Addendum to the Field Fumigation Study Guide

November 2012

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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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.

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

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”
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](http://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](http://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 web site, [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.

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

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FIRST AID

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If on skin or clothing: .................................................... 11
If in eyes: ................................................................. 11
If swallowed: .............................................................. 11

HOT LINE NUMBER

For more information contact the California Department of Pesticide Regulation (CDPR) at 1-800-795-3659.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

WARNING: May be fatal if swallowed. Do not breathe vapor or dust. Do not get in eyes, on skin, or on clothing. Prolonged exposure may cause irritation to skin, eyes, and mucous membranes. The gases released during the degradation of this product in the soil are irritating to the skin, eyes, and mucous membranes. Prolonged or frequent repeated skin contact may cause allergic reactions in some individuals.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are Butyl Ruber 14 mils, Latex Rubber 14 mils, Neoprene Rubber 14 mils, Natural Rubber 14 mils, Polyethylene, Polytetrafluoroethylene (PTFE), 14 mils, Viton 14 mils. For more information, follow the instructions for category A on the chemical-resistance category selection chart.

All handlers must wear at a minimum:
- coveralls over steel-toed boots and short pants when in the treated application block,
- chemical-resistant gloves when handling the product,
- chemical-resistant shoes,
- protective eyewear.
Agricultural use requirements for entry restricted period, notification, and applicator training

Definition of terms in labeling

Application method, practice, and rate restrictions

Certified applicator training

Entry restricted period and notification
Mandatory good agricultural practices

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

Protection for Handlers

The following activities are prohibited from being performed by anyone other than persons who have been appropriately trained and equipped as handlers in accordance with the requirements in VPS (40 CFR Part 170).

- Handling or discharging an applicator
- Implementing or using the fumigant equipment
- Handling or discharging a fumigant container
- Breathing fumigant
- Handling or discharging a fumigant applicator

The following activities are prohibited from being performed in the application block from the start of the application to the end of the restrictions period and in the buffer zone during the buffer zone period by anyone other than persons who have been appropriately trained and equipped as handlers in accordance with the requirements in VPS (40 CFR Part 170).

- Breathing fumigant
- Handling or discharging a fumigant container
- Breathing fumigant
- Handling or discharging a fumigant applicator

All activities for the duration of the application must be performed by a certified handler.

Supervision of handlers

For applications to the start of the application until the application is complete, a certified applicator must be at the application block in the far right of the application and must directly supervise all persons performing handling activities.

For handling activities that take place after the application is complete until the end of the application, the certified applicator is not required to be on-site, but must have communicated in a manner that can be understood by the site owner and handlers responsible for ensuring that all activities that need to be performed after the application are completed.

Any person performing handling activities is required to perform respiratory protection, follow work triggers, and tarp handling.

Respiratory protection, stop work triggers and tarp handling

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

Maximum Application Rates for Pre-Plant Soil Fumigation

Physical/Mechanical Incorporation
Maximum physical incorporated rate for all acres, except for golf course renovation, is 421 lbs of product per treated acre. The maximum rate for golf course renovation, with a physical incorporated application method, is 125 lbs of product per treated acre.

Water Incorporation
Maximum rate for water incorporated applications is 202 lbs of product per treated acre.

Greenhouse
The maximum rate for all greenhouse applications is 262 lbs. of product per treated acre.

Application with hand held equipment is prohibited.

For greenhouse applications

The maximum application block size that can be treated is 50,000 square feet.

During the application keep all doors, vents, and windows to the outside open, and keep all tires or mechanical ventilation systems running within the greenhouse.

For greenhouse applications

Application with hand held equipment is prohibited.

