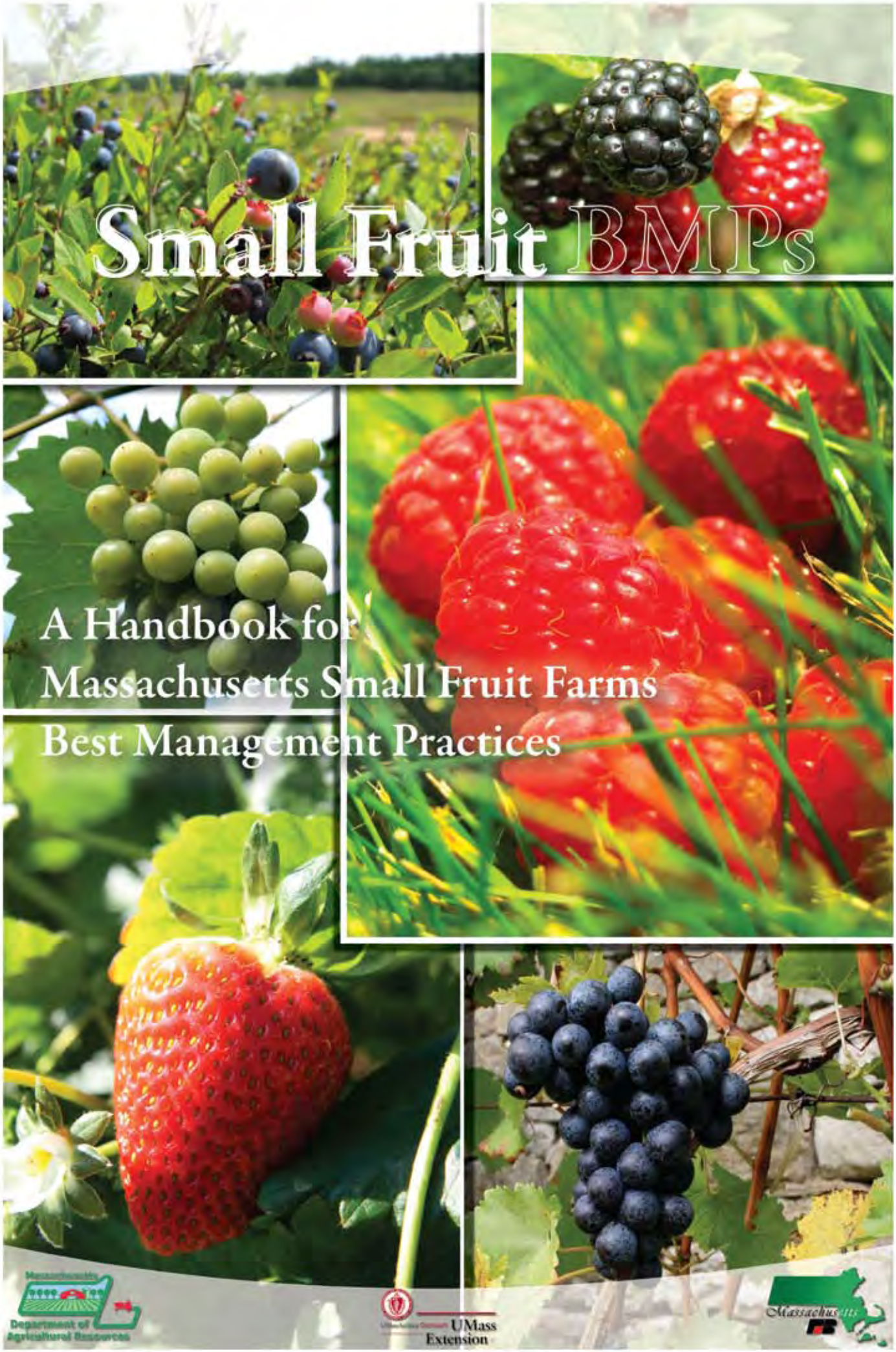

Small Fruit BMPs

A Handbook for Massachusetts Small Fruit Farms Best Management Practices

Massachusetts Department of Agricultural Resources

UMass Extension

Massachusetts

Small Fruit BMPs

A Handbook of

Best Management Practices for Massachusetts Small Fruit Farms

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UMassAmherst Outreach UMass Extension

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Small-fruit BMPs

A Handbook of Best Management Practices for Massachusetts Small Fruit Farms

This handbook is a cooperative publication of the Massachusetts Farm Bureau Federation, University of Massachusetts Extension, and the Massachusetts Department of Agricultural Resources.

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TABLE OF CONTENTS

Binder I – Small Fruit Best Management Practices and GAPs Guidelines:

1. Introduction
2. Best Management Practices for Commercial Small Fruit Field Production
   a. Introduction
   b. Best Management Practices Checklists
      Strawberry
      Highbush Blueberry
      Raspberry/Blackberry
      Grape
      i. Management Considerations for Sites with High Leaching or Runoff Potential
      ii. Preplant Considerations
      iii. Site and Soil Considerations for Established Plantings
      iv. Nutrient Management for Established Plantings
      v. Plant Culture and Irrigation Practices
      vi. Pesticides Application and Records
      vii. Pest Management Practices
      viii. Continuing Education
   c. Pesticide Storage, Mixing & Loading
   d. Worker Protection Standard
   e. Energy Conservation, Generation and Energy Efficiency
3. USDA GAPs Guidelines (Cornell GAPsNET or similar)
   i. Introduction
   ii. Farm Assessment Instructions
   iii. Wild Animals
   iv. My Farm Assessment
   v. Harvest Sanitation
   vi. Glossary
   vii. Post Harvest Handling
   viii. Record Keeping
   ix. Juice and Cider
   x. Worker Hygiene
   xi. Direct Marketing
   xii. Toilets and Handwashing
   xiii. U-Pick Operations
   xiv. Water Use
   xv. Petting Zoos
   xvi. Pesticide Use
   xvii. Farm Biosecurity
   xviii. Manure Use
   xix. Crisis Management
   xx. Compost Use
   xxi. References
4. USDA GAPs Assessment Workbook
5. Worksheets
   GAPs Record Keeping Logs

