

**Safety Information for Handlers Participating in a Field Fumigant Application
for Metam Sodium and Metam Potassium Products**

The U.S. Environmental Protection Agency requires that certified applicators provide safety information to handlers of soil fumigants. Providing this information to handlers in a manner they can understand meets this obligation.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Introduction to FIFRA Training Requirements for Soil Fumigant Handlers

- The 2009 Amended Corrected Reregistration Eligibility Decision (RED) for metam sodium and metam potassium requires that all handlers receive appropriate training BEFORE participating in field fumigation. The training outlined below includes the elements identified in the RED and is in accordance with the EPA Worker Protection Standard. The sections outlined below will address:
 - Fumigants and How They Work
 - Safe Application and Handling of Soil Fumigants
 - Air Monitoring and Respiratory Protection
 - Appropriate Steps to Mitigate Exposure (What To Do in Case of an Emergency, How To Report an Incident, First Aid)

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Chapter 1: Fumigants and How They Work

1. Purpose of Fumigation

- Soil fumigants are pesticides that are placed into the soil before planting to control pests such as nematodes, fungi, and weeds. Soil fumigants may be a liquid or gas at ambient temperatures, but once placed in the soil they form gasses that move through the soil to control pests. Metam sodium and metam potassium are liquids but are converted into the gas methyl isothiocyanate (MITC) following application. Some gas may escape from the soil after it has been placed in the soil.

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Chapter 1: Fumigants and How They Work (cont'd)

2. Types of Fumigants -- Metam Sodium and Metam Potassium

- Metam sodium is one of the most widely used agricultural pesticides in the United States and is presently registered on food and feed crops.
- Metam sodium and metam potassium are non-selective soil fumigants with fungicidal, herbicidal, insecticidal, and nematicidal properties. They are dithiocarbamate salts that break down quickly in the environment to degradate MITC. MITC is highly volatile and is responsible for the fumigant properties of metam sodium and metam potassium.
- Metam sodium and metam potassium are used on a wide range of pests, including fungi, plants, insects, and nematodes. As an agricultural soil fumigant, it is currently labeled for use on most food, feed, and fiber crops. It also is used pre-plant on turf grass, to control invading plant roots in drains and sewers.

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Chapter 1: Fumigants and How They Work (cont'd)

3. Early Signs and Symptoms of Exposure

- Acute air exposures to MITC of 22 parts per billion (ppb) or greater for residential bystanders and occupational handlers exceed EPA's level of concern. May be irritating to eyes, nose, and throat.
- Acute exposure to bystanders or fumigant handlers is possible following metam sodium/metam potassium application due to volatilization and off-site movement of MITC.

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Chapter 1: Fumigants and How They Work (cont'd)

4. Working Safely Around Fumigations

- Soil fumigants are hazardous materials and must be handled with care only by those individuals experienced with their proposed use. As a handler, it is the responsibility of both you and the Certified Applicator to ensure that you have received the proper training to assist in fumigation activities before any such fumigation activity takes place.

5. Resources for More Information

- If a handler needs additional information, these additional resources may be helpful:
 - Application Supervisor (Certified Applicator): Metam sodium and metam potassium are restricted-use pesticides and the application must be supervised on-site by someone who has completed the state-specific training and has been certified by a state program as a “Certified Applicator.” In addition, the Application Supervisor will have additional specific training in soil fumigation application.

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Chapter 1: Fumigants and How They Work (cont'd)

5. Resources for More Information (cont'd):

- Pesticide Label: The pesticide label for the product being applied should be reviewed.
- Fumigant Management Plan: A site-specific Fumigant Management Plan (FMP) is a set of performance criteria for each application that indicates how the certified applicator will comply with the label requirements. It also includes information on the response plan in the event of an unexpected incident. Prior to the start of the fumigation, the certified applicator supervising the application must verify that a site-specific FMP exists for each application block (*i.e.*, a field or portion of a field treated with a fumigant in any 24-hour period). In addition, an agricultural operation fumigating multiple application blocks may format the FMP in a manner whereby all of the information that is common to all the application blocks is captured once, and any information unique to a particular application block or blocks is captured in subsequent sections.