Calculating the Broadcast Equivalent Rate
To calculate the broadcast equivalent rate for bedded or strip applications the following information is needed:

- pounds of product per treated acre
- strip or bed bottom width (inches)
- center-to-center row spacing (inches)
- application block size (acres)

Pounds of product per treated acre is the ratio of total amount of product applied to the site of the total area treated (e.g., the rate of product applied in the bed). For bedded or strip applications, the total area treated is the summation of the area (length x width) of each bedded or strip area that is covered with the application block as shown by the black areas in Figure 1 (e.g., black areas are 0.4 or 0.6 of the area within the application block). The area of the space between the basement is not factored in the total area treated.

The application block size is the acreage within the perimeter of the fumigated portion of a field (including fences, irrigation ditches, roadsides). The perimeter of the application block is the border that connects the outermost edges of total area treated with the fumigant product.

### Table: Maximum Application Rates for Pre-Plant Soil Fumigation

<table>
<thead>
<tr>
<th>Method</th>
<th>Rate (lbs of product per treated acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical/Mechanical Incorporation</td>
<td>421</td>
</tr>
<tr>
<td>Water Incorporation</td>
<td>202</td>
</tr>
<tr>
<td>Greenhouse</td>
<td>262</td>
</tr>
</tbody>
</table>

### Formula

\[
\text{broadcast equivalent rate} = \frac{\text{pounds of product per treated acre} \times \text{center-to-center row spacing} \times \text{area of strip or bed block size}}{\text{inches} \times \text{acres} \times \text{pounds product per treated acre} \times \text{applied in the strip or bed}}
\]
The application rates in Table 1 are based on an incorporation depth of 8 inches. Additional Basamid® G is needed when the incorporation extends to greater depths. For specific use recommendations, see SITE-SPECIFIC INFORMATION. 

### Table 1. Basamid® G Application Rates

<table>
<thead>
<tr>
<th>Application Depth in Inches</th>
<th>Application Rate</th>
<th>Application Per Acre</th>
<th>Product Per Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>0.5-1.0</td>
<td>100-200</td>
<td>5-10</td>
</tr>
<tr>
<td>2-4</td>
<td>1.0-1.5</td>
<td>200-300</td>
<td>10-15</td>
</tr>
<tr>
<td>4-6</td>
<td>1.5-2.0</td>
<td>300-400</td>
<td>15-20</td>
</tr>
<tr>
<td>6-8</td>
<td>2.0-2.5</td>
<td>400-500</td>
<td>20-25</td>
</tr>
</tbody>
</table>

**Application method, practice, and rate restrictions**

**Summary of Uses**

Basamid® G soil fumigants are placed for pre-planting control of weeds, nematodes, and soil diseases of turfgrasses and ornamentals.

- **Horticultural Sites** - such as flowers, bulbs, bedding plants, ground covers, evergreens, and shrubs.
- **Field Crops** - such as forests, nonwoody ornamental shrubs, and ornamental trees.
- **Turf Sites** - establishment or renovation of existing sites such as golf courses, parks, golf courses, and parks.
- **Groves** - such as citrus, fruit orchards, and vineyards.
- **Hoof Hurtle** - such as pastures, orchards, and vineyards.
- **Non-Soil Area** - such as pavement, sidewalks, and driveways.

**Soils Contaminated**
The product will control root rot, damping off, and soil diseases caused by Aphanomyces terreus, Rhizoctonia solani, Phytophthora coronata, Phytophthora cactorum, Phytophthora andromedarum, Phytophthora blakesleeanus, and Phytophthora parasitica. For a complete list see Table 8 — Soil-borne Fungi and Table 9 — Soil-borne Bacteria.

**APPLICATION INSTRUCTIONS**

**Preparation Prior to Application**

1. **Basamid® G** can be applied as a seedling and/or as a foliar spray.
2. **Add-Foam** Site: Add foam to the rootball before the plant is placed in the soil. Mix foam thoroughly with the soil around the plant before planting.
3. **No-Add-Foam Site:** Remove the surrounding soil to a depth of 6-8 inches. Mix the soil with the foam according to the label instructions. Apply the mixture to the soil around the plant before planting.

