigant pesticides to increase protections for agricultural workers and bystanders – people who live, work, or otherwise spend time near fields that are fumigated. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium/potassium, and methyl bromide.

This fact sheet summarizes new requirements to protect fumigant handlers and other workers from fumigant exposures. The new requirements are being implemented in two phases. When new Phase 2 fumigant labels appear in the market place in late 2012, fumigant users will need to comply with these new requirements.

**Elements of FMPs**

To address the risk to bystanders, handlers and workers, the Agency is requiring site-specific fumigant management plans (FMPs) and post-application summaries. Each site-specific FMP must contain the following elements:

- Certified applicator information (name, phone number, license and/or certificate number, employer name, employer address)
- General site information
- Application block location (e.g., address or global positioning system (GPS) coordinates)
- Name, address, and, phone number of owner of the application block
- Map showing the application block location and dimensions, buffer zone, property lines, roadways, rights-of-ways, sidewalks, permanent walking paths, bus stops, nearby application blocks, surrounding structures, locations of buffer zone signs, and locations of difficult to evacuate sites
- General application information (target application date/window, brand name of fumigant, EPA registration number)
- Tarp plan (if tarp is used)
  - Schedule for checking tarps for damage, tears, and other problems
  - Factors used to determine when tarp repair will be conducted
  - Equipment/methods used to perforate tarps
  - Target dates for perforating tarps
  - Target dates for removing tarps
Soil conditions (description of soil texture and moisture in application block, method used to determine soil moisture, and soil temperature measurements if needed)

Buffer zone information (application method and rate, injection depth, application block size, credits applied and measurements taken to support the credits, buffer zone distance, and description of areas in the buffer zone that are not under the control of the owner of the application block)

Emergency response plan

Posting procedures (person(s) who will post signs, dates for posting and for sign removal)

Emergency Preparedness and Response Measures (if applicable)
  - When and where fumigant site monitoring will be conducted (if applicable)
  - Response information for neighbors if applicable (list of residences and businesses informed, name and phone number of person providing information, and method of providing information)

State and/or tribal lead agency advance notification (if state and/or tribal lead agency requires notice, provide a list of contacts that were notified and date notified)

Plan describing how communication will take place between applicator, land owner, and other on-site handlers (e.g., tarp perforators/removers, irrigators) for complying with label requirements (e.g., timing of tarp cutting and removal, PPE, buffer zone location, buffer zone start and end times)
  - Name and phone number of persons contacted
  - Date contacted

Handler (including Certified Applicators) information and PPE
  - Names, addresses and phone numbers of all handlers
  - Employer name, addresses, and phone numbers for all handlers
  - Tasks that each handler is authorized and trained to perform
  - Date of PPE training for each handler
  - Applicable handler PPE

For handlers: Confirmation of receipt of Fumigant Safe Handling Information

For certified applicator(s) supervising the application: Completion date and location of the soil fumigant training program

For handlers designated to wear respirators:
  - Date of medical qualification to wear a respirator
  - Date of respirator training
  - Date of fit testing for the respirator
Unless exempted, verify that:

- Handlers have the appropriate respirators and cartridges during handler activities
- The employer has confirmed that the appropriate respirator and cartridges are immediately available for each handler who will wear one

Air monitoring plan

- For monitoring after tarp perforation is complete and before tarp removal begins, indicate the monitoring equipment to be used and the timing of monitoring
- If sensory irritation is experienced, indicate whether operations will be ceased or operations will continue with respiratory protection
- For monitoring the breathing zone when using methyl bromide formulations with < 20% chloropicrin:
  - Representative handler tasks to be monitored
  - Monitoring equipment to be used and timing of monitoring

- For monitoring residential structures within the buffer zone (for re-entry) when using methyl bromide formulations with < 20% chloropicrin:
  - Monitoring equipment to be used and timing of the monitoring
  - Monitoring location

Description of applicable mandatory Good Agricultural Practices (GAPs)

Description of hazard communication (The application block has been posted in accordance with the label. Pesticide product labels and material safety data sheets are on-site and readily available for employees to review.)