i. Worker Training Log
ii. Field Sanitation Log
iii. Water Treatment Log
iv. Rodent/Pest Control Log
v. Cooler Temperature Log
vi. Thermometer Calibration Sample
vii. Transportation/Truck Checklist
viii. Illness/Injury Report Log
ix. First Aid Kit Monitoring
x. Manure Application Log
xi. Surface Water Testing Log
xii. Mock Traceback Log
xiii. Visitor Log

Worker Protection Forms and Checklists
TracBerry™ and TracGrape™ Pesticide Use Record Forms (on CD enclosed)

Binder II – Resource Materials

1. New England Small Fruit Pest Management Guide
2. Mid-Atlantic Berry Guide for supplemental Production and Enterprise Budget Information
3. Midwest Grape Production Guide

An Introduction to BMPs For Massachusetts Small Fruit Farms

Best management practices (BMPs) can be defined as those farming operations which provide efficient use of resource, optimized economic returns to the farm, provide the greatest possible safety for workers and consumers, and reduce adverse effects on the environment surrounding and within the farming operation. Many considerations, however, enter into a decision regarding the use of one farming practice over another, and what is defined as "best" is different for different people and different situations. Therefore, everyone should view BMPs as a collection of possible choices, the selection of which is made for the best net effect on all stakeholders of the farm. Over time, utilizing "best management practices" results in greater agricultural sustainability.

The activities covered in this guide range from soil management through pesticide application. The *New England Small Fruit Pest Management Guide, Mid-Atlantic Berry Guide and MidWest Grape Production Guide* form the primary background materials detailing the many possible choices which can be classified as BMPs during the crop production phase. The BMP checklist provides some evaluation of where choices fall within the spectrum of best management practices, but please realize that this is a value judgment. It is important to note that the checklist does not include all possible activities in a berry planting or vineyard and is not intended to say that one farm is a "BMP farm" and another is not. For more detail regarding choices presented in the checklist, please refer to the *Resource Materials* section of this handbook

Good agricultural practices (GAPs) are a subset of BMPs which deal primarily with food safety. We chose to adopt the GAPs detailed by the National GAPs Program led by Cornell University. Their publication, *Food Safety Begins on the Farm*, provides an excellent checklist of GAPs and background information about the choices available. This publication is included in its entirety in this handbook. It is very important to be in contact with fruit buyers regarding GAPs, and it is certain that some farmers may find it necessary to become GAPs certified. Certification training sessions are being provided by a few private companies, and likely will be conducted by the Commonwealth of Massachusetts in the near future.

It is important to note that this guide is the product of a significant cooperative effort. First, the producers of the reference materials (*New England Small Fruit Pest Management Guide, Mid-Atlantic Berry Guide and MidWest Grape Production Guide*) included in the guide deserve credit for excellent work. The final *BMP Handbook* resulted from a cooperative effort among the University of Massachusetts, the Massachusetts Farm Bureau Federation, and a group of small-fruit growers (Glenn Cook, Ken Nicewicz, Mo Tougas, Gene Kosinski and Rob Russell), with funding from the Massachusetts Department of Agricultural Resources.

We encourage all small-fruit growers to study this handbook and strive to utilize the best possible BMPs for your farm and to adopt GAPs at the highest level. In the long run, the future of Massachusetts farming will be enhanced by utilizing the most environmentally friendly, economically profitable, and safest farming operations possible.

Best Management Practices for Strawberry Production

1. Management Considerations for Sites with High Leaching or Runoff Potential
2. Preplant Considerations
3. Site and Soil Considerations for Established Plantings
4. Nutrient Management for Established Plantings
5. Plant Culture and Irrigation Practices
6. Pesticides Application and Records
7. Pest Management Practices
8. Continuing Education

Soil Leaching and Runoff Potential

Background

Fruit production sites are extremely variable. Soil textures range from sandy and gravelly loams to heavy clay. Depth of the rooting layer ranges from a less than a foot to 6 feet or more. Differences in soil parent material have resulted in soil pH ranging from 4.0 to 7.0. As a result of this diversity, the potential for leaching and runoff varies greatly – even on the same farm. This worksheet is designed to:

1. Compare the relative risk of ground and surface water contamination among different strawberry fields on your farm.
2. Identify the fields on which you may want to consider using more extensive water protection practices.
3. Set priorities for adopting soil management practices, constructing soil conservation structures, and making changes to nutrient or pesticide management practices.
4. This is applicable for both established plantings and preplant situations.

Page 2 will allow you to enumerate and classify the risk potential for each field. If the assessment shows a high or moderate risk of sedimentation, ground or surface water contamination, you will want to consider possible ways to modify that risk.

If you already know the leaching potential of your soil, you may skip to page 3.

Site Characteristics Worksheets - Instructions

1. If you know that your field has high leaching or runoff potential, you may skip this section.
2. Obtain a scaled map of the field(s) to be assessed. Overlay a soils map to determine the soils that are present on the land. Identify any relevant watershed areas.
    a. *This step may be done using a GIS computer program if one is available. Find the landowner's property on the map of the watershed. If possible, turn on property boundaries from tax maps. Turn on the land uses and soils for the area. You can now print out a copy of this for use.*
3. Identify production fields or natural divisions with similar soils and slopes. Mark the location of each area on the map that was done in step 1. Identify the predominant soil type and average slope in each area.
4. From the county soil survey, fill out the table on page 2 for each field. This will identify if a block has a high potential to leach pesticides or fertilizers into groundwater or a high potential for surface runoff that may carry fertilizers or pesticides into surface waters.