**Methods of Application**

Apply Basamid® G to soil by mixing it into the soil before planting. Apply the soil directly to the site of the plant. Mix the soil thoroughly with the Basamid® G according to the label instructions. Apply the mixture to the soil around the plant before planting.

**Soils Covered With Basamid® G**

Transplants, cuttings, or seeds can be planted directly into the treated soil if the plant species is compatible with the soil. When planting, follow the label instructions for soil pH and temperature. The planting period can be shortened by repeated foliar applications of the correct formulation of the product. The soil must be thoroughly mixed and thoroughly watered before planting. Avoid planting into treated soil within 1 week after planting. If the area is still not ready for planting, wait an additional 2-4 weeks before planting.

**Physical/Mechanical Incorporation for Combined Disease, Nematode, and Weed Control**

1. Apply Basamid® G to 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 rake or spading fork.
3. Following incorporation, mix the soil by hand thoroughly to a depth of 6-8 inches.
4. The treatment is more effective if the incorporation is followed by thorough watering of the soil, keeping it moist but not waterlogged, for 24 hours. After the water has drained, the soil can be planted as usual.

**Water Incorporation with Irrigation for Disease and Weed Control**

1. Apply Basamid® G to the soil.
2. After applying, cover with a layer of plastic film.
3. Activate the Basamid® G by draping, mixing, or incorporating the soil to ensure uniform distribution.
4. The soil must be kept moist but not waterlogged for 24 hours.

**Preparation Prior to Planting**

Before planting, the soil should be thoroughly mixed and thoroughly watered. Avoid planting into treated soil within 1 week after planting. If the area is still not ready for planting, wait an additional 2-4 weeks before planting.

**Fertilization**

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GENERAL RESTRICTIONS AND LIMITATIONS

Maximum seasonal use rate: Refer to Table 1 – Basansi® G Application Rates for maximum rates of Basansi® G fungicidal per acre, per season.

1) Preharvest Interval (PHI): Refer to Preparation Prior to Planting.

2) Environmental Protection: Refer to Environmental Use Requirements.

3) Crop Rotation Restriction: If all label procedures are followed correctly and all gasses are properly removed, no crop rotation restrictions apply.

4) This product cannot be used to formulate or dilute any other pesticide product.

5) DO NOT use Basansi® G when soil temperatures 4° deep are below 50°F (10°C) or above 95°F (35°C).

6) DO NOT plant any crop until all fungicidal gases have dissipated from the soil. A Safety Germination Test is recommended.

7) DO NOT cultivate within 4 feet of growing plants or closer than the drip line of trees and large shrubs.

SITE SPECIFIC INFORMATION

Turf Sites – Establishment or Renovation
Basansi® G can be used for new construction or renovation of existing turf sites such as golf courses, lawns, trees, sports fields, athletic fields, tennis courts, and lawns. Site preparation prior to applying Basansi® G on such sites may differ depending on the type of turf, i.e. cool season vs. warm season grasses.

- Cool Season Grasses – Typically a renovation of a turf site to fill the existing grasses and weed seeds in the soil profile, without disturbing the soil. The area should be mowed to the lowest cutting height possible (1½-inches or less). Then care should be exercised to allow movement of the product to the root zone of the soil profile (generally 6-8 inches). Cobs should be removed and the area cleaned of debris. Verfication may be necessary for water infiltration which will be initiated by a water treaty.

- Warm Season Grasses – Most warm season turf situations involve the removal, or mechanical incorporation, of a thatch layer consisting of residues and/or stolons. Under these conditions, the incorporation of Basansi® G in bermudagrass, bahiagrass, and zoysiagrass is necessary to include the amount of MTG. Follow instructions in Preparation Prior to Application. Select an appropriate application rate (see Table 1 – Basansi® G Application Rates) and methodology or as outlined in Methods of Application. Following, mowing, and before turning off the heat in a greenhouse for each season, a greenhouse management system must be maintained to ensure that MTG has completely degraded. Failing to eliminate all the gases from the soil may delay spring planting or cause plant loss. Prior to receiving or transplanting follow the instructions in Preparation Prior to Planting.

