5481-466 3/1/2004 1/14

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MAR 1 2004

Darryl E. Brock
Regulatory Affairs Manager
AMVAC Chemical Corporation
4695 MacArthur Court
Suite 1250
Newport Beach, CA 92660

Subject: Vapam Soil Fumigant
EPA Reg. No. 5481-466
Amendment dated October 16, 2003

Dear Mr. Brock:

The amended label referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act as amended is acceptable provided the following changes are made:

1. Increase the font size of the signal words "DANGER PELIGRO" to at least 18 pts.

2. Add the following statement at the bottom of the First Aid Block: "NOTE TO PHYSICIAN: Possible mucosal damage may contraindicate the use of gastric lavage. This product may pose an aspiration pneumonia hazard."

3. In the section "Personal Protective Equipment", change "Waterproof gloves" to "Chemical resistant gloves made of any waterproof material" (two times).

One copy of the label stamped "Accepted with comments" is enclosed for your records. This label supercedes all labels previously accepted for this product. Please submit one copy of the final printed label that incorporates the required changes before the product is released for shipment.

If you have any questions, please contact Robert Westin by phone at (703) 305-5721 or via email at westin.robert@epa.gov.

Sincerely,

Mary Waller
Product Manager (21)
Fungicide Branch
Registration Division (7505C)

Enclosure

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VAPAM®

SOIL FUMIGANT

A SOIL FUMIGANT SOLUTION FOR ALL CROPS

MAY BE APPLIED BY CHEMIGATION, SOIL INJECTION OR SOIL BEDDING EQUIPMENT TO SUPPRESS AND/OR CONTROL SOIL-BORNE PESTS WHICH ATTACK ORNAMENTALS, FOOD AND FIBER CROPS.

Controls or suppresses weeds such as Bermudagrass, Chickweed, Dandelion, Ragweed, Henbit, Lambsquarter, Pigweed, Watercress, Amaranths species: Watergrass, Johnsongrass, Nightshade, Nutsedge, Wild Morning-Glory and Purslane, Nematodes and Symphylids. Soil-borne diseases such as Rhizoctonia, Pythium, Phytophthora, Verticillium, Sclerotinia, Oak Root Fungus and Club Root of Crucifers. Refer to specific cropping and application methods to determine control or suppression of the target.

ACTIVE INGREDIENT:	
Sodium methyldithiocarbamate (anhydrous)*	32.7%
INERT INGREDIENTS:	67.3%
TOTAL:	100.0%

*Contains 3.18 lbs Metam Sodium per gallon.

KEEP OUT OF REACH OF CHILDREN
DANGER PELIGRO

Si usted no entiende la etiqueta, busque a alquien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

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

EMERGENCY INFORMATION

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.
FOR THE FOLLOWING EMERGENCIES, PHONE 24 HOURS A DAY:
Transportation: CHEMTREC 1-800-424-9300
Other: AMVAC 1-323-264-3910

SEE SIDE/BACK PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS AND DIRECTIONS FOR USE.
EPA Reg. No. 5481-466
EPA Est. No. ☐ 5481-CA-1 ☐1448-MO-1 ☐ 61842-WA-1 ☐ Other_____
Net Weight:
As Marked on Container

AMVAC
4100 E. Washington Blvd.
Los Angeles, CA 90023 U.S.A
1-323-264-3910 • www.amvac-chemical.com

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER. Corrosive -- Causes skin damage. May be fatal if absorbed through the skin. Do not get on skin or clothing. Prolonged or frequent repeated skin contact may cause allergic reactions in some individuals. Harmful if swallowed or inhaled. Irritating to eyes, nose and throat. Avoid breathing vapor or spray mist. Do not get in eyes.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

(1) **Handlers Performing Direct-Contact Tasks**

Direct-contact tasks include:

- mixing, loading, or fumigant transfer with or without dry-disconnect fittings
- equipment calibration or adjustment
- equipment clean-up or repair
- product sampling
- application or soil-sealing outside an enclosed cab
- any activity less than 6 feet from an unshielded pressurized hose containing this product
- spill clean-up
- removal of tarp or plastic film
- rinsate disposal
- clean-up of small spills
- preparing containers for aeration
- any other handling task not otherwise listed in (2) or (3)

Applicators and other handlers performing direct-contact activities must wear:

- Coveralls over long-sleeved shirt and long pants
- Waterproof gloves
- Chemical-resistant footwear plus socks
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, or when mixing, or transferring without dry-disconnect fittings
- Face-sealing goggles, unless full-face respirator is worn.
- A respirator with an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH approved respirator with an organic vapor (OV) cartridge or canister with any N, R, P or HE prefilter.

(2) **Handlers in Enclosed Cabs**

Applicators and other handlers in enclosed cabs must wear:

- Coveralls
- Shoes and socks

Plus, if pungent, rotten-egg odor of this product can be detected inside the enclosed cab, the handlers in the cab must wear:

- Face-sealing goggles, unless full-face respirator is worn
- A respirator with an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH approved respirator with an organic vapor (OV) cartridge or canister with any N, R, P or HE prefilter.

In addition, the PPE specified in (1) for direct-contact activities must be immediately available in the enclosed cab and must be worn if the handler leaves the enclosed cab to perform any direct-contact activity. *After wearing PPE clothing and if exposure or contamination from handling the product occurs, DO NOT store within the enclosed cab as handler may be exposed to vapors.*

The enclosed cab must meet the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides—40 CFR, Part 170.240(d)(5).

(3) **Handlers in Treated Areas While Entry is Restricted**

While entry is restricted (see "***Entry Restrictions***" in the Agricultural Use Requirements section elsewhere on this label), only the following handling tasks may be performed in a treated area:

- Assessing/adjusting the soil seal
- Assessing pest control/suppression, application technique, or application efficacy
- Sampling air or soil for this product

All other tasks are prohibited until the entry restriction is over. Handlers performing the above tasks must wear:

- Coveralls over long-sleeved shirt and long pants
- Waterproof gloves
- Chemical-resistant footwear and socks

Plus, if pungent, rotten-egg odor of this product can be detected, handlers must wear:

- Face-sealing goggles unless full-face respirator is worn and
- A respirator with an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH approved respirator with an organic vapor (OV) cartridge or canister with any N, R, P or HE prefilter.

USER SAFETY REQUIREMENTS

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1. **Respirator Requirements:** When a respirator is required for use with this product, the following criteria must be met:
   (a) Cartridges or canisters must be replaced daily or when odor or irritation from this product becomes apparent, whichever is sooner.
   (b) Respirators must be fit-tested and fit-checked using a program that conforms to OSHA's requirements (described in 29 CFR, Part 1910.134).
2. **Disposal of Contaminated Clothing:** Discard clothing and other absorbent materials that have been drenched or heavily contaminated with liquid from this product. Do not reuse them.
3. **Clean and Maintain PPE**: Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. Wash PPE after each day's use.

DO NOT transport contaminated clothing inside a closed vehicle. Store in a sealed container and wash or dispose as required under "Disposal of Contaminated Clothing" and/or "Clean and Maintain PPE."

User Safety Recommendations

Users should:

- 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.
- Remove PPE immediately after handling product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not contaminate irrigation ditches or water used for irrigation or domestic purposes. Do not apply when conditions favor drift from treated areas such as adjacent crops, highways or schools. Do not use in a greenhouse or any other enclosed structure or confined area.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation. Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in this section for information about this standard.

CALIFORNIA ONLY: Application must be in compliance with Technical Information Bulletin for California entitled "Metam Sodium Guidelines for All Application Methods in California." This information bulletin may be obtained from your local pesticide dealer or a Metam Sodium registrant.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), restricted entry interval and notification to workers. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard (WPS).

ENTRY RESTRICTIONS

OUTDOORS: Entry (including early entry that would otherwise be permitted under the WPS) by any person --other than a correctly trained and equipped handler who is performing a handling task permitted on this label—is PROHIBITED from the start of the application until 48 hours after application. In addition, if tarps are used for the application, non-handler entry is prohibited while tarps are being removed.