Soil Hydrologic Group	Description
A	**Low runoff potential – high leaching potential**. Mostly deep coarse-textured soils such as sandy loams, gravels, coarse gravelly loams.
B	**Moderately low runoff potential – moderately high leaching potential**. Mostly permeable loams.
C	**Moderately high runoff potential – moderately low leaching potential**. Mostly fine-to-medium textured soils and/or those with imperfect drainage.
D	**High runoff potential – low leaching potential**. Mostly very fine-textured soils and/or those with poor drainage.

Rating of Runoff / Leaching Potential of Fields

	Soil Hydrologic Group A B C D	Rating 1 2 3 4	Average Field Slope < 3% 3 – 6% 7 – 12% > 12%	Rating 1 2 3 4	
Field ID					**Sum of Ratings**
1.					
2.					
3.					
4.					

Sum of Ratings - Results

2 – 3 = **High leaching potential**. Use caution when making ground-directed herbicide or fertilizer applications especially when heavy rainfall is expected. Split applications of nitrogen fertilizers are recommended.

4 – 5 = **Intermediate conditions**. The site may be intermediate in both the risk of runoff and leaching potential.

6 – 8 = **High runoff potential**. Installation of filter strips around field is highly recommended. Delay application of pre-emergence herbicides and fertilizers when >1" of rainfall is forecast.

1. Management Considerations for Sites with High Leaching or Runoff Potential

1.1 If site has a high leaching potential, is a plan in place to minimize this risk?	BMP rating
A management plan is in place to reduce the use of pesticides and fertilizers with high leaching potential, and appropriate herbicide application rates are used to limit movement. ***AND*** Nitrogen rates are adjusted by using split applications or fertigation, and applications of ground-directed fertilizers and herbicides are delayed when heavy rains are expected.	**5**
Other, explain	**3**
Other, explain	**1**
Herbicide, insecticide, fungicide, and fertilizer applications are made on a cost and need only basis with no consideration to leaching potential. ***OR*** No knowledge of which inputs are most prone to leaching, and herbicide rates are not adjusted according to soil texture. ***OR*** No plan is in place to address leaching.	**0**
COMMENTS:	

1.2 If site has a high runoff potential, is a plan in place to mitigate the runoff?	BMP rating
A conservation plan is in place that addresses runoff with appropriate soil conservation structures (e.g. diversions, filter strips, drainage). ***AND*** Application of herbicides, fungicides, insecticides, and fertilizers is delayed if rainfall is forecasted within the drying time of the application.	**5**
Other, explain	**3**
Other, explain	**1**

Soil conservation practices (e.g. diversions, filter strips, drainage) are not considered. ***AND*** Weather conditions and runoff are not considered prior to application of pesticides and fertilizers. (i.e. No management plan exists for reducing erosion and runoff.)	**0**
COMMENTS:	

2. Preplant Considerations

2.1 Are complete soil nutrient analyses done before planting?	**BMP rating**
Soil analyses are done on all distinct portions of the site, the slope is sampled separately from the flat area and different soil types are sampled separately.	**5**
More than one soil analysis is done, but the site is not thoroughly sampled.	**3**
Only one complete soil analysis is done although the site is not uniform.	**1**
Only pH is tested: a complete soil analysis is not done. *OR* No soil analyses are done.	**0**
COMMENTS:	

2.2 Are soil samples sent for nematode analysis before planting?	**BMP rating**
Prior to planting, samples are collected according to laboratory instructions and sent for nematode analysis.	**5**
Other, explain	**3**
Other, explain	**1**
Nematode analysis is not done.	**0**
COMMENTS:	

2.3 Is preplant soil compaction addressed?	BMP rating
Soil compaction is directly evaluated. ***AND*** If soils have impermeable layers or hard pans, subsoiling is performed the year prior to planting. ***OR*** Soils are gravelly with no perched water tables or clay layers requiring subsoiling.	**5**
Soil compaction is not directly evaluated ***BUT*** Subsoiling is done the year prior to planting.	**3**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils are well-drained gravels or gravelly loams in hydrologic classes A and B, which are less prone to compaction.	**1**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils have silt or clay layers, and/or perched water tables. ***OR*** Soils are in hydrologic classes C and D, which are prone to compaction.	**0**
COMMENTS:	

2.4 Are drainage problems addressed?	BMP rating
Soils are well drained to excessively well drained and no tiling is required. ***OR*** Pattern tiling is established, with tile lines parallel to rows at an adequate density for the soil texture.	**5**
Soils are evaluated and drainage requirements are determined before planting. ***AND*** Tile drainage is designed and installed on poorly drained areas or in heavy soils.	**3**
No preplant design or evaluation for tiling is done. ***BUT*** Tile lines installed in observably wet areas.	**1**

Soil drainage is not considered preplant. ***AND*** Soils are poorly drained, no tile drainage present even in wet spots and low areas. ***AND*** Standing water persists after rainfall.	**0**
COMMENTS:	

2.5 If necessary, is soil pH adjusted?	**BMP rating**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***AND*** If the total amount recommended is >6 tons per acre, the lime is split between two applications in the year prior to planting.	**5**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***AND*** Lime applications are *not* split if >6 tons per acre is required.	**3**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***OR*** Less than 3 tons per acre of lime is applied after planting.	**1**
Soil pH is not adjusted before planting. ***OR*** Soil pH is not known. ***OR*** More than 3 tons per acre of lime is applied after planting.	**0**
COMMENTS:	