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Chapter 1: Fumigants and How They Work (cont'd)

5. Resources for More Information (cont'd):

- A copy of the FMP is available at each application site for handler review.
- Material Safety Data Sheet (MSDS): An MSDS for metam sodium and for metam potassium is available from the manufacturer.
- EPA Soil Fumigant Website: Information from EPA on risk mitigation measures for soil fumigant pesticides is available at http://www.epa.gov/opp00001/reregistration/soil_fumigants/

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Chapter 2: Safe Application and Handling of Soil Fumigants

1. Understanding the Roles of Handler Categories

- The following activities are prohibited from being performed in the application block (*i.e.*, the field or portion of a field treated with a fumigant in any 24-hour period) by anyone other than persons who have been appropriately trained and equipped as handlers in accordance with the requirements in the EPA Worker Protection Standard (40 C.F.R. Part 170), from the start of the application until the entry restricted period ends (NOTE: persons installing, perforating, removing, repairing, and monitoring tarps are considered handlers for the durations listed below).

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

1. Understanding the Roles of Handler Categories (cont'd)

- Participating in the application as supervisors, loaders, drivers, tractor co-pilots, shovelers, cross ditchers, or as other direct application participants (the application starts when the fumigant is first introduced into the soil and ends after the fumigant has stopped being delivered/dispensed to the soil);
- Using devices to take air samples to monitor fumigant air concentrations;
- Cleaning up fumigant spills (this does not include emergency personnel not associated with the fumigation application);
- Handling or disposing of fumigant containers;
- Cleaning, handling, adjusting, or repairing the parts of fumigation equipment that may contain fumigant residues;
- Installing, repairing, or operating irrigation equipment in the fumigant application block;

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

1. Understanding the Roles of Handler Categories (cont'd)

- Entering the application site to perform scouting, crop advising, or monitoring tasks;
- Installing, perforating (cutting, punching, slicing, poking), removing, repairing, or monitoring tarps:
 - Until 14 days after application is complete if tarps are not perforated and removed during those 14 days, or
 - Until tarp removal is complete if tarps are **both** perforated **and** removed less than 14 days after application, or
 - Until 48 hours after tarp perforation is complete if they will not be removed within 14 days after application.
 - NOTE: see Tarp Perforation and/or Removal section on this labeling for requirements about when tarps are allowed to be perforated.
- Performing any handling tasks as defined by the EPA Worker Protection Standard.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment

- Metam sodium and metam potassium may be applied via shank injection; spray blade or rotary tiller; center pivot; sprinkler; drip; or flood basin, furrow, and border.



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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

- Good Agricultural Practices (GAPs) must be followed during all fumigant applications. These include the following, specifically applicable to handlers:

- Weather Conditions

- Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application; additional wind speed requirements apply to solid set applications, as set forth below under *Additional GAPs for Specific Applications*.
- Prior to fumigation, the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see Identifying Unfavorable Weather Conditions section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.



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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Weather Conditions (cont'd)

- Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime.
- Unfavorable conditions are common on nights with limited cloud cover and light to no wind, and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.



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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Soil Conditions

- Soil Preparation

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, a deep tillage to fracture these layers must occur prior to or as part of the soil fumigant application except for solid set sprinkler application; additional requirements for solid set sprinkler application are set forth below under *Additional GAPs for Specific Applications*. The soil must be tilled, at minimum to the depth of the treatment zone.
- Plant residue must be worked into the soil with little or no crop residue present on the soil surface for drip, flood basin, furrow, and border applications. Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Additional requirements for center pivot and solid set applications are set forth below under *Additional GAPs for Specific Applications*.
- Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Soil Conditions (cont'd)

- Soil Temperature
 - At the beginning of the application, the maximum soil temperature at the injection depth is 90°F. Additional requirements for center pivot and solid set applications are set forth below under *Additional GAPs for Specific Applications*.
 - If air temperatures have been above 100° F in any of the 3 days prior to application, then soil temperature must be measured and recorded in the FMP.
- Soil Moisture
 - The soil moisture in the top 6 inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application. Additional requirements for shank, spray blade, rotary tiller, drip, and flood basin applications are set forth below under *Additional GAPs for Specific Applications*.
 - If appropriate measuring equipment is not used to determine whether the soil moisture in the top 6 inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior the application, the USDA Feel Method test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Soil Conditions (cont'd)

- Soil Moisture (cont'd)

- » Coarse textured soils (fine sand and loamy fine sand): there must be enough moisture (50-75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.
- » Moderately coarse textured soils (sandy loam and fine sandy loam): there must be enough moisture (50-75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.
- » Medium textured soils (sandy clay loam, loam, and silt loam): there must be enough moisture (50-75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable and forms a weak ribbon between the thumb and forefinger.
- » Fine textured soils (clay, clay loam, and silty clay loam): there must be enough moisture (50-75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Soil Conditions (cont'd)

• Soil Moisture (cont'd)

- » For fields with more than one soil texture, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.