NOTIFICATION: Notify workers of the application by warning them orally and by posting fumigant warning signs. The signs must state:

- "DANGER/PELIGRO"
- "PESTICIDES/PESTICIDAS"
- "KEEP OUT/NO ENTRE"
- "AMV540 SOIL FUMIGANT IN USE"
- The date and time of fumigation
- Name, address, and telephone number of the applicator

Post the WPS sign in compliance with 40 CFR Part 170 and follow WPS requirements pertaining to location, legibility, size, and timing of posting and removal.

Outdoors: Post the fumigant warning signs at entrances to treated areas.

PPE FOR ENTRY DURING THE RESTRICTED PERIOD: PPE for entry that is permitted by this labeling is listed in the "Hazards to Humans and Domestic Animals" section of this label.

GENERAL INSTRUCTIONS

Before applying this product, always thoroughly cultivate the area to be treated by breaking up clods and loosening soil deeply and thoroughly. If soil is not at 50% to 80% moisture capacity in the treatment zone, irrigate 1 to 2 weeks before treatment. Moisten soil after cultivation to the desired depth; sprinkle or flood irrigate. This step is essential for all methods of use. Immediately before application, cultivate lightly if the soil has crusted. VAPAM effectiveness is based on contact of the gaseous phase with a respiring pest. VAPAM will not control or suppress pests not actively respiring. VAPAM does not provide residual control. Pests that are dormant, protected by large clods, harbored by undecomposed plant material, not present at the time of application, or not present in the treatment zone will not be controlled. See Potatoes section for specific directions on the application of VAPAM to potato fields where no-till stubble or cover crop exist.

To prevent loss from evaporation, use only at times when air temperature is moderate and there is little wind movement (2-10 mph). Soil temperature must be 40°F to 90°F in the treated zone. Treated zone is defined as the depth of treatment that VAPAM achieves at the time of application. For other conditions, see section "Days to Planting/Cultivation After Application". Do not apply to soil surface, as in the sprinkler method, when air temperature is over 90°F or when low humidity or high winds would cause loss of VAPAM before it can be drenched into the soil with additional water. If fumes become detectable during treatment, apply more water to seal the fumes into the soil where they should be confined to achieve maximum fumigation benefit. The activity of VAPAM is increased by the use of tarp (plastic, paper or fabric) spread loosely over the treated areas and secured to prevent removal by wind. Keep covered for a minimum period of 48 hours. Seven days after treatment cultivate no deeper than the depth of treatment to aerate the soil. Do not seed or transplant earlier than 21 days or later after application when tarping method is used (see "Testing of Treated Soils Before Planting" section). Use promptly after mixing with water. Do not allow solution to stand. Flush equipment with water after each day's use. Disassemble valves and clean carefully.

Mycorrhizae: There are occasions when VAPAM is known to temporarily reduce mycorrhizae in agricultural soils. For those crops that are mycorrhizae dependent and planted into VAPAM-treated soils, it is necessary to practice a good fertilizer program until the mycorrhizae repopulate the treated area.

PRODUCT INFORMATION

VAPAM is a water soluble liquid. When applied to properly prepared soil, the liquid is converted into a volatile fumigant. After sufficient interval of time, the fumigant dissipates leaving the soil ready for planting.

WHEN TO USE MAXIMUM AND MINIMUM RATES

The application rate of VAPAM is dependent on the soil type to be treated and the position in the soil of the pest to be suppressed or controlled. For maximum control or suppression, an understanding of the pest, its location and its respiring state will ensure maximum performance of VAPAM. Generally, a light sandy soil requires a lower application rate than a heavier mineral soil. In addition, if the pest is in the upper portion of the soil profile (annual weeds), a lower application rate is generally required than if the pest is deeper in the soil profile and deeper penetration is desired (perennial weed seeds and nematodes). When a range of application rates is given in this label, consult your local agricultural extension service for more specific information.

VAPAM is recommended for the suppression or control of the following soil-borne pests that attack ornamental, food and fiber crops (consult specific cropping and application instructions for recommendations): Weeds and germinating weed seeds such as Bermudagrass, Chickweed, Dandelions, Ragweed, Henbit, Lambsquarter, Pigweed, Watercress, Johnsongrass, Nightshade, Nutsedge (suppression only), Wild Morning-glory and Purslane; nematodes (suppression only), Symphylids (Garden Centipede) and soil-borne diseases such as Rhizoctonia, Pythium, Phytophthora, Verticillium, Sclerotina, Oak Root Fungus and Club Root of Crucifers.

***Nematodes and Nutsedge*:** Nematode suppression is achieved when VAPAM converts to MITC and makes contact with active forms of the nematodes, preferably juveniles. Endo-parasites in plant residue may not be suppressed. Plant residues from previously infected crops should be completely decomposed prior to VAPAM application to ensure maximum exposure. Eggs are more difficult to suppress than juveniles, but are susceptible. Pre-irrigation has been demonstrated to stimulate egg hatch of some species and may enhance overall VAPAM performance. Nutsedge may be suppressed with VAPAM if actively growing and a high use rate is used (100 gals/acre). More often, rhizomes, roots and shoots will be controlled but the tuber will remain viable and at a later time regrow. Treatments made immediately prior to a crop planting (after the necessary waiting period) will give a weed-free period for crop establishment.

USE PRECAUTIONS

Keep children and pets out of treated areas. VAPAM uses described on this label are intended for pre-plant soil preparation only. All plant foliage and any established plants growing on the treatment sites will be either severely damaged or destroyed. Keep the product off of any desirable turf or plants. Do not apply within 3 feet of the drip line of desirable plants, shrubs, or trees. Do not use in confined areas without adequate ventilation or when fumes may enter nearby dwellings. Do not use in greenhouses. Keep container tightly closed when not in use. Do not store near feed or food. NOTE: VAPAM will suppress and/or control only those pests in the fumigation zone at the time of treatment. Reinfestation may occur subsequent to the fumigants dissipation from the soil.

TREATMENT GUIDELINES

For optimum results, certain procedures should be observed at designated times in the treatment program. Described below are important guidelines for each of the four stages of the treatment process. Consult your Sales Representative for the appropriate treatment program for your particular needs.

- Pre-Application
- Field Preparation Prior to Application
- Application
- Pre-Planting After Application of VAPAM

PRE-APPLICATION

VAPAM is applied post-harvest and 14 to 21 days before a new crop is planted (see "Testing of Treated Soil Before Planting" section). In some areas, fall application is preferred as the product will dissipate over the winter which allows planting to begin as soon as favorable springtime conditions arrive.

Application Rate

Apply 50 to 100 gallons of product per treated acre depending on crop, target pest and soil properties. Some of the soil properties to consider when determining the application rate include soil texture, percent organic matter and depth of soil to be treated.

Target Pest and Depth of Treatment

When application rates for this product are given in ranges, use the higher rate if pests (insects, nematodes, etc.) are present in high numbers or if the area to be treated has a history of pest problems. Consult with your State nematologist, entomologist and plant pathologist to determine if crop rotation is more feasible or desirable than fumigation. NOTE: This product will only suppress or control pests that are in the fumigated zone at time of treatment. For control of weeds and fungi, which cause seed or seedling diseases, treatment of only the top 2 to 4 inches of soil may be required. Treatment depths greater than 4 inches may be required for control of nematodes and fungi which occur throughout the rhizosphere. The required application rate should be increased proportionately with the depth of the treatment required. Always choose the appropriate application method to evenly distribute this product throughout the soil to the required treatment depth.

Soil Characteristics

Soil properties to consider when determining the application rate of this product include the depth of soil to be treated, soil texture, and percent organic matter. Plant materials under the soil surface (except in the case of cover crops) should be thoroughly decomposed before application. Due to the absorbing effect of humus, soils with high levels of organic matter under the surface require higher rates. For example, muck soil may require twice the rate that would be used in mineral soils. Application rates will also vary with soil texture. For example, heavy clay soils require a higher rate than light sandy soils.

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FIELD PREPARATION PRIOR TO APPLICATION

Before applying this product, always thoroughly cultivate the area to be treated breaking up clods and loosening soil deeply and thoroughly. Then sprinkle or flood irrigate to moisten loosened soil if needed (see "General Instruction" section). Immediately before treatment, cultivate lightly to break up soil crust. See Potatoes section for specific directions on the application of VAPAM to potato fields where no-till stubble of cover crop exist.