Record-keeping procedures (the owner of the application block, as well as the certified applicator, must keep a signed copy of the site-specific FMP for 2 years from the date of application)

For situations where an initial FMP is developed and certain elements do not change for multiple fumigation sites (e.g., applicator information, handlers, record keeping procedures, emergency procedures) only elements that have changed need to be updated in the site-specific FMP provided the following:

- The certified applicator supervising the application has verified that those elements are current and applicable to the application block before it is fumigated
- Recordkeeping requirements are followed for the entire FMP (including elements that do not change)

The certified applicator must make a copy of the FMP immediately available for viewing by handlers involved in the application. The certified applicator or the owner of the application block must provide a copy of the FMP to any local/state/federal/tribal enforcement personnel who request the FMP. In the case of an emergency, the FMP must be made available when requested by local/state/federal/tribal emergency response and enforcement personnel. The certified applicator must ensure the FMP is at the application block during all handler activities.
New Requirements for Post-Application Summaries

Within 30 days of completing the application portion of the fumigation process, the certified applicator supervising the application must complete a post-fumigation application summary that describes any deviations from the FMP that have occurred, measurements taken to comply with GAPs, as well as any complaints and/or incidents that have been reported to him/her.

Specifically the Post-Application Summary must contain the following elements:

- Actual date and time of the application, application rate, and size of application block fumigated
- Summary of weather conditions on the day of the application and during the 48-hour period following the fumigant application including wind speed and air stagnation advisories. The forecast must be checked on the day of, but prior to the start of the application, and on a daily basis during the application if the time period from the start of the application until the application is complete is greater than 24 hours.
- Tarp damage and repair information (if applicable)
  - Date of tarp damage discovery
  - Location and size of tarp damage
  - Description of tarp/tarp seal/tarp equipment failure
  - Date and time of tarp repair completion
- Tarp perforation/removal details (if applicable)
  - Date and time tarps were perforated
  - Date and time tarps were removed
  - If tarps were perforated and/or removed early, describe the conditions that caused early perforation and/or removal
- Complaint details (if applicable)
  - Person filing complaint (e.g., on-site handler, person off-site)
  - If person filing complaint is off-site, provide their name, address, and phone number
  - Description of control measures or emergency procedures followed after complaint
- Description of incidents, equipment failure, or other emergency and emergency procedures followed (if applicable)
- Air monitoring results
  - When sensory irritation experienced:
    - Date, time, location, and handler task/activity where irritation was observed
    - Resulting action (e.g., cease operations, continue operations with respiratory protection, implement Emergency Response Plan)
When using a direct read detection device:
- Sample date(s), time(s), location(s), and concentration(s)
- Handler task/activity monitored (if applicable)
- Resulting action (e.g., cease operations, continue operations with respiratory protection, implement Emergency Response Plan)

- Date of sign posting and removal
- Any deviations from the FMP

Both the certified applicator and owner of the application block keep a signed copy of the post-application summary record for 2 years from the date of application.

Applicators and other stakeholders have the flexibility to use EPA’s FMP template, prepare their own FMP templates, or use other commercially available software with certain elements listed above in check-list and/or fill in the blank format.

For additional information, please see EPA's Soil Fumigant Toolbox, www.epa.gov/oppsrd1/reregistration/soil_fumigants/.
EPA is requiring important new safety measures for soil fumigant pesticides to increase protections for agricultural workers and bystanders -- people who live, work, or otherwise spend time near fields that are fumigated. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium/potassium, and methyl bromide.

This fact sheet summarizes new requirements to protect fumigant handlers and other workers from fumigant exposures.

### Handler activities on labels

A clear description of handler activities on labels

All persons performing the following handler activities at any time must be trained and equipped as handlers in accordance with the requirements in the WPS (40 CFR Part 170):

- Monitoring fumigant air concentrations;
- Cleaning up fumigant spills (this does not include emergency personnel not associated with the application);
- Handling or disposing of fumigant containers; and
- Cleaning, handling, adjusting, or repairing the parts of application equipment that may contain fumigant residues.

All persons performing the following handler activities in the application block during the application until the entry restricted period ends and in the buffer zone during the buffer zone period must be trained and equipped as handlers in accordance with the requirements in the WPS (40 CFR Part 170):

- Participating in the application as supervisors, loaders, drivers, tractor co-pilots, shovellers, cross ditchers, or as other direct application participants;
- Installing, repairing, operating, or removing irrigation equipment;
- Performing scouting, crop advising, or monitoring tasks;
- Installing, perforating (cutting, punching, slicing, poking), or removing tarps; and
- Repairing or monitoring tarps until 14 days after application is complete if tarps are not perforated and removed during those 14 days.