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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Application and Equipment Considerations

- Application equipment must be in good working order.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
 - Before using a fumigation rig for the first time, or when preparing it for use after storage, the operator must check the following items carefully:
 - » Check the filter, and clean or replace the filter element as required.
 - » Check all tubes and chisels to make sure they are free of debris and obstructions.



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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPS for Specific Applications

- Shank Applications

- The soil moisture in the top 6 inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, EXCEPT in areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- The injection point for bedded and broadcast applications shall be a minimum of 3 inches from the final soil/air interface. Chisel traces must be eliminated following an application and the soil surface must be sealed immediately after application using one or more of the following methods:
 - » Compaction with a bed-shaper, roller, press wheel or by similar device, OR
 - » Covering the treated soil with 3 to 6 inches of untreated soil, OR
 - » Applying a minimum of a ½-inch of water beginning immediately after application of a set and completing the water treatment within 4 hours, OR
 - » Covering treated area with a tarp.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPS for Specific Applications (cont'd)

- Shank Applications (cont'd)

- Do not apply or allow fumigant to drain or drip onto the soil surface. Injectors must be placed below the soil surface before product flow begins. For each injection line either have a check valve located as close as possible to the final injection point, or drain/purge the line of any remaining fumigant prior to lifting injection shanks from the ground. Do not lift injection shanks from the soil until the shut-off valve has been closed and the fumigant has been depressurized (passively drained) or purged (actively forced out via air compressor) from the system.
- Application equipment must be in good working order.
- Before using a fumigation rig for the first time, or when preparing it for use after storage, the operator must check the following items carefully:
 - » Check the filter, and clean or replace the filter element as required.
 - » Check all tubes and chisels to make sure they are free of debris and obstructions.
 - » Check and clean the orifice plates.
- Tarps
 - » When tarps are used for emission control, the tarps must be installed immediately after application.
 - » When tarps are used, a written tarp plan must be developed and included in the FMP.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPs for Specific Applications (cont'd)

- Spray Blade Applications (includes bed-top blade and soil cap applications) and Rotary Tiller Applications
 - The soil moisture in the top 6 inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, EXCEPT in areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
 - Apply the product on the soil immediately ahead of the bed-shaping equipment or tiller equipment. The soil surface must be compacted immediately after application using one or more of the following methods:
 - » Compaction with a bed-shaper, roller, press wheel or similar device, OR
 - » Covering the treated soil with 3 to 6 inches of untreated soil, OR
 - » Applying a minimum of a ½-inch of water beginning immediately after application of a set and completing the water treatment within 4 hours, OR
 - » Covering treated area with a tarp.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPS for Specific Applications (cont'd)

- Spray Blade Applications (includes bed-top blade and soil cap applications) and Rotary Tiller Applications (cont'd)
 - Do not apply or allow fumigant to drain or drip onto the soil surface.
 - Application equipment must be in good working order.
 - Before using a fumigation rig for the first time, or when preparing it for use after storage, the operator must check the following items carefully:
 - » Check the filter, and clean or replace the filter element as required.
 - » Check all tubes and chisels to make sure they are free of debris and obstructions.
 - » Check and clean the orifice plates.
 - Tarps
 - » When tarps are used for emission control, the tarps must be installed immediately after application.
 - » When tarps are used, a written tarp plan must be developed and included in the FMP.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPS for Specific Applications (cont'd)

- Center Pivot Applications

- Wind Speed:

- » For sprinkler or chemigation applications: 1) not using a solid stream type nozzle, OR 2) having a release height or spray height greater than 4 feet, OR 3) having 30 lbs or greater PSI at the sprinkler head, wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application and the maximum wind speed is 10 mph.
 - » For sprinkler or chemigation applications: 1) a solid stream, AND 2) having release height and spray height less than 4 feet, AND 3) having 29 lbs or less PSI at the sprinkler head, wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application and the maximum wind speed is 25 mph.