Soil Temperature During Treatment

Soil temperature must be from 40°F to 90°F in the treated zone. Treated zone is defined as the depth of treatment that VAPAM achieves at the time of application.

To prevent rapid evaporation of the product from the soil, avoid treating soil during the time of day when soil temperatures exceed 90°F within the first two inches of soil. Instead, make the application at night or in early morning when the soil temperature is coolest.

Soil Moisture at Time of Treatment

Applications should be made only to fields with good seed bed moisture conditions (50% to 80% of field capacity). As a simple field test, squeeze a handful of soil into a ball and then gently try to break it apart with your fingers. If it does not form a ball, the soil is too dry. If it forms a ball but breaks easily, the soil moisture content is sufficient. If it will not break apart easily or if water can be squeezed out, the soil is too wet. When necessary, sprinkle or flood irrigate the soil 1 to 2 weeks prior to treatment to increase the moisture content. The soil must be moistened to at least the desired treatment depth.

Air Temperature During Treatment

To prevent loss from evaporation, use only at times when air temperature is moderate and there is little wind movement (2-10 mph). Do not apply to soil surface, as in the sprinkler irrigation method, when air temperature at time of application is 90°F or higher or when high winds or low humidity would cause loss of VAPAM before it can be drenched into the soil with additional water.

Phytotoxicity

VAPAM is phytotoxic. Protect valuable, non-target plants by stopping soil applications of this product at least 3 feet short of the drip line of trees, shrubs and other desirable plants. For sprinkler application, crop injury and lack of effectiveness can result from non-uniform distribution of the treated water.

APPLICATION OF VAPAM

Apply according to the methods and rates outlined below under the section **"Uses, Rates and Application Methods."**

Use of Diluted VAPAM

Do not store the diluted product. Do not allow the diluted solution to stand overnight. Use the diluted solution promptly after mixing with water. Flush all equipment with water after each day's use, disassemble valves and clean carefully.

Odors During or After Application

Strong odors during or after application are a signal that the fumigant is escaping and needs to be sealed in the soil. If increasingly strong odors are occurring, the application should be stopped immediately and not resumed until the source of the odor problem is identified and corrected. For sprinkler applications or whenever possible with other application methods, a water seal should be applied immediately to the treated areas of the field.

Sealing VAPAM in Soil

To be most effective, VAPAM should be sealed in the soil at the time of application. Sealing methods include applying a water seal by sprinkler irrigation, tarping (plastic, paper or fabric), packing soil with a roller, drag or press wheel or covering with an adequate amount of soil. Tarpaulins should be spread loosely over the treated area and secured to prevent removal by wind. They should remain in place for at least 48 hours. If tarped, the sealed area should be cultivated to a depth no deeper than the treated zone to aerate the soil seven days after treatment. When tarpaulins are used to seal the soil, wait at least 21 days before planting.

Application in Tank Mix with Liquid Fertilizer

VAPAM may be injected in a mixture with liquid fertilizers; however, a dual injection system is preferred. Since the composition of liquid fertilizers vary considerably, the physical compatibility of each VAPAM/fertilizer tank mix should be checked by using the following procedure:

Mix a small quantity of VAPAM and liquid fertilizer in the same ratio as they will be applied to the field e.g., if 50 gallons of VAPAM and 50 gallons of liquid fertilizer are to be applied per acre, then the mixture should be mixed in a 50:50 or 1:1 ratio. Mix in a glass container. Mixing should be done outdoors and out of direct sunlight. Agitate the liquids to attain a complete uniform mixture. IF A UNIFORM MIX CANNOT BE MADE, THE MIXTURE SHOULD NOT BE USED! If the mixture remains uniform for 30 minutes without agitation, the combination may be used. Should the mixture separate after 30 minutes but is readily remixed with agitation, the mixture can be used if adequate agitation is maintained in the tank.

DO NOT PLACE CAPS ON MIX JAR AS INCOMPATIBLE MIXES MAY EVOLVE HYDROGEN SULFIDE GAS. USE PROMPTLY AFTER MIXING WITH WATER OR FERTILIZER. DO NOT ALLOW THE SOLUTION TO STAND. FLUSH ALL EQUIPMENT WITH WATER AFTER EACH DAY'S USE. DISASSEMBLE VALVES AND CLEAN CAREFULLY.

GENERAL PRECAUTIONS FOR IRRIGATION SYSTEMS

Posting of areas to be chemigated is required when (1) any part of a treated area is within 300 feet of sensitive areas such as residential areas, labor camps, businesses, day care centers, hospitals, in-patient clinics, nursing homes or any public areas such as schools, parks, playgrounds, or other public facilities not including public roads, or (2) when chemigated area is open to the public such as golf courses.

Posting must conform to the following requirements: (1) Treated areas shall be posted with signs at all usual points of entry and along likely routes of approach from the listed sensitive areas. When there are no usual points of entry, signs must be posted in the corners of the treated areas and in any other location affording maximum visibility to sensitive areas. (2) The printed side of the sign should face away from the treated area towards the sensitive area. (3) The signs shall be printed in English. (4) Signs must be posted prior to application and must remain posted until foliage has dried and soil surface water has disappeared. Signs may remain in place indefinitely as long as they are composed of materials to prevent deterioration and maintain legibility for the duration of the posting. (5) All words shall consist of letters of at least 2-1/2 inches tall and all letters and the symbol shall be a color which sharply contrasts with their immediate background. At the top of the sign shall be the words KEEP OUT followed by an octagonal stop sign symbol of at least 8 inches in diameter containing the word STOP. Below the stop sign symbol shall be the words PESTICIDES IN IRRIGATION WATER. This sign is in addition to any sign posted to comply with the Worker Protection Standard.

CHEMIGATION OF VAPAM

When applying by chemigation methods, the following directions or warnings must be observed:

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 (including greenhouse systems) 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

Chemigation Using a Public Water System

NOTE: AMVAC does 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.

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 twice 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.

The pesticide injection pipeline must also contain a functional, normally-closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.

The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in the cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.

Systems must use a metering pump such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock. *Any alternatives to the above required safety devices must conform to the list of EPA-approved alternative devices.*

Do not apply when wind speed favors drift beyond the area intended for treatment.

Sprinkler & Drip Chemigation Systems

See "Field Application Where Entire Area is Being Treated" under Use Rates, and Application Methods section of this label. The system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid toward the injection pump. The pesticide injection pipeline must also contain a functional, normally-closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.

The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.

Systems must use a metering pump such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock. Do not apply when wind speed favors drift beyond the area intended for treatment.

Flood Basin, Furrow And Border Chemigation

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.

PRE-PLANTING AFTER APPLICATION OF VAPAM

Effects of Rain

If rain occurs within 24 hours after a VAPAM application, lack of control at and near the soil surface may occur.

Recontamination

Precautions must be taken to prevent recontamination of treated fields with plant pathogenic fungi, plant parasitic nematodes or weed seed. Use clean seeds or plants. Before farm equipment is driven into the treated area, it should be rinsed free of untreated soil and weed seeds from other fields.

Days to Cultivating or Planting After Application

Because VAPAM is harmful to germinating seeds and living plants, an appropriate interval must be observed between treatments and planting. On well-drained soils which have a light to medium texture and which are not excessively wet or cold following the application, planting can begin 14 to 21 days after treatment. If soils are heavy or especially high in organic matter or if the soil remains wet and/or cold (below 60°F) following the application, a minimum interval of 21 days or greater should be observed. The interval before planting should be extended until the soil is sufficiently dry to allow for cultivation.

Cultivation of Soil Before Planting

IMPORTANT: Heavier soils including soils high in clay or organic matter should be allowed to aerate and dry thoroughly after treatment with VAPAM. During cold and/or wet weather, frequent shallow cultivation can aid dissipation of VAPAM from the treated soil.

On heavy, wet soils, light surface cultivation to break up crusting and promote drying should be done 5 to 7 days after treatment if planting is to occur within 14 to 21 days after treatment. This cultivation may be repeated as necessary.