2.6 For sites with low soil organic matter (<3%), is additional organic matter added?	**BMP rating**
Organic matter is supplied through one of the following methods: cover crops (particularly with sorghum/sudan hybrids); compost; or manure, preferably composted.	**5**
Other, explain	**3**

Other, explain	**1**
Organic matter is not added, particularly on sandy sites.	**0**
COMMENTS:	

2.7 For sites previously planted to strawberries, was a crop rotation plan carried out before replanting to strawberries?	**BMP rating**
Land was not previously in strawberries. **OR** Land was planted to strawberries in the past and rotated to non-related (i.e., non-rosaceous) crops or cover crops for 6 years before replanting to strawberries **AND** Only non-solonaceous crops were included in the rotation. **AND/OR** Cover crops used were selected for specific properties (e.g., marigolds for suppressing nematodes, sudangrass for suppressing weeds and/or adding organic matter).	**5**
Land was previously planted to strawberries and rotated to non-related crops or cover crops for 4 years before replanting to strawberries **AND** Only non-solonaceous crops were included in the rotation. **AND/OR** Cover crops used were selected for specific properties (e.g., marigolds for suppressing nematodes, sudangrass for suppressing weeds and/or adding organic matter).	**3**
Land was previously planted to strawberries and rotated to non-related crops or cover crops for 2 years before replanting to strawberries	**1**
Land was previously planted to strawberries and replanting to strawberries without rotating to a different crop or fallow period.	**0**
COMMENTS:	

3. Site and Soil Considerations for Established Plantings

3.1 Is pH adjusted if necessary?	**BMP rating**

Soil test is performed in the current year and lime is added according to recommendations. ***AND*** No more than 2-3 tons per acre is applied per year.	**5**
Other, explain	**3**
Soil test is performed in the current year and lime is added according to recommendations. ***AND*** More than 3 tons per acre is applied in one application.	**1**
Soil tests are never taken and lime is added systematically or not at all.	**0**
COMMENTS:	
3.2 How is soil compaction addressed if evident?	**BMP rating**
Equipment is chosen or modified to minimize compaction (e.g. lightest equipment possible, wider or larger diameter tires, tire pressure is as low as possible). ***AND*** In compacted areas, subsoiling is completed every other year in the tire tracks, or deep-rooting cover crops are planted to help restore soil structure. ***AND*** Equipment use is avoided when soils are saturated.	**5**
In compacted areas, subsoiling is completed every two to three years. ***AND*** Equipment use is usually avoided when soils are saturated.	**3**
Compaction status is not known. ***AND*** Equipment is sometimes used when soil is saturated.	**1**
Compaction status is not known. ***AND*** Equipment is regularly used when soil is saturated.	**0**
COMMENTS:	
3.3 How is soil erosion addressed if evident?	**BMP rating**

No soil erosion is evident. **AND/OR** Straw mulch is applied in row middles and maintained throughout the growing season. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips). ***AND*** Buffer/filter strips are established around all water bodies, wetlands, and outlet ends of concentrated flow areas.	**5**
Other, explain	**3**
An annual cover crop is established in row middles. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips), but some erosion is still evident. ***AND/OR*** No buffer/filter strips are established around any water bodies, wetlands, and outlet ends of concentrated flow areas.	**1**
No cover crop is established. ***AND/OR*** Erosion is evident and no corrective measures are taken.	**0**
COMMENTS:	

3.4 Is biodiversity of soil microorganisms considered when making soil management decisions?	**BMP rating**
A conscious effort is made to increase and diversify the soil microbial populations with 3 or 4 of the following methods: • Annual application of compost or other organic matter • Annual soil incorporation of organic matter (e.g., straw mulch). • Reduction in or elimination of preemergent herbicide use • Avoiding the overuse of postemergent herbicides	**5**
At least 3 of the bulleted points listed above are used to benefit soil microbial populations.	**3**
One or 2 of the bulleted points listed above are used to benefit soil microbial populations.	**1**
No effort is made to improve soil microbiology.	**0**

COMMENTS:

4. Nutrient Management for Established Plantings

4.1 Are fertilizer applications based on leaf tissue analysis and soil tests?	BMP rating
Soil and leaf tissue tests are performed annually and used to guide fertilizer applications.	5
A leaf tissue test only if performed once in 3 years and used to modify fertilizer program if indicated.	3
A soil test only is performed once in 3 years and used to modify fertilizer program if indicated.	1
No soil or tissue tests are performed on established plantings.	0

COMMENTS:

4.2 Are Nitrogen applications made to avoid excessive spring foliage growth which can increase disease and pest problems?	BMP rating
Nitrogen fertilizer is applied after harvest (at renovation). **AND** Nitrogen fertilizer is applied in September. **OR** Nitrogen fertilization is provided from slow release sources such as aged compost using application rates calculated to avoid Nitrogen over-fertilization.	5
Nitrogen fertilizer is applied after harvest (at renovation). **AND** Nitrogen fertilizer is applied in September.	3
Other, explain	1
Nitrogen fertilization is applied in a single application.	0

COMMENTS:

5. Plant Culture and Irrigation Practices

5.1 Is the planting pattern designed to optimize air circulation and drying conditions for foliage and fruit?	**BMP rating**
The canopy width when fully grown does not exceed 2 ft. **AND** Rows are spaced to allow for at least 2 ft. of open space between fully grown row canopies.	**5**
Other, explain	**3**
The canopy width when fully grown exceeds 2 ft. **BUT** Rows are spaced to allow for at least 2 ft. of open space between fully grown row canopies.	**1**
The canopy width when fully grown exceeds 2 ft. **AND** Rows are spaced to allow for less than 2 ft. of open space between fully grown row canopies.	**0**
COMMENTS:	