- Except when applying over cover crops as set forth in the General Instructions for Sprinkler System, crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.
 - Maximum air temperature is 90°F.
 - Maximum soil temperature is 90°F, measured at 3 inches in depth.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPs for Specific Applications (cont'd)

- Solid Set Sprinkler Applications

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application and the maximum wind speed is 10 mph.
- Maximum air temperature is 90°F.
- Maximum soil temperature is 90°F, measured at 3 inches in depth.
- Except when applying over cover crops as set forth in the General Instructions for Sprinkler System, crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water. Maximum soil temperature is 90°F, measured at 3 inches in depth.



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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

- Additional GAPs for Specific Applications (cont'd)
 - Drench and Drip Applications
 - Maximum air temperature is 90°F.
 - Maximum soil temperature is 90°F, measured at 3 inches in depth.
 - Tarps for Drip Applications
 - » When tarps are used for emission control in drip irrigation, the tarps must be installed immediately after application.
 - » When tarps are used, a written tarp plan must be developed and included in the FMP.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

2. Understanding the Application Method and Equipment (cont'd)

➤ Additional GAPS for Specific Applications (cont'd)

- Flood Furrow and Border Applications

- Maximum air temperature is 90°F.
- Maximum soil temperature is 90°F, measured at 3 inches in depth.
- The soil moisture in the top 6 inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, EXCEPT in areas where soil moisture must exceed field capacity to form a bed (*e.g.*, certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- Systems using a gravity flow pesticide dispersing system must meter the pesticide into the water at the head of the field and downstream of a hydraulic discontinuity such as a drop structure or weir box to decrease potential for water source contamination from backflow if water flow stops.
- Meter at a steady rate into 3 to 18 inches of water per treated acre during irrigation. **IMPORTANT:** Prior to starting the application, always inspect ditches and border areas to ensure containment of the irrigation waters. Apply only into field head ditch. **DO NOT APPLY INTO ANY LATERAL DITCHES.**
- Tarps
 - » When tarps are used for emission control, the tarps must be installed immediately after application.
 - » When tarps are used, a written tarp plan must be developed and included in the FMP.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

3. For Chemigation Methods

- Apply this product only through sprinkler, including center pivot, lateral move, end tow, side (wheel) roll, traveler, big gun, solid set, or hand move; flood (basin); furrow, border, or drip (trickle) irrigation systems. **DO NOT APPLY** this product through any other type of irrigation system. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water. If you have questions about calibration, you should contact your State Extension Service Specialists, equipment manufacturers or other experts. Do not connect an irrigation system used for pesticide application to a public water system unless prescribed safety devices for public water systems stated on the pesticide label are in place. A person knowledgeable of the chemigation system and responsible for its operation or under the supervision of the responsible person shall shut the system down and make necessary adjustments should the need arise.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

3. For Chemigation Methods (cont'd)

- Using a Public Water System:
 - Metam registrants do not encourage connection of chemigation systems to public water systems. The following information is provided for users who have evaluated alternative application and water source options before choosing to make such a connection.

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

3. For Chemigation Methods (cont'd)

- Using a Public Water System (cont'd):
 - OBSERVE THE FOLLOWING PRECAUTIONS IF YOUR CHEMIGATION SYSTEM IS CONNECTED TO A PUBLIC WATER SYSTEM: Public water system is defined as a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Chemigation systems must contain a functional, reduced pressure zone (RPZ), backflow preventer or the functional equivalents in the upstream water supply line from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and top of overflow rim of the reservoir tank of at least the inside diameter of the fill pipe. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid toward the injection pump. *Any alternatives to the above-required safety devices must conform to the list of EPA-approved alternative devices.*

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

4. Re-entry Restrictions for a Fumigated Field

- Entry (including early entry that would otherwise be permitted under the EPA Worker Protection Standard) by any person -- other than a correctly trained and PPE-equipped handler who is performing a handling task listed on this labeling -- is PROHIBITED -- from the start of the application until:

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Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