NOTE OF CAUTION: To avoid contaminating treated soils, care should be taken to assure that untreated soils are not mixed with treated soils.

Testing of Treated Soils Before Planting

Fields are fumigated to control soil-borne fungi, nematodes, insects, and weeds. The length of time required for fumigants to escape from the soil before plants can safely be planted varies greatly. Typically 14 to 21 days are needed under typical conditions; however, circumstances which do not favor evaporation of the fumigant can greatly lengthen the waiting period as much as up to 30 days. The release period is short with (1) low rates of fumigants, (2) light soil, (3) high soil temperatures, (4) low soil moisture, (5) shallow application depth, and (6) repeated cultivations after fumigation. Seeded crops are less susceptible to residual soil fumigant injury than transplanted crops. In general, fumigants escape slowly from cold, wet, heavy soils.

If in doubt, perform either the lettuce seed test or the tomato transplant test as described elsewhere in this label. If germination occurs in 1 to 3 days or if tomato plant shows signs of wilting or root burn in 2 days, the product is still available and an extended wait period must be observed.

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NOTE: When applied in the Spring, allow a minimum of 14 to 21 days before planting providing no fumes are detectable. When the soil temperature is below 60°F, allow a minimum of 21 days before planting. Check for noxious fumes and aerate as needed. Use a seedling indicator plant with a hot cap to check for activity or fumes (or follow instructions in preceding paragraph). DO NOT plant if fumes are detectable or injury to plant has occurred. Re-aerate the soil and check again.

The information below describes two simple tests to assay for harmful residual soil fumigants before planting.

Lettuce Seed Test

1. With a trowel, dig into the treated soil to or just below the depth of application. Remove 2 to 4 small (1 to 2 oz.) soil samples, mix lightly, and immediately place a portion in an air-tight jar so that fumes will not escape. Use mason, wheat germ or similar jars with gas-tight lids.
2. Sprinkle lettuce seeds on the moistened surface of the soil and recap immediately. Prepare a similar jar with untreated soil (untreated check) for comparison.
3. Keep the jars at 65°F to 85°F; do not place in direct sunlight. Direct sunlight may kill the seed by overheating. Lettuce seed will not germinate in the dark.
4. Inspect the jars for germination in 1 to 3 days.
5. The soil is safe for planting if seeds in the treated jar germinate the same as seeds in the untreated jar.

IMPORTANT: Be sure (1) to sample the field properly in several areas, particularly low, wet areas; (2) that the lids are air tight and have no grit under the seal; and (3) that the jars are placed in indirect sunlight.

Tomato Transplant Test

Transplant 5 to 10 succulent, fast-growing tomato seedlings into fumigated beds approximately 4 to 6 inches deep. Do the same in a non-fumigated area. If there is variation in the field, plant into the heaviest, wettest soil. Inspect the seedlings in 2 days for wilting or "root burn". If plants in the fumigated zone look the same as those in the non-fumigated zone, it is safe to plant.

Which Test is Best?

Both the lettuce seed and tomato transplant tests can serve the purpose. The response of tomato seedlings varies somewhat depending on how succulent they are, the relative humidity, soil moisture and temperature. Relative differences between plants in fumigated and non-fumigated areas are key to detecting low level residues. High concentrations should produce clear-cut symptoms. Lettuce seed tested in jars are not subjected to the variations in the field that can affect the response of tomato transplants. However, the process of collecting a soil sample allows some fumigant to escape prior to sealing the jar. In addition, excess soil moisture can inhibit normal lettuce seed germination reducing the sensitivity of the test.

USES, RATES AND APPLICATION METHODS

FIELD APPLICATION WHERE ENTIRE AREA IS BEING TREATED

SOIL INJECTION: Apply with injectors such as shanks, blades, fertilizer wheels, plows, etc. Apply VAPAM at the rate of 50 to 100 gallons per treated acre. Follow immediately with a roller to smooth and compact the soil surface. Light watering or tarping after rolling helps prevent fumigant escape. It may be necessary to stagger the injector placement on two or more tool bars to prevent soil build up during application.

When setting up your soil injection equipment with either spray blades, injection knives or coulters make sure they are evenly and closely placed to create an even application width and depth. To accomplish this, it may require multiple tool bars with the injection tools staggered. This will help prevent build up of trash and aid in the soil sealing. For example, apply VAPAM through injectors placed 4 inches below the soil surface and 5 inches apart.

SOIL COVERING: VAPAM may be applied as a broadcast application immediately in front of soil covering equipment such as bed shapers, rotary tillers, discs, etc. to a minimum depth of 6 inches using a single pass to incorporate. Use 50 to 100 gallons of VAPAM per treated acre followed immediately by a roller/packer to smooth and compact the soil surface.

ROTARY TILLER OR POWER MULCHER: Spray VAPAM immediately in front of the tiller or mulcher, set to the depth to where control is desired. Use 50 to 100 gallons per treated acre. Follow immediately with a roller, power roller or bed shaper to seal the soil surface. Light watering or a tarp after rolling may be used to help prevent fumigant escape.

SPRINKLER SYSTEM: Use only those sprinkler systems which give large water droplets to prevent excessive loss. Use 50 to 100 gallons of VAPAM per acre. Meter continuously throughout the injection period all of the VAPAM required to come in contact with the targeted pest in the treated zone. The desired depth of treatment obtained may be contingent upon soil moisture and type. Soil conditions must facilitate even moisture penetration without runoff. Flush lines following injection of VAPAM. For proper application rate and placement, consult your local VAPAM Sales Representative or County Extension Expert.

Follow instructions under General Precautions for Irrigation System section of this label.

Application Over Cover Crops: VAPAM can be applied through sprinkler irrigation systems on cover crops such as alfalfa, clover, and grasses such as rye, oats, wheat, and sudan. When applied on cover crops, no soil cultivation is required before the application.

Effects of Air Temperature & Winds on Sprinkler Applications: When using the sprinkler application method, apply VAPAM only when the air temperature is below 90°F. This precaution is recommended to guard against evaporation of the product. Low humidity or high wind velocity can also cause premature evaporation of the fumigant before drenching into the soil. Do not apply when wind conditions favor drift from treated field.

Prevention of Treatment Runoff: To prevent runoff of the treatment during a sprinkler application, do not apply VAPAM at a rate greater than the absorption capacity of the field. Should runoff occur, isolate it from growing crops and water sources. Once collected, reapply to the treated field.

Check Flood (Basin), Furrow and Border: Meter VAPAM at a steady rate into water during irrigation. Depending on the kind of pest and the treatment depth, use 50 to 100 gallons per treated acre in 3 to 18 inches of water per acre. Meter VAPAM into the irrigation water at the head of the field at a point with enough turbulence to assure adequate mixing of the product in the water. IMPORTANT: Prior to starting the application, always inspect ditches and border areas to ensure containment of the irrigation waters. Damage to bordering crops will occur if leaks develop. Apply only into field head ditch. DO NOT APPLY INTO ANY LATERAL DITCHES.

Follow instructions under General Precautions for Irrigation System section of this label.

DRIP IRRIGATION SYSTEM: VAPAM must be applied through a drip irrigation system designed to wet the soil thoroughly in the area being treated. Meter 50 to 100 gallons VAPAM per treated acre into the drip system during the entire irrigation period. APPLICATION MUST BE CONTINUOUSLY SUPERVISED. Flush irrigation system with adequate water after completion of application.

Important: **WEED ELIMINATION WILL NOT BE SATISFACTORY IF TOO MUCH WATER IS APPLIED**. AN ADEQUATE CONCENTRATION OF VAPAM MUST BE PRESENT AT THE TIME OF WEED SEED GERMINATION IN ORDER TO BE EFFECTIVE. Further directions for use are as follows:

1. Ground must be in seed-bed condition, no clods larger than 1/2 inch in diameter.
2. Beds must be lifted, shaped and ready for planting.
3. Soil moisture must be 50% to 80% of field capacity in the top 2 to 3 inches at time of application.
   NOTE: If VAPAM is applied to established plant beds under plastic tarps to terminate growth of a previous crop and to fumigate the bed in preparation of planting a subsequent crop, the terminated crop must not be used for any food or feed purposes after VAPAM has been applied.