### On-site supervision and training

**On-site supervision and training**

- Direct, on-site supervision by certified applicators during most fumigant applications
- New training for certified applicators who supervise fumigant applications
- New training information for other handlers.
Respiratory protection requirements

- Handlers must either stop work and leave the area or use air-purifying respirators if they experience sensory irritation (this does not apply to methyl bromide formulations with less than 20% chloropicrin).
- For methyl bromide formulations with less than 20% chloropicrin, handlers must wear air-purifying respirators during handling activities.
- Air monitoring while handlers use respirators to ensure concentrations do not exceed the upper working limit of respirators.
- All handlers who will wear a respirator must be fit-tested, trained, and medically examined to ensure they do not have health problems such as a heart condition that could make use of a respirator dangerous.
- An air purifying respirator with the appropriate cartridges must be available for each handler who will wear a respirator.

Tarp perforation and removal requirements

- If tarps are used, they may not be perforated until at least 5 days (120 hours) have elapsed after the application is complete unless a weather condition exists that necessitates early removal.
- Tarp removal may not begin until at least 2 hours after tarp perforation is complete and tarp removers must follow respiratory protection requirements.
  - For methyl bromide, air monitoring with direct-read instruments is required before tarp removal can begin.
- If tarps are not removed, planting may not begin until at least 48 hours after tarp perforation is complete.
- If tarps are left on the soil for at least 14 days after the application is complete, planting may begin when the tarps are being perforated.
- Tarps must be perforated using mechanical methods (e.g., all-terrain vehicles with cutting implements) except for small areas (less than 1 acre), at the start of a row, and during flood prevention activities.

Entry-restricted period requirements

- Entry into treated fields (including early entry that would otherwise be permitted under the WPS) by any person other than a trained and equipped handler is prohibited from the start of the application until:
  - 5 days (120 hours) after application is complete for untarped applications, or
  - After tarps are perforated and removed if tarp removal is completed less than 14 days after application, or
  - 48 hours after tarp perforation is complete if they will not be removed at least 14 days after the application, or
  - 5 days (120 hours) after application is complete if tarps are not perforated and removed 14 days after the application is complete.
## Entry Restricted Period by Scenario

<table>
<thead>
<tr>
<th>If the application is [ ____ ]</th>
<th>and Tarp is [ ____ ]</th>
<th>[ ____ ] days after application is completed</th>
<th>workers may enter [ ____ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Untarped</td>
<td>________</td>
<td>________</td>
<td>5 days after application is complete</td>
</tr>
<tr>
<td>2. Tarped</td>
<td>Perforated and Removed</td>
<td>Within 14 days</td>
<td>After tarp is removed</td>
</tr>
<tr>
<td>3. Tarped</td>
<td>Perforated <strong>BUT</strong> NOT Removed</td>
<td>Within 14 days</td>
<td>48 hours after tarp perforation is complete</td>
</tr>
<tr>
<td>4. Tarped</td>
<td>Perforated and/or Removed</td>
<td>More than 14 days</td>
<td>5 days after application is complete</td>
</tr>
</tbody>
</table>

For additional information, please see EPA's Soil Fumigant Toolbox, [www.epa.gov/oppsrrd1/reregistration/soil_fumigants/](http://www.epa.gov/oppsrrd1/reregistration/soil_fumigants/).
EPA is requiring important new safety measures for soil fumigant pesticides to increase protections for agricultural workers and bystanders -- people who live, work, or otherwise spend time near fields that are fumigated. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium/potassium, and methyl bromide. This fact sheet summarizes new requirements to protect fumigant handlers and other workers from fumigant exposures. Some fumigant products have additional buffer zone requirements beyond those described in this factsheet (e.g., methyl bromide products applied with certain high barrier tarps). See the buffer zone section of individual labels for these requirements. The new Buffer Zone requirements are being implemented during the second of two phases. When new Phase 2 fumigant labels appear in the market place in late 2012, fumigant users will need to comply with these new requirements.

A buffer zone provides distance between the application site (i.e., edge of field) and bystanders, allowing airborne residues to disperse before reaching the bystanders. This buffer will reduce the chances that air concentrations where bystanders are located will cause acute adverse health effects.