5.2 Is a mulch layer maintained in bearing beds through harvest to suppress weeds and prevent splashing of water from rain or irrigation?	**BMP rating**
A weed-free biodegradable mulch layer is maintained within the row from early spring until renovation. **AND** A weed-free biodegradable mulch layer is maintained between rows from early spring until renovation.	**5**
A plastic mulch layer is maintained within the row from early spring until renovation. **AND** A weed-free biodegradable mulch layer is maintained between rows from early spring until renovation.	**3**
A plastic mulch layer is maintained within the row from early spring until renovation. **AND** No mulch layer is maintained between rows from early spring until renovation.	**1**
No mulch layer is maintained within the row from early spring until renovation. **AND** No mulch layer is maintained between rows from early spring until renovation.	**0**

COMMENTS:	
5.3 Are strawberry rows covered for winter protection?	**BMP rating**
A weed-free biodegradable mulch layer is applied to plant rows for winter protection.	**5**
Other, explain	**3**
A spun-bonded row cover is applied to plant rows for winter protection.	**1**
No cover is applied to plant rows for winter protection.	**0**
COMMENTS:	

5.4 Is irrigation supplied to plant rows?	**BMP rating**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development. **AND** Overhead irrigation is supplied to plant rows for frost protection during bloom and evaporative cooling during harvest. **AND** A water use plan is used which minimizes disease development, optimizes water use efficiency, and minimizes erosion and run-off.	**5**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development. **AND** Overhead irrigation is supplied to plant rows for frost protection during bloom and evaporative cooling during harvest.	**3**
Overhead irrigation is supplied to plant rows for to deliver water when needed for plant growth and fruit development, frost protection during bloom and for evaporative cooling during harvest.	**1**
No irrigation is supplied to plant rows.	**0**
COMMENTS:	

6. Pesticides Application and Records

- *Only pesticides approved and registered for use in strawberries in the Massachusetts are used.*
- *Pesticide drift is minimized.*
- *Re-entry and pre-harvest intervals are adhered to.*

6.1 Is the Insecticide/fungicide sprayer is calibrated regularly?	**BMP rating**
The insecticide/fungicide sprayer is calibrated before the start of the season following an established protocol. **AND** Insecticide/fungicide sprayer is recalibrated at least once midway through the growing season.	**5**
Other, explain	**3**
The insecticide/fungicide sprayer is calibrated before the start of the season.	**1**
The insecticide/fungicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.2 Is the herbicide sprayer is calibrated regularly?	**BMP rating**
The herbicide sprayer is calibrated before the start of the growing season following an established protocol. **AND** The herbicide sprayer is recalibrated midway through the growing season.	**5**
Other, explain	**3**
The herbicide sprayer is calibrated before the start of the growing season.	**1**
The herbicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.3 Are spray records are maintained and organized?	**BMP rating**

Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracBerry (www.nysipm.cornell.edu/trac/about/about_berry.asp) or TracGrape (www.nysipm.cornell.edu/trac/about/about_grape.asp) or similar software. **AND** Win-PST analysis (http://policy.nrcs.usda.gov/viewerFS.aspx?id=1476) is conducted for all pesticides considered for use on the farm.	**5**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracBerry (www.nysipm.cornell.edu/trac/about/about_berry.asp) or TracGrape (www.nysipm.cornell.edu/trac/about/about_grape.asp) or similar software.	**3**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated in paper files and not electronically or by using published software.	**1**
Records of pesticide applications are kept, but are incomplete and not well organized.	**0**
COMMENTS:	

6.4 Are Worker Protection Standards being followed?	**BMP rating**
All workers receive required WPS training **AND** All WPS requirements are implemented(e.g., signage, wash stations, etc.)	**5**
All workers receive required WPS training **AND** Most WPS requirements are implemented (e.g., signage, wash stations, etc.)	**3**
Most workers receive required WPS training **AND** Most WPS requirements are implemented(e.g., signage, wash stations, etc.)	**1**
Some workers receive required WPS training **AND** Some WPS requirements are implemented	**0**
COMMENTS:	

6.5 Does the pesticide applicator have and maintain a pesticide applicators license?	**BMP rating**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** Is the only individual who mixes, loads and applies pesticides (restricted use or general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**5**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** may occasionally supervise another individual who mixes, loads and applies pesticides (general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**3**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Only mixes, loads and applies general use pesticides on the farm	**1**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Isn't sure if one is required for applying pesticides as needed on the farm	**0**
COMMENTS:	

7. Pest Management Practices

7.1 Is access to current pest information and recommendations maintained?	**BMP rating**
A resource library containing reliable pest identification and diagnostic information (e.g., NRAES Strawberry Production Guide, Cornell Berry Diagnostic Tool) is accessible (in print or electronically) on the farm to assist in identifying the cause of a problem. ***AND*** A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A current relevant newsletter subscription is maintained to stay abreast of new or emerging pest problems (*e.g., Massachusetts Berry Notes*). ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**5**

A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**3**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** Pesticide labels are read and understood thoroughly.	**1**
Pest Management decisions are based solely on historical approaches ***AND*** No up-to-date management materials are maintained.	**0**
COMMENTS:	

7.2 Are pests monitored appropriately?	**BMP rating**
Currently recommended approaches to assess pest presence and potential for damage are used for all pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed	**5**
Currently recommended approaches to assess pest presence and potential for damage are used for most of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**3**
Currently recommended approaches to assess pest presence and potential for damage are used for a few of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**1**
No monitoring is done. ***AND*** Pest control is applied on a calendar basis.	**0**
COMMENTS:	

7.3 Are control measures selected appropriately?	BMP rating
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings) **AND** Selected to preserve beneficial organisms (e.g., predatory mites and other beneficials) whenever possible.	**5**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings)	**3**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible)	**1**
Control measures are selected according to recommendations made by chemical salesman **AND** Widest target range **AND** Lowest cost	**0**
COMMENTS:	