Follow instructions under General Precautions for Irrigation System in the previous section.

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FIELD PREPARATION: To remove compacted areas that are in the field to be treated, rip and disc the field prior to the VAPAM application. After this soil preparation and 7 to 10 days prior to the VAPAM application, irrigate the field applying enough water so that at time of the application the soil will be 50% to 85% of field capacity.

SOIL INJECTION: VAPAM may be applied using (1) a single shank spaced no more than 6 inches apart and a spray nozzle 6 inches deep; (2) a single shank spaced no more than 6 inches apart and spray nozzles spaced 6 to 12 inches deep; (3) a single sweep spaced no more than 12 inches apart and sweep blades 12 inches wide with a spray nozzle that will give broadcast coverage from sweep tip to sweep tip; (4) a double-winged shank spaced no more than 12 inches apart and 9 inched between the wings with spray nozzles giving uniform coverage; (5) a Noble Plow blade with spray nozzles spaced every 6 inches and set to 12 to 14 inches deep using a disc to immediately incorporate the VAPAM placed on the surface. All soil injection applications must be followed immediately with a roller/packer to smooth and compact the soil surface. Regardless of which method used, you must use 50 to 100 gallons of VAPAM per treated acre.

When applying VAPAM with injector blades such as Noble Plow blades in Spring, the following precautions must be followed:

- Apply all fertilizers after the VAPAM application. Wait a minimum of 7 days before making the application.
- Thoroughly aerate the soil 5 to 7 days after the VAPAM application by plowing, shallow ripping or discing, or the combination thereof to allow the fumes to dissipate. Do not work soil deeper than the depth of treatment.
- Planting may take place 14 to 21 days after the VAPAM application provided no fumes are detected at the time of planting.
- If noxious fumes are noticeable at planting, do not plant and rework the soil.
- If soil temperatures are below 60°F, delay planting for a minimum of 21 days from the day of the VAPAM application regardless of any other precautions that may have been taken.
- In conjunction with the delayed planting, set indicator plants (such as tomatoes) in various places in the treated field with a "hot cap" left undisturbed for a minimum of 24 hours to ensure all of the VAPAM has left the soil. (See "Testing of Treated Soil Before Planting" section.)

FIELD APPLICATION TO BEDS OR ROWS

SOIL INJECTION ***(Pre-formed Beds):*** VAPAM may be injected into pre-formed plant beds following the directions in the "Soil Injection" section above. If a wider treated band is desired, space 2 or more shanks at intervals of 5 inches to cover the desired treating width. Use thin injection shanks and inject VAPAM 4 inches deep into well-prepared soil. Follow immediately with a bedshaper, roller press wheel or similar device, or cover with an adequate amount of soil to seal the fumigant into the soil. Light watering or a tarp after rolling may be used to help prevent fumigant escape. Apply at the rate of 50 to 100 gallons per treated acre (see "Method of Determining Fluid Ounces per 100 Feet of Linear Row" section). Place shanks 5 inches apart to cover the desired treating width.

SOIL INJECTION ***(At Bed Forming Operation):*** VAPAM may be injected during the bedding or row building process, or to pre-formed beds, using one of the following delivery systems: (1) single narrow knife blade (2) a series of narrow knife blades set no more than 5 inches apart, (3) a spray blade, (4) tiered shanks, (5) spray rake or (6) similar equipment that places VAPAM in contact with the pest to be controlled or suppressed. The use rate for the above operations is 50 to 100 gallons per acre based on a broadcast application rate. Reduced rates will vary depending upon the actual width of the treated band desired (see "Method of Determining Fluid Ounces per 100 Feet of Linear Row" section). Apply the VAPAM at the desired depth in the soil and follow immediately with the soil capping operation, bedding process, or roller/packer to seal the fumigant into the soil.

SOIL COVERING METHOD ***(Bed-Over Methods)***: VAPAM may be sprayed in a bed wide band onto the soil immediately ahead of bed shapping equipment. Cover the VAPAM with soil to a depth of 3 to 6 inches. The soil should be rolled and compacted immediately. Apply at the rate of 50 to 100 gallons per acre of treated soil or 15 to 30 fluid ounces per 100 linear feet of row (12-inch bed). If a narrower or wider bed is to be treated, adjust the fluid ounces/100 linear feet of row to reflect the actual treated acres (see "Method of Determining Fluid Ounces per 100 Feet of Linear Row" section).

DRENCH APPLICATION ON BEDS OR ROWS: VAPAM may be applied to finished beds for control of shallow seeded weeds. Cultivate the area to be treated and pre-irrigate in accordance with Use Directions. Apply 50 to 100 gallons of VAPAM per treated acre in a band or bands in enough water to soak at least 2 inches deep (see "Method of Determining Fluid Ounces per 100 Feet of Linear Row" section). To avoid contamination by untreated soil, do not disturb the treated area.

ROTARY TILLER or POWER MULCHER: Spray VAPAM immediately in front of the tiller or mulcher, set to the depth to where control is desired. Use 50 to 100 gallons per treated acre (see "Method of Determining Fluid Ounces per 100 Feet of Linear Row" section). Follow immediately with a roller, power roller or bed shaper to seal soils surface. Light watering or a tarp after rolling may be used to help prevent fumigant escape.

Method of Determining Fluid Ounces per 100 Feet of Linear Row

1. Determine width of treated band in feet by dividing width of band in inches by 12 (e.g.: 8 " band = 8 in. ÷ 12 in/ft. = 0.666 ft)
2. Determine square feet in 100 linear feet of band by multiplying the width of the band by 100 (e.g.: 0.666 ft. x 100 ft. = 66.66 sq. ft.)
3. Determine the treated acres per 100 linear feet of band by dividing the square feet by 43,560 (square feet in an acre)
   (e.g., 66.66 sq. ft + 43,560 = 0.0015)
4. To determine the fluid ounces per 100 linear feet.
   a) 1 gal. = 128 fl. oz.; 50 gals. = 6400 fl. oz.; 100 gal. = 12,800 fl. oz.
   b) Multiply fluid ounces by acres. Example: 50 gals. = 6400 fl. oz. x 0.0015 = 9.6 fl. oz. per 100 linear feet row.

ADDITIONAL RECOMMENDATIONS

SEED TREATMENT: A suitable fungicide should be used to treat all crop seed being planted into the treated soil.

PEANUTS: For suppression and/or control of *Cylindrocladium Black Rot* (CBR) and nematodes, apply VAPAM at the rate of 10 gallons per acre (8.81 fluid ounces per 100 linear feet of row). Use with partially resistant cultivators (NC-10C or others as designated by your local Agricultural Extension Service) in cases of severe disease pressure. Plant other varieties only in cases of light CBR pressure.

***Soil Preparations*:** Before applying VAPAM, all residues from the previous crop should be decomposed (enhance by fall discing) and plowed under in the spring with a moldboard plow. Soil incorporated pre-plant herbicides must be applied prior to the application of VAPAM.

***Application*:** Apply 8 to 10 inches below seed placement with injector shank or coulter type applicator placed in front of a bedshaper to mark rows. Soil temperatures must be in the range of 60°F to 90°F at a 3-inch depth at time of treatment.

***Tillage and Planting After Application*:** Do not mix untreated soil with treated soil by tillage or other cultural practices. Plant the peanuts in the center of the treated beds no earlier than 14 days following the application of VAPAM. An at-planting nematocide treatment will be necessary in fields with heavy infestations of Root Knot, Ring and/or Sting nematodes.

MINT (SUPPRESSION OF VERTICILLIUM WILT): When infestation is limited to small spots in a field, the spread of *Verticillium* can be reduced by treating the infected spots. Apply at the rate of up to 100 gallons of VAPAM per treated acre using injector blade or thin shank injector rig. Follow directions for "Field Application - Where Entire Area Is Being Treated".

POTATOES: For suppression of potato pests such as nematodes, weed seeds and *Verticillium dahliae* (Early Maturity Disease);

For soil injection, apply a minimum of 50 gallons per treated acre of VAPAM following the directions for "Field Application Where Entire Area Is Treated". VAPAM may also be applied at the rate of 67 to 100 gallons per acre using a Noble Plow blade set to 12 to 14 inches deep with spray nozzles spaced every 6 inches apart to give uniform coverage plus a surface application using a disc to immediately incorporate the VAPAM placed on the surface.