EPA has selected buffer distances that will protect bystanders from acute exposures, but which are not so great as to eliminate benefits of soil fumigant use. The size of the buffer zones is based on the following factors:

- application rate;
- field size;
- application equipment and methods; and,
- credits for use of emission-reduction measures such as high-barrier tarps and site conditions.

Buffer zone distances are scenario-based using applicable site conditions and will be based on look-up tables on product labels. EPA is also giving “credits” to encourage users to employ practices which reduce emissions. Credits will reduce buffer distances. Some credits will also be available for site conditions that reduce emissions (e.g., high organic or clay content of soils).

To address the risk to bystanders who live and work near fumigated fields, the Agency is requiring buffer zones. The following summarizes the buffer zone requirements:

**General**

- A “buffer zone” must be established around the perimeter of each application block where a soil fumigant is applied. The buffer zone must extend from the edge of the application block perimeter equally in all directions.
- All non-handlers including field workers, nearby residents, pedestrians, and other bystanders must be excluded from the buffer zone during the buffer zone period, except for people in transit (see exemptions section below).
• The “buffer zone period” starts at the moment when any fumigant is delivered/dispensed to the soil within the application block or greenhouse and lasts for a minimum of 48 hours after the fumigant has stopped being delivered/dispensed to the soil.

Buffer zone distances

• Buffer zone distances must be based on look-up tables on product labels unless otherwise specified on the product label (25 feet is the smallest distance regardless of site-specific application parameters).
• For selective replant fumigation in an orchard using hand held application methods (e.g., deep injection auger probes) to treat individual tree holes, the minimum buffer zone will be 25 feet measured from the center of each injection site (i.e., tree hole).

Authorized entry to buffer zones

• Only authorized handlers who have been properly trained and equipped according to EPA’s Worker Protection Standard (WPS) and label requirements may be in the buffer zone during the buffer zone period.

Buffer zone proximity

• To reduce the potential for off-site bystander exposure to peak fumigant emissions from multiple fumigated fields, buffer zones from multiple application blocks may only overlap under the following conditions:
  • For continuous-move center-pivot applications (metam sodium/potassium products only), buffers may overlap only if applications are made using low-drift systems.
  • For all other application methods, buffers may overlap only if at least 12 hours have elapsed from end of the application for which a buffer is already in place to the start of the subsequent application.
  • The certified applicators in charge of the fumigations must provide information to handlers who may work in the buffers about the protective equipment, signs of exposure, and health effects associated with each fumigant to which they may be exposed.

Exemptions for transit through buffer zones

• Vehicular and bicycle traffic on public and private roadways through the buffer zone is permitted.
• Bus stops or other locations where persons wait for public transit are not permitted within the buffer zone.
• See the Posting Fact Sheet for additional requirements that may apply.

Structures under the control of owner of the application block

• Buffer zones may not include buildings used for storage such as sheds, barns, garages, etc., UNLESS,
  • The storage buildings are not occupied during the buffer zone period, and
  • The storage buildings do not share a common wall with an occupied structure.
• See the Posting Fact Sheet for additional requirements that may apply.
Areas Not Under the Control of Owner of the Application Block

Areas not under the control of owner of the application block

- Buffer zones may not include residential areas (including employee housing, private property, buildings, commercial, industrial, and other areas that people may occupy or outdoor residential areas, such as lawns, gardens, or play areas) UNLESS,
  - The occupants provide written agreement that they will voluntarily vacate the buffer zone during the entire buffer zone period, and
  - Reentry by occupants and other non-handlers does not occur until the buffer zone period has ended.
  - For methyl bromide formulations with less than 20% chloropicrin, air monitoring with direct-read instruments shows concentrations are below action levels before reentry is permitted.

- Buffer zones may not include agricultural areas owned/operated by persons other than the owner of the application block, UNLESS,
  - The owner of the application block can ensure that the buffer zone will not overlap with a buffer zone from any adjacent property owners, taking into account the amended requirements for overlapping buffers, and
  - The owner/operator of the areas that are not under the control of the applicator provides written agreement to the applicator that they, their employees, and other persons will stay out of the buffer zone during the entire buffer zone period.

- Buffer zones may not include publicly owned and/or operated areas (e.g., parks, sidewalks, walking paths, playgrounds, athletic fields, etc), UNLESS,
  - The area is not occupied during the buffer zone period,
  - Entry by non-handlers is prohibited during the buffer zone period, and
  - Written permission is given by the appropriate state and/or local authorities to include public areas in the buffer zone.