Requirements for Pre-Mist Greenhouse Soil Fumigation: The maximum application block size cannot be treated to 60,000 square feet.

Soil Media
Basansi® G can be used for disinfection of soil media, such as potting soils, soil mixes, compost, and potting soil. The maximum amount of Basansi® G (see Table 1 – Basansi® G Application Rates) per cubic yard of substrate. Soil moisture should be maintained at 60-65% of field capacity for seed, 60-80% for soil, and 60-80% for clay soils. The soil should be allowed to dry to 70% of the field capacity this high during the entire fungicide period. Commercial soil media treatments are effective and incorporate the product with the soil to be treated. The following are two examples of acceptable methods:

Layering
1) Spray moist soil on a solid surface. If possible on a polyethylene sheet.

2) Each soil layer should be 1-16 deep.

3) The required amount of Basansi® G is spread on each soil layer and thoroughly incorporated with a rotary tiller.

Bulk
1) Mix soil on a solid surface, if possible on a polyethylene sheet.

2) Using a front loader, or equivalent, thoroughly mix the required amount of Basansi® G into the soil by repeated tilling.

3) Repeat the procedure until all the treated soil has been blended.

Treated soil can be hauled up to 1 yard high (36 inches). To seal the surface and reduce gas escapes, cover the treated soil with a plastic layer highly recommended. Leave the site closed for a minimum of 7 days, then remove the cover and leave undisturbed for an additional 7 days to allow residual gas to dissipate. Prior to use, follow the guidelines in Preparation Prior to Planting and utilize the Safety Germination Test.

Interplanting
For soil treatment prior to interplanting in existing orchards, berry fields, and similar areas, thoroughly till a strip large enough to accommodate the root system of the plant. The site should be completely cleared prior to contact with the treated soil. Soil may be treated in place based on the area, and depth filled using the instructions in Table 1; refer to the Environmental Use Requirements. For Nutrients, and Weed Control. The soil may be removed and treated in a pile (see Soil Media). The soil surface should be tarped before use. Do not harvest produce within one year of application.

Buffer Zone Requirements
A buffer zone must be established for every fungicidal application of the general buffer zone requirements:

- The buffer zone must extend outward from the edge of the application block, perpendicular in all directions.

- All non-handlers, including field workers, residents, pedestrians, and other bystanders, must be excluded from the buffer zone during the buffer zone period except for transit (see Buffer Zone Exemptions for Transit on Roadways).

- Local, state, or federal officials performing 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, excluding those official duties from the application block or the buffer zone.

- The buffer zone period 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 zone (or other MTG generating pesticide) buffer zone(s):

- To reduce the potential for off-site movement from multiple fungicidal fields, buffer zones from multiple fungicidal fields (other MTG generating pesticide) application blocks must not overlap.

- A minimum of 12 hours have elapsed from the time the earlier application(s) is complete until the start of the later application, and

- 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.

Areas not 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 storage buildings are not occupied during the buffer zone period, and

  - The storage buildings do not share a common wall with an occupied structure.

Buffer Zone requirements

- Buffer zones must not include residential areas (e.g., employee housing, private property), buffer zones must not overlap with commercial, industrial, outdoor residential areas (e.g., farms, gardens, play areas) and other areas that people may occupy, UNLESS:

  - The occupant properties written agreement, prior to the start of the application, that they will voluntarily vacate the buffer zone during the entire buffer zone period, and

  - Reentry by occupants and other non-handlers must not occur until, « The buffer zone period has ended, and

  - Sensory irritation is not experienced upon re-entry.

- Buffer zones must not include agricultural areas owned and/or 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 different buffer zone (or other MTG generating pesticide) buffer zone from any other property owners, except as provided in the Buffer Zone Exemptions section, and

  - The owner of the other property has written agreement to the applicator that they, their employees, and other persons will stay off the buffer zone during the entire buffer zone period.