***Early Maturity Diseases Of Potatoes In The Pacific Northwest*:** Apply 50 gallons VAPAM per treated acre using the soil injection method as described in the "Field Application - Where Entire Area Is Being Treated" section.

SPRINKLER SYSTEM PRE-PLANT APPLICATIONS: Apply 50 to 100 gallons of VAPAM per acre in sufficient water to penetrate to the desired treatment depth. Meter continuously into the irrigation system throughout the entire application period. Soil temperature should be in the range of 40°F to 90°F in the treatment zone. Soil moisture immediately prior to treatment must be 50% to 80% of field capacity down to the 24 inch level. Soil condition must facilitate even water penetration without runoff.

NOTES:
1. VAPAM may be applied where a crop stubble or vegetation exists without prior tillage, provided there is adequate penetration of the product.
2. VAPAM will suppress Root Knot nematodes in the treatment zone at the time of treatment. The treatment zone is defined as the depth of penetration that VAPAM achieves at the time of application. If high numbers or deep nematodes are identified, anticipate nematodes to build up throughout the growing season. Some damage may occur unless additional action is taken. VAPAM has no residual activity and re-infestation of a treated field can occur from numerous sources such as deep nematode populations, seed pieces, irrigation water, equipment contamination and blowing wind.

TREATMENT OF TREE REPLANT SITES IN COMMERCIAL ORCHARDS

After removing dead or diseased trees and as much of the root system as possible, make a shallow basin over the planting site. Add VAPAM to the stream of water while filling the basin. Use 1 qt. of VAPAM per 100 sq. ft. in sufficient water (depending on the soil type) to penetrate at least 6 ft. For control of Oak Root Fungus, use a basin of at least 20 ft. x 20 ft., increase dosage to 2 qts. per 100 sq. ft. in sufficient water to penetrate to the depth of the root system. If water is tanked to the planting site, add VAPAM to the water and mix before filling the basin.

ESTABLISHMENT OF TRANSPLANT ORCHARDS AND VINEYARDS

Apply 67 to 100 gallons of VAPAM per broadcast acre to properly prepared fields by chemigation in sufficient water (e.g. 3 to 18 acre inches) to place the VAPAM in contact with the target pest in the treated zone and to penetrate the desired root zone (to 6') of the crop to be transplanted. The percent field capacity of the soil prior to irrigation will help determine the amount of water to use to penetrate the desired zone. A lethal concentration of VAPAM must be present while the target species is actively respiring. VAPAM should be placed at or slightly below the soil level of the target pest. Deep-soil ripping is recommended prior to treatment.

SYMPHLID SUPPRESSION: Soil should be in good seed bed condition to a depth of 8 to 10 inches. Maintain adequate moisture during the spring season to bring Symphylids to the upper soil surface. Treat during July - August when Symphylids are in the upper soil surface. Apply a minimum of 20 gallons of VAPAM per treated acre (0.4 pints per 100 sq. ft. of treated soil) using blade or thin blade chisel injectors spaced 5 inches apart. Inject below the level of Symphylid concentration, usually 6 to 8 inches. Pack soil immediately after the application.

TOBACCO PLANT BEDS

Fall applications are recommended whenever possible. Read and follow the use directions carefully.

TARP METHOD: Prepare the bed 5 to 7 days before application to insure best conditions for weed seed germination and fumigant action of VAPAM. The bed should be free of clods, level and in good tilth. Apply 1 to 1-1/2 gallons of VAPAM in a minimum of 40 gallons of water per 100 square yards. Apply uniformly over the entire bed. Cover the bed immediately with a plastic cover. Keep covered no less than one day, but no more than two days. The cover need not be tented, but should be secured to prevent wind from uncovering the treated area. Seven days after the date of application, loosen the treated soil to a depth of 2 inches. Do not seed tobacco earlier than 21 days after the VAPAM application.

DRENCH METHOD: Apply 2-1/2 gallons VAPAM in 150 to 200 gallons of water per 100 square yards. Application may be made with sprinklers, spravers with nozzles or any suitable equipment. Follow directions given above for "Field Applications - Where Entire Area is Being Treated" section.

TANK MIX WITH TILLAM® 6E HERBICIDE (TOMATOES ONLY): A tank mix of VAPAM soil fumigant plus TILLAM 6E herbicide may be used to provide the additional benefit of residual weed control. The mixture must be applied pre-plant to tomatoes if all directions and precautions pertaining to both VAPAM and TILLAM 6E are followed. Apply through a spray blade, by shank injection, low pressure boom sprayer or (Western Region only) through solid set sprinkler systems. Maintain constant agitation of the mixture throughout the filling and application. Use in accordance with the more restrictive of label limitations and precautions. No label dosage rates should be exceeded. This product cannot be mixed with any other product containing a label prohibition against such mixing. Do not tank mix with other chemicals unless prior use has proven compatibility.

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CARROTS: Apply a broadcast application of 50 to 100 gallons per acre of VAPAM for the suppression of Root Knot nematodes and 40 or 100 gallons for pre-plant suppression of soil-borne diseases.

MINT (*including Peppermint and Spearmint*): Apply a pre-plant broadcast application of 50 to 100 gallons per acre of VAPAM for the suppression of Root Knot nematodes and *Verticillium dahliae*.

ONIONS: Apply a broadcast or banded application of 50 to 100 gallons per treated acre of VAPAM for the suppression of Root Knot nematodes or 40 to 100 gallons for suppression of soil-borne diseases.

POTATOES: Apply a broadcast sprinkler application of 50 to 100 gallons per acre of VAPAM for the suppression of Root Knot nematodes and *Verticillium dahliae*. Apply a broadcast soil application of 50 to 100 gallons per acre VAPAM for the suppression of *Verticillium dahliae*.

SUGAR BEETS: Apply a broadcast or a banded application of 50 to 100 gallons per acre VAPAM for the suppression of soil-borne disease. A fall application of Ro-Neet® herbicide followed by or tank mixed with VAPAM in a broadcast application or band application will enhance the overall weed control.

ORCHARD RE-PLANT: Apply a broadcast application rate of 75 to 100 gallons per acre of VAPAM in a minimum of 1-acre inch of water through a sprinkler system, or a row treatment of 75 to 100 gallons broadcast equivalent to the future tree row using a weed sprayer by applying multiple passes of VAPAM while the sprinklers are running until the desired rate has been applied for the treatment of specific orchard replant disease. Trees should not be replanted into the replant site for at least 21 days after treatment. Check for noxious fumes in the soil before planting. VAPAM may also be applied at the rate of 75 to 100 gallons per acre using a Noble Plow blade set 12 to 14 inches deep with spray nozzles spaced every 6 inches apart to give uniform coverage with a surface application using a disc to immediately incorporate the VAPAM placed on the surface.

WHEAT AND BARLEY: Apply VAPAM at a rate of 2-1/2 to 10 gallons per acre 14 to 21 days prior to planting for the suppression of certain early season soil fungi which cause root diseases of small grains. VAPAM may be diluted with water or, if compatible, non-acidic liquid fertilizers (see "Application in Tank Mix with Liquid Fertilizer" section) and injected into moist soil 5 to 8 inches before planting.

IN THE PACIFIC NORTHWEST, IF THE FIELD HISTORY OR SOIL SAMPLING SHOW HIGH POPULATIONS OF NEMATODES, FUMIGATION USING BOTH VAPAM AND TELONE® II SHOULD BE USED. CONSULT YOUR AMVAC OR DOWELANCO REPRESENTATIVE FOR ADDITIONAL INFORMATION.

NOTE: Read the label affixed to the container of TELONE II before applying. Carefully follow all precautionary statements and applicable use directions. Except as specified in this section, the labels affixed to the containers for TELONE II and VAPAM subject to all user precautions and limitations impose.

USE DIRECTIONS FOR SEQUENTIAL GROUND APPLICATION OF TELONE II & VAPAM

Sequential application of TELONE II and VAPAM for suppression of *Verticillium dahliae* and control of Root Knot and Lesion nematodes in soils to be planted to potatoes in the Pacific Northwest.