4. Re-entry Restrictions for a Fumigated Field (cont'd)

- Five days (120 hours) after the application is complete for untarped applications, or
- Five days (120 hours) after application is complete if tarps are not perforated and removed for at least 14 days following application, or
- Forty-eight hours after tarp perforation is complete if tarps will not be removed for at least 14 days following application, or
- Until tarp removal is completed if tarps are both perforated and removed less than 14 days after application.
- NOTE: see Tarp Perforation and/or Removal section on this labeling for requirements about when tarps are allowed to be perforated.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

5. Buffer Zone Restrictions Around a Fumigated Field (to be added once these requirements are part of the EPA approved label)

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

6. Buffer Zone Perimeter Monitoring (to be added once these requirements are part of the EPA approved label)

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

7. Tarp Repair and Removal Plans

- Persons perforating, repairing, removing, and/or monitoring tarps are defined, within certain time limitations, as handlers and must be provided the PPE and other protections for handlers as required by the label in the EPA Worker Protection Standard.
 - Tarps must not be perforated until a minimum of 5 days (120 hours) have elapsed after the fumigant injection into the soil is complete (e.g., after injection of the fumigant product and tarps have been laid or after drip lines have been purged and tarps have been laid), unless a weather condition exists which necessitates the need for early perforation or removal, see *Early Tarp Removal for Broadcast Applications Only* and *Early Tarp Perforation for Flood Prevention Activities* sections below.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

7. Tarp Repair and Removal Plans (cont'd)

- If tarps will be removed before planting, tarp removal must not begin until at least 2 hours after tarp perforation is complete.
- If tarps will not be removed before planting, planting or transplanting must not begin until at least 48 hours after the tarp perforation is complete.
- If tarps are left intact for a minimum of 14 days after fumigant injection into the soil is complete, planting or transplanting may take place while the tarps are being perforated.
- Each tarp panel used for broadcast fumigation must be perforated.
- Tarps used for fumigations may be perforated manually ONLY for the following situations:
 - At the beginning of each row when a coulter blade (or other device which performs similarly) is used on a motorized vehicle such as an ATV.
 - In fields that are 1 acre or less.
 - During flood prevention activities.
 - In all other instances tarps must be perforated (cut, punched, poked, or sliced) only by mechanical methods.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

7. Tarp Repair and Removal Plans (cont'd)

- Tarp perforation for broadcast fumigations must be completed before noon.
- For broadcast fumigation, tarps must not be perforated if rainfall is expected within 12 hours.
- Early Tarp Removal for Broadcast Applications Only:
 - Tarps may be removed before the required 5 days (120 hours) if adverse weather conditions have compromised the integrity of the tarp, provided that the compromised tarp poses a safety hazard. *Adverse weather* includes high wind, hail, or storms that blow tarps off the field and create a hazard, *e.g.*, tarps blowing into power lines and onto roads. A *compromised tarp* is a tarp that due to an adverse weather condition is no longer performing its intended function and is creating a hazard.
 - If tarps are removed before the required 5 days have elapsed due to adverse weather, the events must be documented in the post-application summary.
- Early Tarp Perforation for Flood Prevention Activities
 - Tarp perforation is allowed before the 5 days (120 hours) have elapsed.
 - Tarps must be immediately retucked and packed after soil removal.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 2: Safe Application and Handling of Soil Fumigants (cont'd)

7. Tarp Repair and Removal Plans (cont'd)



This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection

1. Respiratory Protection

■ When To Wear Respiratory Protection

- Respiratory Protection and Stop Work Triggers: The following procedures must be followed to determine whether an air-purifying respirator is required or if operations must cease for any person performing a handling task as stated on the label.
 - If at any time any handler experiences sensory irritation (tearing, burning of the eyes or nose) then either:
 - An air-purifying respirator must be worn by all handlers who remain in the application block, or
 - Operations must cease and handlers not wearing air-purifying respirators must leave the application block.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)

■ When To Wear Respiratory Protection (cont'd)

- When air-purifying respirators are worn, then air monitoring samples must be collected at least every 2 hours in the breathing zone of a handler performing a representative handling task.
- If at any time: (a) a handler experiences any sensory irritation when wearing an air-purifying respirator, or (b) an air sample is greater than or equal to 6,000 ppb MITC, then all handler activities must cease and handlers must be removed from the application block. If operations cease, the emergency plan detailed in the FMP must be implemented.
- In emergency situations, an air-rescue device (e.g., self-contained breathing apparatus (SCBA) or other supplied-air device) should be worn if the applicator or handler must enter an area of potentially hazardous fumigant air concentrations, as could occur if a valve malfunctioned or a dispensing line broke and released fumigant into the air or onto the soil. In such a rare event, the Certified Applicator will instruct you what to do.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)