- Buffer zones must not include roadways and other lots of any, 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 Roadways

- For all other publicly owned and/or operated areas such as parks, streets, parking lots, playgrounds, and public transit stops, buffer zones must not include these areas, UNLESS:

  - The area is not occupied during the buffer zone period, and

  - Written permission to include the public area in the buffer zone is obtained from that person or their authority responsible for management of the area.

Certified applicators must comply with all local laws and regulations.

Use the Posting Section for 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.
Calculating buffer zone distances

Posting buffer zone warning signs

Table 1: Buffer zone distances (in feet) for mechanically incorporated dazomet soil applications except golf course terraces and greenhouses

<table>
<thead>
<tr>
<th>Application Rate (lbs/acre)</th>
<th>0</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>
<th>90</th>
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<tr>
<td>Black Zone Size (acres)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0</td>
<td>20</td>
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<td>1980</td>
<td>2200</td>
<td>2420</td>
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<tr>
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<td>1560</td>
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Table 2: Buffer zone distances (in feet) for dazomet greenzone applications

<table>
<thead>
<tr>
<th>Block Size (acres)</th>
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<th>10</th>
<th>20</th>
<th>30</th>
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<tbody>
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<td>840</td>
<td>1220</td>
<td>1600</td>
<td>2000</td>
<td>2380</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, use the buffer zone distances in Table 1.

Buffer Zone Credits

The buffer zone distances for fumigant/PF applications may be reduced by the percentages listed below. Credits may be added, but credits cannot exceed 25%. 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 <1.5% or 40% reduction in buffer zone distance, if the organic content of the soil in the application block is >1.5% and <3%.
- A 30% reduction in buffer zone distance, if the soybean fields are more than 20 years old.
- A 5% reduction in the buffer zone distance, if the soil temperature is above 80°F. Rainfall measurements are at the application site whenever is shallower.
- A 10% reduction in the buffer zone distance, if the clay content of the buffer block is greater than 27%.

Examples of Buffer Credits (in a Credit Block) are as follows:

- If the buffer zone is 60 feet and the application qualifies for a buffer zone reduction credit since the soil organic content is 1.6%, then the buffer zone can be reduced by 10%, i.e., reduced by 6 feet based on the following calculation: 60 feet * (1 - 0.1) = 54 feet.
- If the buffer zone is 80 feet and the application qualifies for two buffer zone credits since the soil organic content is 1.5% and the clay content is greater than 27%, then the buffer zone can be reduced by 20% (10% organic content credit + 10% clay content credit), i.e., reduced by 10 feet based on the following calculation: 80 feet * (1 - 0.2) = 64 feet.

Posting Fumigant Buffer Zones

- Posting of a buffer zone 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, parks, and side 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 buffer zone 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.
- Signs must remain in place during the entire posting period and must meet the general standards outlined in the WV Safe signs, test site, and legality (see 49 CFR §176.120).
- Signs must be posted no sooner than 24 hours prior to the start of the application and remain posted until the buffer zone period has expired.
- Signs must be removed within 24 hours after the end of the buffer zone period.
- Buffer Zone signs which react to solar or wind conditions must be installed at points of sale for applicators to use. Templates may be downloaded from http://www.epa.gov/pesticideregistration/advisories/
Emergency Preparedness and Response Measures

If a buffer zone is 10 feet or more, then the Emergency Preparedness and Response Measures are not applicable.

Emergency Response Plan

The certified applicator must include in the FMP a written emergency response plan that identifies:

- Evacuation routes,
- Locations of telephones,
- Contact information for first responders and local/state/federal personnel,
- Emergency procedures/responsibilities (e.g., adding water to the tank, repelling pests, rolling equipment, evacuating animals). If:
  - a tank is an incident,
  - a successful mitigation is experienced outside of the buffer zone, and/or there are equipment/structural failures or other absences.