The following use directions provide information for a sequential treatment program of applications of TELONE II soil fumigant and VAPAM soil fumigant. For best results, apply both TELONE II and VAPAM in the fall. Alternative treatment schedules include a fall application of TELONE II followed by a spring application of VAPAM, a fall application of VAPAM followed by a spring application of TELONE II, or a spring application of both products. Due to time constraints resulting from varying weather conditions, a spring application may result in delayed planting.

APPLICATION DIRECTIONS FOR TELONE II

Soil conditions at the time of application of TELONE II that allow rapid diffusion of the fumigant as a gas through the soil normally give best results. Compacted soil layers within the desired treatment zone must be fractured before or during application of the fumigant. Soil temperature must be between 40°F and 80°F at the depth of injection, moist from 2 inches below the soil surface to at least 12 inches deep as determined by the feel method, free of clods, and with crop residue thoroughly incorporated into the soil at least at the time of application and sealing.

Apply TELONE II as a broadcast treatment at the minimum rate of 15 gallons per acre (44.3 fl oz/1000 feet of row/outlet based on 12-inch centers) using either chisel (shank), Noble Plow (sweep) or modified Para Till application equipment. Chisel equipment must have ripper-type shanks. Para Till equipment must be modified so that outlet spacing is evenly distributed under the tool bar. With chisel and Para Till equipment, a shank spacing of 12 to 24 inches is recommended. Do not exceed a shank spacing of 24 inches. Outlet depth should be at least 18 inches below the final soil surface. Noble Plow equipment may be used only when either shallow soils (those less that 18 inches deep) or soils containing excessive live root material such as alfalfa or corn stubble prevents the use of shank application. Noble Plow outlet spacing should not exceed 12 inches and application should be made to a depth of at least 15 inches. Fumigant penetration may be limited if a plow pan exists below the depth of the Noble blade. Do not use plow-sole application. Immediately after application of TELONE II, use a disc, paddle wheel or similar device to uniformly mix the top 4-6 inches of soil to effectively eliminate chisel traces. Then follow immediately with a ring roller or multi-packer to seal the soil surface. Little or no crop residue should be exposed at the surface following the sealing operation. Any remaining crop residue should lie flat following sealing. Following application and sealing, leave soil undisturbed for 7-14 days. The longer undisturbed interval may be necessary if the soil is or becomes cold or wet during this period.

APPLICATION DIRECTIONS FOR VAPAM

Soil conditions at the time of application of VAPAM must be between 40°F and 90°F in the treated zone and at 50% to 85% field capacity. If necessary, pre-irrigate about a week prior to treatment to adjust soil moisture to desired levels. Immediately before application, cultivate lightly if the soil has crusted.

Apply VAPAM either by chemigation or by soil injection or surface incorporation as a sequential application with TELONE II. When VAPAM is used prior to TELONE II, allow a minimum of 7 days between treatments. When TELONE II is applied prior to VAPAM, allow a minimum of 7 days before disturbing the soil or beginning any pre-irrigation for the application of VAPAM.

For chemigation, apply VAPAM at the minimum rate of 40 gallons per acre in a minimum of 1/2 acre-inch of water to the desired depth of treatment. Heavier soils may require a higher amount of water. Use only those sprinkler systems that give large water droplets to prevent excessive fumigant loss. Do not apply when wind speed favors drift beyond the area intended for treatment or when conditions of thermal inversion exist. If for any reason chemigation is interrupted prior to completion (e.g., excessive wind, equipment malfunction, etc.), back the system up prior to restarting to ensure full application to the area affected prior to shutting down the system and to allow full distribution of the VAPAM solution throughout the irrigation system prior to moving over untreated soil. After application is completed, flush equipment until all VAPAM is eliminated from the system. Follow all application directions described in the "General Precautions for Irrigation System " and "Sprinkler Chemigation Systems" sections).

For soil injection, apply VAPAM at the minimum rate of 40 gallons per acre using either shanks, sweep blades, double-winged shanks, or a Noble Plow blade combined with a surface application. Single shanks should be spaced no more than 6 inches apart with either single injection outlets no more than 6 inches deep or dual injection outlets spaced at 6 and 12 inches deep. Single sweep blades should be spaced no more than 12 inches apart with sweeps 12 inches wide and a spray nozzle that will provide broadcast coverage from sweep tip to sweep tip. Double-winged shanks should be spaced no more than 12 inches apart with no more than 9 inches between adjacent wings and with spray nozzles that provide uniform coverage. The Noble Plow blade should have spray nozzles spaced 6 inches apart to give uniform coverage, an injection depth set at 12 to 14 inches deep, and be combined with a surface application using a disc to immediately incorporate the VAPAM placed on the surface. Follow all the above applications immediately with a roller/packer to smooth and compact the soil surface.

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For surface incorporation, apply VAPAM at the minimum rate of 40 gallons per acre as a broadcast application to the soil surface immediately in front of soil covering equipment such as rotary tillers, discs, etc., to a minimum depth of 6 inches using a single-pass incorporation followed immediately by a roller/packer to smooth and compact the soil surface.

SOIL FUMIGATION INTERVAL: Planting may take place only after odors of either TELONE II or VAPAM are no longer present within the zone of fumigation. If VAPAM follows TELONE II and is applied in the spring with the Noble Plow blade, apply all fertilizers at least 7 days after the application of VAPAM. Thoroughly aerate the soil 5 to 7 days after the application of VAPAM by shallow plowing and/or discing to allow the fumigant odors to dissipate. Wait 14 to 21 days after the application of VAPAM before planting the crop. Use the 21-day interval if soil temperatures are below 60°F regardless of any other precautions that may have been taken. In addition to waiting 21 days, set indicator plants (e.g., tomato seedlings) in various places in the treated field and cover the plants with a "hot cap', plastic sheeting, bucket, etc., to trap and confine any fumes present. Leave the plants undisturbed for a minimum of 24 hours then examine for injury before planting the crop. Do not plant the crop if injury to indicator plants is observed. If noxious fumes are noticeable at time of planting, stop planting and rework the soil. If TELONE II follows VAPAM and is applied in the spring, wait at least one week for each 10 gallons of TELONE II applied beyond the initial undisturbed period before planting the crop. If fumigant odors are present at planting, thoroughly aerate the soil following shallow ripping and/or discing to allow fumigant odors to dissipate. Do not till the soil so deep as to move untreated soil from below the treated zone into the treated soil.

Special Considerations and Precautions:

- Use of this sequential application program of reduced rates of TELONE II and VAPAM does not guarantee pest-free potatoes at harvest.
- Use of TELONE II and VAPAM according to these use directions will control Root Knot and Lesion nematode populations present within the fumigated zone at the time of fumigation. The fumigated zone can vary depending upon a number of factors such as fumigant rate, application methods used, depth of fumigant application, soil moisture, soil type, soil temperature and soil tilth (including soil compaction and soil porosity). The sequential combination of reduced rates of TELONE II and VAPAM will not control or prevent re-infestation subsequent to the treatments. Subsequent pest populations may infest the fumigated zone from irrigation water, equipment, potato seed or other sources of contamination or may invade the fumigated zone from surrounding untreated soil such as from beneath the fumigated zone or from non-fumigated pockets within the fumigated zone.
- In fields with a history of severe Columbia Root Knot nematode problems, the maximum Federal label rate of 20 gallons TELONE II per acre is recommended in sequential combination with a minimum of 50 gallons VAPAM per acre per these label directions.
- If the application of TELONE II occurs in the fall and the application of VAPAM is not planned until spring, a cover crop such as wheat or grass can be planted following the undisturbed soil interval associated with the application of TELONE II to reduce the potential for over-winter soil erosion.
- Refer to the product labels affixed to the containers for both TELONE II and VAPAM for recommended soil conditions, product performance can be expected to improve as the soil conditions move toward optimum. Use of this sequential application program of TELONE II and VAPAM under soil conditions outside the recommended range of soil conditions can be expected to yield less than satisfactory performance.