■ Approved Respiratory Protection Equipment

➤ When an air-purifying respirator is required, handlers must wear at minimum either:

- A full-face respirator with an organic-vapor-removing cartridge with a prefilter approved for pesticides (NIOSH approval number prefix TC-23C), or
- A full-face respirator with a canister approved for pesticides (NIOSH approval number prefix TC-14G) or canister with any N, R, P, or HE prefilter.
- **IMPORTANT:** An air-supplying respirator (*i.e.*, a respirator connected directly to a clean air source or a SCBA) is not permitted for routine handler tasks. Such respirators are only permitted in emergencies such as a spill or leak or when corrective action is needed to reduce air levels to acceptable levels.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)



This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)

■ Requirements for Removing Respiratory Protection

- Handlers can remove air-purifying respirators or resume operations if 2 consecutive breathing zone samples taken at the handling site at least 15 minutes apart show that levels of MITC have decreased to less than 600 ppb, provided that handlers do not experience sensory irritation. Samples must be taken where the irritation is first experienced.
- During the collection of air samples, an air-purifying respirator must be worn by the handler taking the air samples.
- When using monitoring devices to monitor air concentration levels, a direct reading detection device, such as a Dräger or Sensidyne device must be used. The devices must have a sensitivity of at least 600 ppb for MITC.
- When breathing zone samples are required, they must be taken outside respiratory protection equipment and within a ten-inch radius of handler's nose and mouth.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)

- Requirements for Removing Respiratory Protection (cont'd)
 - Handlers can resume work activities without air-purifying respirators, if 2 consecutive breathing zone samples taken at the handling site at least 15 minutes apart show levels of MITC have decreased to less than 600 ppb, provided that handlers do not experience sensory irritation. During the collection of air samples, an air-purifying respirator must be worn by the handler taking the air samples. Samples must be taken where the irritation is first experienced.
 - Work activities can resume if all the following conditions exist provided that the appropriate air-purifying respirator is worn:
 - Two consecutive breathing zone samples for MITC taken at the handling site at least 15 minutes apart must be less than 6,000 ppb,
 - Handlers do not experience sensory irritation while wearing the air-purifying respirator,
 - Cartridges have been changed, and
 - During the collection of air samples, an air-purifying respirator must be worn by the handler taking the air samples. Samples must be taken where the irritation is first experienced.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)

- Respirator Fit Testing, Medical Qualification, and Training
 - Employers must verify that any handler who uses a respirator is:
 - Fit-tested and fit-checked using a program that conforms to OSHA's requirements (see 29 C.F.R. Part 1910.134).
 - Trained using a program that conforms to OSHA's requirements (see 29 C.F.R. Part 1910.134).

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

1. Respiratory Protection (cont'd)

■ Respirator Fit Testing, Medical Qualification, and Training (cont'd)

- Examined by a qualified medical practitioner to ensure physical ability to wear safely the style of respirator to be worn. A qualified medical practitioner is a physician or other licensed health care professional who will evaluate the ability of a worker to wear a respirator. The initial evaluation consists of a questionnaire that asks about medical conditions (such as a heart condition) that would be problematic for respirator use. If concerns are identified, then additional evaluations, such as a physical exam, might be necessary. Fit testing certificate must be retained and a copy should be kept with the FMP. Upon request by local/state/federal/tribal enforcement personnel, employers must provide documentation how they have complied with these requirements.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

2. Other PPE Considerations

■ Clothing and Attire

- Some materials that are chemical-resistant to this product are barrier laminate or viton = 14 mils. For more options, follow the instructions for category H on an EPA chemical-resistance category selection chart.
- All handlers must wear:
 - Long-sleeved shirt and long pants; and
 - Shoes and socks.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

2. Other PPE Considerations (cont'd)

■ Clothing and Attire (cont'd)

- Handlers applying via weed sprayer while irrigation sprinklers are running or handlers who may be exposed to liquid spray while repairing a malfunctioning chemigation system or shutting off equipment must wear:
 - Chemical-resistant coveralls over long-sleeved shirt and long pants;
 - Chemical-resistant gloves;
 - Chemical-resistant footwear and socks;
 - Chemical-resistant headgear;
 - Protective eyewear (Do NOT wear goggles); and
 - Respirator of the type specified in the respiratory protection section in the PPE requirements on the metam sodium and metam potassium labels.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