8. Continuing Education

8.1 Is/are the management decision-makers keeping up-to-date with Best Management Practices in commercial strawberry production?	BMP rating

The management decision maker(s) attend 3 or more berry related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.). ***AND*** A current relevant newsletter subscription (*e.g., Massachusetts Berry Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**5**
The management decision maker(s) attend 3 or more berry related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.).	**3**
The management decision maker(s) are members of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.).	**1**
The management decision maker(s) don't attend any meetings ***OR*** Are members of any grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.). ***OR*** Subscribe to any newsletter subscription (*e.g., Massachusetts Berry Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**0**
COMMENTS:	

Best Management Practices for Highbush Blueberry Production

1. Management Considerations for Sites with High Leaching or Runoff Potential
2. Preplant Considerations
3. Site and Soil Considerations for Established Plantings
4. Nutrient Management for Established Plantings
5. Plant Culture and Irrigation Practices
6. Pesticides Application and Records
7. Pest Management Practices
8. Continuing Education

Soil Leaching and Runoff Potential

Background

Fruit production sites are extremely variable. Soil textures range from sandy and gravelly loams to heavy clay. Depth of the rooting layer ranges from a less than a foot to 6 feet or more. Differences in soil parent material have resulted in soil pH ranging from 4.0 to 7.0. As a result of this diversity, the potential for leaching and runoff varies greatly – even on the same farm. This worksheet is designed to:

1. Compare the relative risk of ground and surface water contamination among different strawberry fields on your farm.
2. Identify the fields on which you may want to consider using more extensive water protection practices.
3. Set priorities for adopting soil management practices, constructing soil conservation structures, and making changes to nutrient or pesticide management practices.
4. This is applicable for both established plantings and preplant situations.

Page 2 will allow you to enumerate and classify the risk potential for each field. If the assessment shows a high or moderate risk of sedimentation, ground or surface water contamination, you will want to consider possible ways to modify that risk.

If you already know the leaching potential of your soil, you may skip to page 3.

Site Characteristics Worksheets - Instructions

1. If you know that your field has high leaching or runoff potential, you may skip this section.
2. Obtain a scaled map of the field(s) to be assessed. Overlay a soils map to determine the soils that are present on the land. Identify any relevant watershed areas.
    a. *This step may be done using a GIS computer program if one is available. Find the landowner's property on the map of the watershed. If possible, turn on property boundaries from tax maps. Turn on the land uses and soils for the area. You can now print out a copy of this for use.*
3. Identify production fields or natural divisions with similar soils and slopes. Mark the location of each area on the map that was done in step 1. Identify the predominant soil type and average slope in each area.
4. From the county soil survey, fill out the table on page 2 for each field. This will identify if a block has a high potential to leach pesticides or fertilizers into groundwater or a high potential for surface runoff that may carry fertilizers or pesticides into surface waters.

Soil Hydrologic Group	Description
A	**Low runoff potential – high leaching potential**. Mostly deep coarse-textured soils such as sandy loams, gravels, coarse gravelly loams.
B	**Moderately low runoff potential – moderately high leaching potential**. Mostly permeable loams.
C	**Moderately high runoff potential – moderately low leaching potential**. Mostly fine-to-medium textured soils and/or those with imperfect drainage.
D	**High runoff potential – low leaching potential**. Mostly very fine-textured soils and/or those with poor drainage.

Rating of Runoff / Leaching Potential of Fields

	Soil Hydrologic Group A B C D	Rating 1 2 3 4	Average Field Slope < 3% 3 – 6% 7 – 12% > 12%	Rating 1 2 3 4	
Field ID					**Sum of Ratings**
1.					
2.					
3.					
4.					

Sum of Ratings - Results

2 – 3 = **High leaching potential**. Use caution when making ground-directed herbicide or fertilizer applications especially when heavy rainfall is expected. Split applications of nitrogen fertilizers are recommended.

4 – 5 = **Intermediate conditions**. The site may be intermediate in both the risk of runoff and leaching potential.

6 – 8 = **High runoff potential**. Installation of filter strips around field is highly recommended. Delay application of pre-emergence herbicides and fertilizers when >1" of rainfall is forecast.

1. Management Considerations for Sites with High Leaching or Runoff Potential

1.1 If site has a high leaching potential, is a plan in place to minimize this risk?	BMP rating
A management plan is in place to reduce the use of pesticides and fertilizers with high leaching potential, and appropriate herbicide application rates are used to limit movement. ***AND*** Nitrogen rates are adjusted by using split applications or fertigation, and applications of ground-directed fertilizers and herbicides are delayed when heavy rains are expected.	**5**
Other, explain	**3**
Other, explain	**1**
Herbicide, insecticide, fungicide, and fertilizer applications are made on a cost and need only basis with no consideration to leaching potential. ***OR*** No knowledge of which inputs are most prone to leaching, and herbicide rates are not adjusted according to soil texture. ***OR*** No plan is in place to address leaching.	**0**
COMMENTS:	

1.2 If site has a high runoff potential, is a plan in place to mitigate the runoff?	BMP rating
A conservation plan is in place that addresses runoff with appropriate soil conservation structures (e.g. diversions, filter strips, drainage). ***AND*** Application of herbicides, fungicides, insecticides, and fertilizers is delayed if rainfall is forecasted within the drying time of the application.	**5**
Other, explain	**3**
Other, explain	**1**

Soil conservation practices (e.g. diversions, filter strips, drainage) are not considered. ***AND*** Weather conditions and runoff are not considered prior to application of pesticides and fertilizers. (i.e. No management plan exists for reducing erosion and runoff.)	**0**
COMMENTS:	