- Buffer zones may include publicly owned and/or operated roads, including rights of ways. As mentioned in the previous bullet, if a sidewalk or permanent walking path is associated with it, written permission must be given by the appropriate state and/or local authorities.

For additional information, please see EPA's Soil Fumigant Toolbox, www.epa.gov/oppsrrd1/reregistration/soil_fumigants/.
EPA is requiring important new safety measures for soil fumigant pesticides to increase protections for agricultural workers and bystanders -- people who live, work, or otherwise spend time near fields that are fumigated. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium/potassium, and methyl bromide.

This fact sheet summarizes new requirements to protect fumigant handlers and other workers from fumigant exposures. The new Posting Requirements for Buffer Zones are being implemented during the second of two phases. When new Phase 2 fumigant labels appear in the market place in late 2012, fumigant users will need to comply with these new requirements.

New Requirements for Posting Buffer Zones

Current soil fumigant labels require treated areas to be posted, and handlers are required to wear specific personal protective equipment when they are in a treated area. For buffer zones to be effective, bystanders need to be informed of the location of the buffer to ensure they do not enter areas designated as part of the buffer zone. The perimeter of the fumigant buffer zones must be posted as described below.

Posting of a buffer zone is required unless there is a physical barrier that prevents bystander access to the buffer zone.

Additional Posting Requirements

Buffer zone posting signs must:

- Be placed at all usual points of entry and along likely routes of approach from areas where people who are not under the land owner’s control may approach the buffer zone.
  - Some examples of points of entry include, but are not limited to, roadways, sidewalks, paths, and bike trails.
  - Some examples of likely routes of approach are the area between a buffer zone and a roadway, or the area between a buffer zone and a housing development.
- The printed side of the sign must face away from the treated area toward areas from which people could approach.
- Signs must remain legible the entire posting period.
- Signs must be posted no sooner than 24 hours before the start of the application and remain posted until the buffer zone period has expired.
- Signs must be removed within three days after the end of the buffer zone period.
Exception: If multiple contiguous blocks are fumigated within a 14-day period, the entire periphery of the contiguous blocks’ buffer zones may be posted. Buffer zone signs must be posted no sooner than 24 hours prior to the start of the first application. The signs must remain posted until the last buffer zone period expires and signs must be removed within three days after the buffer zone period for the last block has expired.

Contents of Signs
Signs must meet the general standards outlined in the Worker Protection Standard (WPS) for sign size, text size and legibility (see 40 CFR §170.120). Registrants must provide generic buffer zone posting signs that meet these criteria at points of sale for applicators to use.

Current soil fumigant labels require treated areas to be posted, and handlers are required to wear specific personal protective equipment when they are in a treated area.

The buffer zone sign must include the following:

- Do not walk symbol
- "DO NOT ENTER/NO ENTRE,"
- "[Name of fumigant] [Name of product] Fumigant BUFFER ZONE,"
- Contact information for the certified applicator in charge of the fumigation
The treated area sign (currently required for fumigants) must state the following:

- Skull and crossbones symbol
- "DANGER/PELIGRO,"
- "Area under fumigation, DO NOT ENTER/NO ENTRE,"
- "[Name of fumigant] Fumigant in USE,"
- Date and time of fumigation,
- Date and time entry restricted period is over
- Name of the product
- Name, address, and telephone number of the certified applicator in charge of the fumigation.

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EPA is requiring important new safety measures for soil fumigant pesticides to increase protections for agricultural workers and bystanders -- people who live, work, or otherwise spend time near fields that are fumigated. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium/potassium, and methyl bromide.

This fact sheet summarizes new requirements to protect fumigant handlers and other workers from fumigant exposures. The new Emergency Preparedness and Response requirements are being implemented during the second of two phases. When new Phase 2 fumigant labels appear in the marketplace in late 2012, fumigant users will need to comply with these new requirements.

### New Requirements for Emergency Preparedness and Response

To reduce risks to people who may be near a buffer zone (e.g., at their home or working in a nearby field), EPA is requiring applicators to either provide on-site monitoring of the buffer zone perimeter in areas where residences and other occupied structures are within a specific distance, or, as an alternative to on-site monitoring, provide emergency response information directly to neighbors. Whether measures are required depends on the size of the buffer zone and how close people may be to the buffer zone. An example of each element is discussed in more detail below.