Site-Specific Fumigant Management Plan (FMP)

Prior to the start of applications, the certified applicator overseeing the application must verify that a site-specific FMP exists for each application block. In addition, an agricultural operation’s application blocks may perform the FMP in a manner whereby all of the operations that are covered to all the application blocks that are captured once, and any information unique to a particular application block or blocks is captured in subsequent sections.

The FMP must be prepared by the certified applicator, the site owner, the lead agency, or another party.

The certified applicator must verify in writing (and sign) that the site-specific FMP reflects current site conditions before the start of application.

Each site-specific FMP must contain the following elements:

- Certified applicator (supervising the application),
- Phases,
- Phone number,
- Pestidide applicator license and/or certificate number,
- Specify if grower or private applicator,
- Employer name,
- Employer address, and
- Date and location of completing EPA approved soil fumigant training program.

General site information:

- Application block location (e.g., county, township-range-section-quarter), address, and global positioning system (GPS) coordinates,
- Name, address, and phone number of application block owner,
- Map, aerial photo, or detailed sketch showing:
  - Application block location
  - Application block dimensions
  - Buffer zones dimensions
  - Property lines
  - Roads
  - Right-of-ways
  - Sidewalks
  - Permanent walking paths
  - Dike slopes
  - Temporary application blocks
  - Surrounded by structures (occupied and non-occupied)
  - Locations of Buffer Zone signs,
  - Locations of difficult to reach areas.

- General site information:
  - Target application characteristics
  - Fumigant product name,
  - EPA registration number

- Topo Plan (if used is conducted)
  - Method used to determine soil moisture, and
  - Soil temperature measurement.

- Buffer zones:
  - Method used to determine moisture, and
  - Application block,
  - Application rate from lookup table on label,
  - Application block size from lookup table on label,
  - Credits applied and measurements taken (if applicable),
  - Organic material content
  - Organic material content
  - Soil temperature
  - Buffer zone distance, and
  - Description of buffer zones in the buffer zone that are not under the control of the local agency.

- Buffer Zone signs:
  - Location of the application block,
  - Description of buffer zones (if applicable),
  - List of resistances and businesses impacted,
  - Name and phone number of person providing information, and
  - Method of providing the information.

- Location of the application block.

- Site specific fumigant management plan

- Buffer zone monitoring plan (if applicable):
  - Site and/or tribal lead agency requires notice, provide a list of contents that were notified and date notified
Post-application summary

- Plan describing how communication will take place between the certified applicator, the owner, and other relevant parties (e.g., farm personnel, neighbors, irrigation_website) for complying with label requirements (e.g., buffer zone establishment, buffer zone enforcement, irrigation_website) for complying with label requirements (e.g., buffer zone establishment, buffer zone enforcement).
- Names and number of persons contacted by the certified applicator, and the date contacted.
- Applicator (including certified applicator) information and PPE
  - Name, address, and phone number of personnel
  - Tasks that each handler is authorized to perform
  - Date of PPE training for each handler
  - Applicable PPE including:
    - Chemical resistant gloves
    - respiratory protection
    - Protective eyewear
    - Air-purifying respirators
    - Protective clothing
  - Respirator masks, model, type, style, size, cartridge type, and cartridge replacement schedule

- Record Keeping Procedures
  - Air monitoring: At the end of each day, keep a record of the number of respirators used, the time they were used, and the number of cartridges replaced.
  - Good Agricultural Practices (GAPs): Include written instructions for the handling and storage of the product.
  - Record-keeping: Keep records of all applications, including the date, time, location, and method of application.
  - Material Safety Data Sheets (MSDS): Include the MSDS for each product used.

- General Information
  - Important Notes to User
    - Read all the instructions before use.
    - This product is recommended for use in greenhouses and under greenhouses.
    - This product is not recommended for use in open fields or in fields where no protective equipment is worn.
    - This product is not recommended for use on plants that are sensitive to chemicals.
  - Mixture of Action
    - When using this product, follow the label instructions for handling and disposal.
    - Store this product in a cool, dry place.
    - Do not dispose of this product in the usual household waste.