2. Preplant Considerations

2.1 Are complete soil nutrient analyses done before planting?	**BMP rating**
Soil analyses are done on all distinct portions of the site, the slope is sampled separately from the flat area and different soil types are sampled separately.	**5**
More than one soil analysis is done, but the site is not thoroughly sampled.	**3**
Only one complete soil analysis is done although the site is not uniform.	**1**
Only pH is tested: a complete soil analysis is not done. *OR* No soil analyses are done.	**0**
COMMENTS:	

2.2 Are soil samples sent for nematode analysis before planting?	**BMP rating**
Prior to planting, samples are collected according to laboratory instructions and sent for nematode analysis.	**5**
Other, explain	**3**
Other, explain	**1**
Nematode analysis is not done.	**0**
COMMENTS:	

2.3 Is preplant soil compaction addressed?	BMP rating
Soil compaction is directly evaluated. ***AND*** If soils have impermeable layers or hard pans, subsoiling is performed the year prior to planting. ***OR*** Soils are gravelly with no perched water tables or clay layers requiring subsoiling.	**5**
Soil compaction is not directly evaluated ***BUT*** Subsoiling is done the year prior to planting.	**3**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils are well-drained gravels or gravelly loams in hydrologic classes A and B, which are less prone to compaction.	**1**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils have silt or clay layers, and/or perched water tables. ***OR*** Soils are in hydrologic classes C and D, which are prone to compaction.	**0**
COMMENTS:	

2.4 Are drainage problems addressed?	BMP rating
Soils are well drained to excessively well drained and no tiling is required. ***OR*** Pattern tiling is established, with tile lines parallel to rows at an adequate density for the soil texture.	**5**
Soils are evaluated and drainage requirements are determined before planting. ***AND*** Tile drainage is designed and installed on poorly drained areas or in heavy soils.	**3**
No preplant design or evaluation for tiling is done. ***BUT*** Tile lines installed in observably wet areas.	**1**

Soil drainage is not considered preplant. ***AND*** Soils are poorly drained, no tile drainage present even in wet spots and low areas. ***AND*** Standing water persists after rainfall.	**0**
COMMENTS:	

2.5 If necessary, is soil pH adjusted?	**BMP rating**
In the year prior to planting, soil pH is adjusted so the top 16" of soil is between 4.5 and 5.5. ***AND*** If the total amount recommended is 1/2 ton per acre, the sulfur is split between two applications in the year prior to planting.	**5**
In the year prior to planting, soil pH is adjusted so the top 16" of soil is between 4.5 and 5.5. ***AND*** Sulfur applications are *not* split if >1/2 ton per acre is required.	**3**
In the year prior to planting, soil pH is adjusted so the top 16" of soil is between 4.5 and 5.5. ***OR*** Less than 1/2 tons per acre of sulfur is applied after planting.	**1**
Soil pH is not adjusted before planting. ***OR*** Soil pH is not known. ***OR*** More than 1/2 ton per acre of sulfur is applied after planting.	**0**
COMMENTS:	

2.6 For sites with low soil organic matter (<5%), is additional organic matter added?	**BMP rating**
Organic matter is supplied through one of the following methods: cover crops (particularly with sorghum/sudan hybrids); compost; peat moss, or manure, preferably composted. **AND** Soil is retested for nutrient content and pH prior too planting.	**5**

Organic matter is supplied through one of the following methods: cover crops (particularly with sorghum/sudan hybrids); compost; peat moss, or manure, preferably composted.	**3**
Other, explain	**1**
Organic matter is not added, particularly on sandy sites.	**0**
COMMENTS:	

3. Site and Soil Considerations for Established Plantings

3.1 Is pH adjusted if necessary?	**BMP rating**
Soil test is performed in the current year and adjusted to 4.5 - 5.5 according to recommendations.	**5**
Soil test is performed once in 5 years and pH adjusted to 4.5 - 5.5 according to recommendations.	**3**
Other, explain	**1**
Soil tests are never taken and soil pH is not accurately known.	**0**
COMMENTS:	

3.2 How is soil compaction addressed if evident?	**BMP rating**
Equipment is chosen or modified to minimize compaction (e.g. lightest equipment possible, wider or larger diameter tires, tire pressure is as low as possible). ***AND*** In compacted areas, subsoiling is completed every other year in the tire tracks, or deep-rooting cover crops are planted to help restore soil structure. ***AND*** Equipment use is avoided when soils are saturated.	**5**
In compacted areas, subsoiling is completed every two to three years. ***AND*** Equipment use is usually avoided when soils are saturated.	**3**

Compaction status is not known. ***AND*** Equipment is sometimes used when soil is saturated.	**1**
Compaction status is not known. ***AND*** Equipment is regularly used when soil is saturated.	**0**
COMMENTS:	

3.3 How is soil erosion addressed if evident?	**BMP rating**
No soil erosion is evident. **AND/OR** Grass sod is maintained in row middles throughout the season. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips). ***AND*** Buffer/filter strips are established around all water bodies, wetlands, and outlet ends of concentrated flow areas.	**5**
Grass sod is maintained in row middles throughout the season.	**3**
Other, explain	**1**
No cover crop is established. ***AND/OR*** Erosion is evident and no corrective measures are taken.	**0**
COMMENTS:	

3.4 Is biodiversity of soil microorganisms considered when making soil management decisions?	**BMP rating**
A conscious effort is made to increase and diversify the soil microbial populations with 2 or 3 of the following methods: • Annual application of compost or other organic matter • Reduction in or elimination of preemergent herbicide use • Avoiding the overuse of postemergent herbicides	**5**