### When are Emergency Preparedness and Response Measures Needed?

#### Site-Specific Proximity Triggers for Buffer Zones Greater than 25 Feet

<table>
<thead>
<tr>
<th>If the buffer zone is:</th>
<th>AND there are residences and businesses:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 25 feet and ≤ 100 feet</td>
<td>50 feet from the edge of the buffer zone</td>
</tr>
<tr>
<td>&gt; 100 feet and ≤ 200 feet</td>
<td>100 feet from the edge of the buffer zone</td>
</tr>
<tr>
<td>&gt; 200 feet and ≤ 300 feet</td>
<td>200 feet from the edge of the buffer zone</td>
</tr>
<tr>
<td>&gt; 300 feet</td>
<td>300 feet from the edge of the buffer zone</td>
</tr>
</tbody>
</table>

Applicator must either:
- Monitor the air (Option 1)
- Provide information to neighbors (Option 2)

Exception: If the buffer zone is 25 feet, the minimum buffer zone size, then Emergency Preparedness and Response measures are not required. Also, if all of the land within 300 feet of the edge of the buffer zone is under the control of the owner of the fumigated field, then Emergency Preparedness and Response measures are not required regardless of the size of the buffer zone.
Fumigation Site Monitoring

If emergency response measures are required based on the triggers above and the applicator chooses to monitor the buffer perimeter rather than to provide information directly to the neighbors, here is what the applicator must do:

- Monitoring must begin on the day the application begins and continue until the buffer zone period expires.
- Monitoring must take place approximately 1 hour before sunset on the day the application begins and continue once during the night, once at 1 hour after sunrise, and once during the day until the end of the buffer zone period.
- Monitor for sensory irritation for metam sodium/potassium, dazomet, chloropicrin, and methyl bromide products that include at least 20% chloropicrin.
- Air concentrations of methyl bromide must be measured using a direct-read instrument if the methyl bromide product applied contains less than 20% chloropicrin.
- Monitoring must be conducted by a certified applicator or someone under his/her supervision.
- Monitoring must take place in areas between the buffer zone perimeter and residences or other occupied areas that trigger this requirement.
- If at any time the person monitoring the air concentrations experiences sensory irritation consistent with fumigant exposure, then the emergency response plan stated in the Fumigant Management Plan (FMP) must be immediately implemented.
- If other problems occur, such as a tarp coming loose, then the appropriate control plan must be activated.
- For formulations with less than 20% chloropicrin, the location and results of the air monitoring must be recorded in the post-application summary.
- For formulations with 20% or greater chloropicrin, the location where any sensory irritation occurred must be recorded in the post-application summary.

EPA believes this will help ensure that if a problem occurs during or after the fumigation, the appropriate steps can be taken to reduce the risk of exposure. While protective, site monitoring may be burdensome for users fumigating in areas with few people. Therefore, users have the option of providing emergency response information directly to neighbors rather than monitoring.

Response Information for Neighbors

As an alternative to on-site monitoring, the certified applicator supervising the application would need to ensure that residences and businesses that trigger the requirement have been provided the information below at least one week before the application starts. The information provided may include application dates that range for no more than 4 weeks.
If an application is not made when specified, the information must be delivered again.

Information that must be provided includes:

- The location of the application block,
- Fumigant(s) applied including the active ingredient, name of the fumigant product(s), and the EPA Registration number,
- Contact information for the applicator and property owner/operator,
- Time period in which the fumigation is planned to take place (must not range more than 4 weeks),
- Early signs and symptoms of exposure to the fumigant(s) applied, what to do, and emergency responder phone number to call (911 in most cases), and
- How to find additional information about fumigants.

The method used to share the response information for neighbors can be accomplished through mail, telephone, door hangers, or through other methods that can be reasonably expected to effectively inform residences and businesses within the required distance from the edge of the buffer zone.

**Example Site Map**
Below is an example to clarify this requirement:

- 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 dotted house and the buffer zone or residents of the dotted house must be provided emergency response information.
- The location of the cross-hatched house would not prompt any action since it is outside the specified distance.

For additional information, please see EPA's Soil Fumigant Toolbox, www.epa.gov/oppsrrd1/reregistration/soil_fumigants/.