2. Other PPE Considerations (cont'd)

■ Clothing and Attire (cont'd)

- Except as required above, handlers transferring or loading liquid formulations, handlers operating motorized ground equipment with open cabs, handlers repairing or inactivating irrigation or chemigation equipment during application, and handlers cleaning up spills or equipment must wear:
 - Coveralls over long-sleeve shirt and long pants;
 - Chemical-resistant gloves;
 - Chemical-resistant footwear and socks;
 - Chemical-resistant apron if transferring or loading the fumigant or cleaning up spills or equipment;
 - Protective eyewear (Do NOT wear goggles); and
 - Respirator of the type specified in the respiratory protection section in the PPE requirements on the metam sodium and metam potassium labels.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

2. Other PPE Considerations (cont'd)

■ Clothing and Attire (cont'd)

- All other handlers (including handlers operating motorized ground equipment with closed cabs except for handlers who set up and calibrate chemigation and irrigation equipment and start the application from inside the application block) as stated in this labeling must wear:
 - Long-sleeve shirt and long pants;
 - Shoes plus socks; and
 - Respirator of the type specified in the eye and respiratory protection section in the PPE requirements on this label if triggered.
- All handlers who set up and calibrate chemigation and irrigation equipment and start the application from inside the application block must wear:
 - Long-sleeve shirt and long pants;
 - Shoes plus socks;
 - Protective eyewear (Do NOT wear goggles); and
 - Respirator of the type specified in the respiratory protection section in the PPE requirements on the metam sodium and metam potassium labels if triggered.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

2. Other PPE Considerations (cont'd)



This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

2. Other PPE Considerations (cont'd)

■ Personal Hygiene

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. DO NOT transport contaminated clothing inside a closed vehicle. Store in a sealed container and wash or dispose as specified.
- Remove PPE immediately after handling product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.
- Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

3. Other Health Considerations

■ Heat Illness:

- Handlers wearing chemical-resistant attire are limited to 30 minutes of exposure in any 60-minute period to prevent heat illness, and, as required by the EPA Worker Protection Standard, employers of these handlers must take any necessary steps to avoid heat illness.
- Heat illness is caused by working in air temperatures that are excessively hot, and it can occur in both humid and dry conditions. Some of the symptoms of heat illness are the same as overexposure to fumigants, including dizziness, headache, fatigue, weakness, clammy skin, nausea, vomiting, hyperventilation, and irritability. Be sure to keep hydrated; drink sufficient water or other suitable liquids when working under hot conditions.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

3. Other Health Considerations (cont'd)

- Dust and Other Sensory Irritants:
 - Dust, pollen, and many other things can cause sensory irritation of the eyes, nose, throat, and respiratory tract. If you experience sensory irritation while engaged as a handler participating in a fumigation, take the necessary precautions by leaving the immediate area, moving upwind of the fumigation site, and donning an air-purifying respirator.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 3: Air Monitoring and Respiratory Protection (cont'd)

4. Air Monitoring

- **Equipment Used for Air Monitoring:** The equipment used for monitoring the air varies by the fumigant. In general, fumigant vapors are detected using small tubes that change color once they are exposed to air by means of a pump that passes a known volume of air through the tube. The tube contents will change color if the fumigant is detected at a certain concentration or range of concentrations. When using monitoring devices to monitor air concentration levels for metam sodium and metam potassium, a direct reading detection device, such as a Dräger or Sensidyne must be used. The devices must have a sensitivity of at least 600 ppb for MITC.
- **Sensory Irritation:** Tearing, burning of the eyes or nose. (See the “When to Wear Respiratory Protection” Chapter 3, Section 1 above).