NOTE: Read the label affixed to the container of TELONE II before applying. Carefully follow all precautionary statements and applicable use directions. Except as specified in this section, use of TELONE II or VAPAM is subject to all use precautions and limitations imposed by the labels affixed to the containers for TELONE II and VAPAM, respectively.

USE DIRECTIONS FOR SIMULTANEOUS GROUND APPLICATION OF TELONE II & VAPAM

Simultaneous application of TELONE II & VAPAM for suppression of *Verticillium dahliae* and control of Root Knot and Lesion nematodes In soils to be planted to potatoes In the Pacific Northwest.

The following use directions provide information for simultaneous ground application of TELONE II soil fumigant and VAPAM soil fumigant. For best results, a fall application is recommended. Due to time constraints resulting from varying weather conditions, a spring application may result in delayed planting.

Note: When TELONE II and VAPAM are applied simultaneously, the most restrictive personal protective equipment, worker notification and re-entry restrictions specified on labels for each product must be followed.

Soil Conditions

Soil temperature must be between 40°F and 80°F in the treated zone. Soil moisture in the top 12 inches should be at 50% to 85% of field capacity. Soil moisture below 12 inches should be moist as determined by the feel method. If necessary, pre-irrigate about a week prior to treatment to adjust soil moisture to the desired levels.

Application Methods And Equipment

Use a dual equipment setup to apply TELONE II and VAPAM during a single pass. Calibrate equipment for simultaneous application of each product. Because of more shallow product placement and the need to disrupt chisel traces from application of TELONE II, mount equipment for application of VAPAM behind that of TELONE II.

Apply TELONE II as a broadcast treatment at a minimum rate of 15 gallons per acre (44.3 fl oz/1000 feet of row/outlet based on 12 inch centers) using either chisel (shank), noble (sweep) or modified Para Till application equipment. Chisel equipment must have ripper-type shanks. Para Till equipment must be modified so that outlet spacing is evenly distributed under the tool bar. With chisel and Para Till equipment, a shank spacing of 12 to 24 inches is recommended. Do not exceed a shank spacing of 24 inches. Outlet depth should be at least 18 inches below the final soil surface. Noble plow outlet spacing should not exceed 12 inches and application should be made to a depth of at least 15 inches. Fumigant penetration may be limited if a plow pan exists below the depth of the Noble blade. Do not use plow sole application.

For soil injection, apply VAPAM as a broadcast treatment at a minimum rate of 40 gallons per acre using either shanks, sweep blades or double winged shanks. Single shanks should be spaced no more than 6 inches apart with either single injection outlets any more than 6 inches deep or dual injection outlets spaced at 6 and 12 inches deep. Single sweep blades should be spaced no more than 12 inches apart with sweeps 12 inches wide and a spray nozzle that will provide broadcast coverage from sweep tip to sweep tip. Double-winged shanks should be spaced no more than 12 inches apart with no more than 9 inches between adjacent wings and with spray nozzles that provide uniform coverage.

For surface incorporation, apply VAPAM at the minimum rate of 40 gallons per acre as a broadcast application to the soil surface immediately in front of soil covering equipment such as rotary tillers, discs, etc., set to a minimum depth of 6 inches.

Sealing The Soil After Application

Immediately after application the soil must be sealed to prevent fumigant loss and ensure that an effective concentration of fumigant is maintained within the soil. Chisel traces resulting from the TELONE II application must be disrupted to a depth of at least 4 to 6 inches. This may be accomplished with the VAPAM applicator or with a disc or similar device.

As a final step to compact the soil surface and help maximize soil sealing, all above applications must be followed with a ring roller or culti-packer.

Soil Fumigation Interval

Planting may take place only after the odors of both TELONE II and VAPAM are no longer present. Following application and sealing leave the soil undisturbed for 7 to 10 days. The longer undisturbed interval may be necessary if the soil is or becomes cold or wet during this period. For spring applications, thoroughly aerate the soil after the initial undisturbed interval by shallow plowing and/or discing to allow the fumigant odors to dissipate. Allow 21 days prior to planting. In addition to waiting 21 days, place indicator plants (e.g., potted tomato seedlings) in various places in the treated field and cover the plants with a "hot cap", plastic sheeting, bucket, etc., to trap and confine any fumes present. Leave the plants undisturbed for a minimum of 24 hours then examine for injury before planting the crop. Do not plant the crop if injury to indicator plants is observed. If noxious fumes are noticeable at time of planting, stop planting and rework the soil.

Special Considerations And Precautions:

- Use of this simultaneous application program of reduced rates of TELONE II and VAPAM does not guarantee pest-free potatoes at harvest.
- Use of TELONE II and VAPAM according to these use directions will control Root Knot and Lesion nematode populations present within the fumigated zone at the time of fumigation. The fumigated zone can vary depending upon a number of factors such as fumigant rate, application methods used, depth of fumigant application, soil moisture, soil type, soil temperature and soil tilth (including soil compaction and soil porosity). The simultaneous combination of reduced rates of TELONE II and VAPAM will not control or prevent re-infestation subsequent to the treatment. Subsequent pest populations may infest the fumigated zone from irrigation water, equipment, potato seed or other sources of contamination, or may invade the fumigated zone from surrounding untreated soil such as from beneath the fumigated zone or from within non-fumigated pockets within the fumigated zone.
- In fields with a history of severe Columbia Root Knot nematode problems, the maximum Federal label rate of 20 gallons of TELONE II per acre is recommended in simultaneous combination with a minimum of 50 gallons of VAPAM per acre, per these label directions.
- With fall applications, a cover crop such as wheat or grass may be planted following the undisturbed soil interval associated with this application to reduce the potential for over-winter soil erosion.
- Refer to the product labels affixed to the containers for both TELONE II and VAPAM for further recommendations and precautions for optimum fumigant performance. Within the range of recommended soil conditions, product performance can be expected to improve as the soil conditions move towards optimum. Use of this simultaneous application program of TELONE II and VAPAM under soil conditions outside the recommended range of soil conditions can be expected to yield less than satisfactory performance.

NOTE: The "Use Directions for the Pacific Northwest" may be used in other areas of the country, if not prohibited elsewhere on the label. Consult your local sales representative or extension personnel for further directions or recommendations.

STORAGE AND DISPOSAL

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

STORAGE: Store in a cool, dry locked place out of reach of children. Keep container closed when not in use. Do not store below 32°F. Product crystallizes at lower temperatures. Warm or store at higher temperatures and mix to re-dissolve crystals and assure uniformity before use.

PESTICIDE DISPOSAL: Pesticide wastes are toxic. Improper disposal of excess pesticide spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional office for guidance.

CONTAINER DISPOSAL: Triple rinse (or equivalent) and, then, offer for recycling or reconditioning; puncture and dispose of in a sanitary landfill; or, if allowed by State and local authorities, burn or incinerate. If burned, stay out of smoke.

FOR BULK AND MINI-BULK CONTAINERS

CONTAINER DISPOSAL: Reseal container and offer for recycling or reconditioning; triple rinse (or equivalent); or clean in accordance with manufacturer's instructions.

CONTAINER PRECAUTIONS: Before refilling, inspect thoroughly for damage such as cracks, punctures, bulges, dents, abrasions and damage or worn threads on closure devices.

REFILL ONLY WITH VAPAM SOIL FUMIGANT

The contents of this container cannot be completely removed by cleaning. Refilling with materials other than VAPAM soil fumigant will result in contamination and may weaken the container. After filling and before transporting, check for leaks. Do not refill or transport damaged or leaking container.
NOTE OF WARNING: CONTAINER IS NOT SAFE FOR FOOD, FEED OR DRINKING WATER!

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LIMITED WARRANTY AND DISCLAIMER

The manufacturer warrants (a) that this product conforms to the chemical description on the label; (b) that this product is reasonably fit for the purposes set forth in the directions for use, subject to the inherent risks referred to herein, when it is used in accordance with such directions; and (c) that the directions, warnings, and other statements on this label are based upon responsible experts' evaluations of reasonable tests of effectiveness, of toxicity to laboratory animals and to plants and residues on food crops, and upon reports of field experience. Tests have not been made on all varieties of food crops and plants, or in all states or under all conditions.

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VAPAM® is a registered trademark of Amvac Chemical Corporation.

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