- Post-application Summary
  - The certified applicator must provide a copy of the application summary to the owner of the property within 5 days of the application.
  - The application summary must include:
    - Date of application
    - Time of application
    - Method of application
    - Weather Conditions
  - The certified applicator must also provide a copy of the application summary to the local or state regulatory agency, if required by law, and to any other person who may be affected by the application.

- Post-application Summary
  - The certified applicator must provide a copy of the application summary to the owner of the property within 5 days of the application.
  - The application summary must include:
    - Date of application
    - Time of application
    - Method of application
    - Weather Conditions
  - The certified applicator must also provide a copy of the application summary to the local or state regulatory agency, if required by law, and to any other person who may be affected by the application.
Table 5. Dormant Annual Weeds

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burdocks</td>
<td>Arctium lappa</td>
</tr>
<tr>
<td>Horseweed</td>
<td>Silene caroliniana</td>
</tr>
<tr>
<td>Bull Thistle</td>
<td>Cirsium vulgare</td>
</tr>
<tr>
<td>Red Clover</td>
<td>Trifolium pratense</td>
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<tr>
<td>White Clover</td>
<td>Trifolium repens</td>
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Table 6. Plant-parasitic nematodes

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
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</thead>
<tbody>
<tr>
<td>Cylindrocladium preferens</td>
<td>Cylindrocladium preferens</td>
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<td>Pratylenchus penetrans</td>
<td>Pratylenchus penetrans</td>
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<td>Helicotylenchus dipsaci</td>
<td>Helicotylenchus dipsaci</td>
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<tr>
<td>Globodera rostochiensis</td>
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Table 7. Root Propagated Weeds

<table>
<thead>
<tr>
<th>Common Name</th>
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<tbody>
<tr>
<td>Black Knot</td>
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<td>White Ash</td>
<td>Fraxinus americana</td>
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<td>White Pine</td>
<td>Pinus strobus</td>
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Table 8. Root-knot nematodes

<table>
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<th>Common Name</th>
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<tbody>
<tr>
<td>Meloidogyne incognita</td>
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Table 9. Soil-borne Fungi

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pythium ultimum</td>
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</table>

Table 10. Soil-borne Bacteria

<table>
<thead>
<tr>
<th>Common Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ralstonia solanacearum</td>
<td>Ralstonia solanacearum</td>
</tr>
</tbody>
</table>
Storage and Disposal

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

Peatoid Storage: Store this product in a dry, cool place below 86°F (30°C) — it will decompose at higher temperatures. This material reacts nonviolently with moisture, releasing fumigant 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 domestic plants, seeds, fertilizers, insecticides, and other agricultural chemicals as plant injury or loss may result from contamination.

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

Container Handling: Non-releasable container. Do not reuse or refill this container. Completely empty bag into application equipment. Then offer for recycling, if available or dispose of empty bag in a sanitary landfill or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Steps to be taken in case 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.

LIMITED WARRANTY AND DISCLAIMER

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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 Fumigant Mitigation: Site-Specific Fumigant Management Plans (continued)

- 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)
Post-Application Summaries (continued)

- 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/oppsrrd1/reregistration/soil_fumigants/.
To address risks to fumigant handlers and workers, EPA is requiring:

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, shovalers, 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

- 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 BUT 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/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. 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.

Buffer Zone Distances

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).

See www.epa.gov/pesticides/tarpcredits for a list of tarps that have been tested and determined to qualify for buffer zone reduction credits.

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

- 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) \textit{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, \textit{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), \textit{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

![Buffer Zone Sign Image]
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.

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 Emergency Preparedness and Response 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.

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>Buffer Zone Size</th>
<th>Residence and Business Distance</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 products(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/](http://www.epa.gov/oppsrrd1/reregistration/soil_fumigants/).