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 4: Exposure Mitigation

1. Notifying Applicator Supervisor of Suspected or Known Exposures

- If you suspect that you, another handler, or other person has been exposed to a fumigant, notify the Fumigation Supervisor (Certified Applicator) immediately. The Certified Applicator will have a series of questions for you to answer.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 5: Appropriate Steps To Mitigate Exposure

1. What To Do in Case of an Emergency

- **Preparing for Emergencies:** Soil fumigants are hazardous materials and must be handled with care only by those individuals experienced with their proper use. While rare, the equipment (cylinders, valves, connecting hose and lines, etc.) may fail, causing a release of the fumigant into the immediate area. Also rare, the fumigant(s) may escape from the soil at an accelerated rate and/or not disperse adequately, such as under no-wind conditions. For all emergencies, follow the proper steps to make sure you and other handlers are properly protected. This includes having quick access to respiratory protection, knowing what mitigation steps can be taken to reduce exposure (e.g., leaving the area and going upwind), and knowing how to evacuate yourself from the immediate area if needed.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

1. What To Do in Case of an Emergency (cont'd)

- Examples of Emergency Situations: (A) Equipment Failure: if a valve malfunctions or a connecting hose or line breaks, there could be an immediate release of fumigant vapor or liquid into the surrounding area. You should take immediate steps to avoid exposure, such as moving upwind of the release. The Certified Applicator will instruct when it is safe to resume activities by correcting the problem, taking air monitoring samples, and/or removing all personnel from the exposure area. (B) Vapor Drift: under certain weather and/or soil conditions, fumigant vapor can escape from the soil at an atypically high rate, thereby posing an exposure risk to handlers and bystanders. The Certified Applicator will instruct you on what to do in case of an airborne exposure risk. Generally, you will be instructed to move upwind of the treated field. For off-site drift of fumigant vapor, the Certified Applicator will start the necessary mitigation measures to reduce the release of the fumigant vapor.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

1. What To Do in Case of an Emergency (cont'd)

- Notifying the Application Supervisor of a Suspected or Known Emergency Situation: If you suspect or know that you, another handler, or another person has been exposed to a fumigant and are experiencing the signs and symptoms of fumigant exposure, stop all work and contact the supervisor (Certified Applicator) immediately.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

1. What To Do in Case of an Emergency (cont'd)

- **Spill and Leak Procedures:** Evacuate everyone from the immediate area of the spill or leak. For entry into an affected area to correct the problem, wear the PPE (including prescribed respirator) specified in the Hazards to Humans section of this labeling. Move leaking or damaged containers outdoors or to an isolated location. Observe strict safety precautions. Work upwind, if possible. Allow spilled fumigant to evaporate or to absorb onto vermiculite, dry sand, earth, or similar absorbent material. Such material should be disposed of on-site or at an approved disposal facility. Only correctly trained and PPE-equipped handlers are permitted to perform such cleanup. Do not permit entry into the spill or leak area by any other person until the concentration of MITC is measured to be less than 600 ppb.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

2. How To Report an Incident

- Requirements for Reporting an Incident: By law, all exposure incidents must be reported to EPA. If you suspect or know an incident occurred, contact the supervisor (Certified Applicator) immediately, and he/she will gather the required information that must be submitted.
- Documenting the Incident: The Certified Applicator will be aware of the types of information that must be collected. However, in general, when an incident occurs, the following information are needed: your name, the applicator's name, the location of the incident, the date of the incident, the product used that is suspected or known to be involved in the incident, the names of the people experiencing symptoms, and a description of the symptoms experienced.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements

Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

2. How To Report an Incident (cont'd)

- Reporting Your Observations to the Application Supervisor or Registrant: Once you contact the Supervisor (Certified Applicator), the Supervisor will gather the information needed and will assist you in determining what course of action may be needed to resolve the incident, including the mitigation steps to be followed and any medical-related concerns.

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Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

3. First Aid

■ If on Skin or Clothing

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

■ If in Eyes

- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

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Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

3. First Aid (cont'd)

■ If Inhaled

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, and then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a poison control center or doctor for treatment advice.

■ If Swallowed

- Call a poison control center or doctor immediately for treatment advice.
- Have a person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

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Chapter 5: Appropriate Steps To Mitigate Exposure (cont'd)

3. First Aid (cont'd)

- **EMERGENCY INFORMATION:** Have the product container or label with you when calling a poison control center (1-800-222-1222) or doctor, or going for treatment. For emergencies involving a spill, leak, fire, exposure, or accident, contact: CHEMTREC at (800) 424-9300.

This presentation summarizes the handler training requirements set forth in the EPA-approved product label and is provided as a training aid. The user must read the product label to confirm compliance with all label requirements, including handler training requirements