At least 1 of the bulleted points listed above are used to benefit soil microbial populations.	3
Other, explain	1
No effort is made to improve soil microbiology.	0
COMMENTS:	

4. Nutrient Management for Established Plantings

4.1 Are fertilizer applications based on leaf tissue analysis and soil tests?	**BMP rating**
Soil and leaf tissue tests are performed annually and used to guide fertilizer applications.	5
A leaf tissue test only if performed once in 3 years and used to modify fertilizer program if indicated.	3
A soil test only is performed once in 3 years and used to adjust adjust soil pH and fertilizer program if indicated.	1
No soil or tissue tests are performed on established plantings.	0
COMMENTS:	

4.2 Are Nitrogen applications made to avoid excessive vegitative growth (esp. late season) which can increase winter injury and disease problems?	**BMP rating**
Half the annual Nitrogen fertilizer (as determined by tissue analysis the previous year) is applied in May **AND** The second half of annual Nitrogen fertilizer is applied in June (no N-fertilization takes place after early July). **OR** Nitrogen fertilization is provided from slow release sources such as aged compost using application rates calculated to avoid Nitrogen over-fertilization.	5
The full annual Nitrogen fertilization (as determined by tissue analysis the previous year) is applied as a soluble fertilizer in a single application in May.	3

Other, explain	**1**
A standard amount of Nitrogen fertilization (not determined by tissue analysis) is applied in a single application without regard to avoiding late season timing.	**0**
COMMENTS:	

5. Plant Culture and Irrigation Practices

5.1 Is the planting pattern designed to optimize air circulation and drying conditions for foliage and fruit?	**BMP rating**
Rows are planted with in-row spacing that allows for open space between bushes (spacing will vary with varieties) **AND** Rows are planted with between-row spacing that allows for tractor operations all season between fully grown row canopies.	**5**
Rows are planted with between-row spacing that allows for tractor operations all season between fully grown row canopies **BUT** In-row spacing does not allow for open space between bushes (spacing will vary with varieties)	**3**
Rows are planted with in-row spacing that allows for open space between bushes (spacing will vary with varieties) **BUT** Between-row spacing does not allow for tractor operations all season between fully grown row canopies.	**1**
Rows are planted with in-row spacing that does not allow for open space between bushes (spacing will vary with varieties) **AND** Between-row spacing does not allow for tractor operations all season between fully grown row canopies.	**0**
COMMENTS:	

5.2 Is a mulch layer maintained within the plant row to conserve soil moisture, suppress weed growth and provide needed soil organic matter?	**BMP rating**

A weed-free biodegradable mulch layer is applied annually in the plant rows using materials such as sawdust, woodchips, bark mulch, and the like within the row from early spring until renovation **AND** Mulch material is aged outdoors for at least one year before application **AND** Mulch is applied in the spring before budbreak to cover fallen fruit or other material that could harbor overwintering inoculum of blueberry diseases (esp. Mummyberry).	**5**
A weed-free biodegradable mulch layer is applied annually in the plant rows using materials such as sawdust, woodchips, bark mulch, and the like within the row from early spring until renovation. **AND** Mulch material is aged outdoors for at least one year before application	**3**
A weed-free biodegradable mulch layer is applied every 3-4 years in the plant rows using materials such as sawdust, woodchips, bark mulch, and the like within the row from early spring until renovation. **AND** Mulch material is aged outdoors for at least one year before application	**1**
No mulch layer is maintained within the plant row. **OR** A weed-free biodegradable mulch layer is applied but mulch material is not aged outdoors for at least one year before application. .	**0**
COMMENTS:	

5.3 Blueberry plants are pruned for overall plant health and productivity?	**BMP rating**
Pruning takes place in late winter/early spring to remove old unproductive wood and spacially balance remaining wood to allow for good air circulation and light penetration and to remove diseased, insect infested or damaged wood from the planting.	**5**
Pruning takes place anytime in the winter to remove old unproductive wood and spacially balance remaining wood to allow for good air circulation and light penetration and to remove diseased, insect infested or damaged wood from the planting.	**3**
Other, explain	**1**
Pruning is not performed on a regular basis	**0**

COMMENTS:	
5.4 Is irrigation supplied to plant rows?	**BMP rating**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development. **AND** A water use plan is used which minimizes disease development, optimizes water use efficiency, and minimizes erosion and run-off.	**5**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development.	**3**
Overhead irrigation is supplied to plant rows for to deliver water when needed for plant growth and fruit development.	**1**
No irrigation is supplied to plant rows.	**0**
COMMENTS:	

6. Pesticides Application and Records

- *Only pesticides approved and registered for use in strawberries in the Massachusetts are used.*
- *Pesticide drift is minimized.*
- *Re-entry and pre-harvest intervals are adhered to.*

6.1 Is the Insecticide/fungicide sprayer is calibrated regularly?	**BMP rating**
The insecticide/fungicide sprayer is calibrated before the start of the season following an established protocol. **AND** Insecticide/fungicide sprayer is recalibrated at least once midway through the growing season.	**5**
Other, explain	**3**
The insecticide/fungicide sprayer is calibrated before the start of the season.	**1**
The insecticide/fungicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.2 Is the herbicide sprayer is calibrated regularly?	BMP rating
The herbicide sprayer is calibrated before the start of the growing season following an established protocol. **AND** The herbicide sprayer is recalibrated midway through the growing season.	**5**
Other, explain	**3**
The herbicide sprayer is calibrated before the start of the growing season.	**1**
The herbicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.3 Are spray records are maintained and organized?	BMP rating
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracBerry (www.nysipm.cornell.edu/trac/about/about_berry.asp) or similar software. **AND** Win-PST analysis (http://www.wsi.nrcs.usda.gov/products/W2Q/pest/winpst.html) is conducted for all pesticides considered for use on the farm.	**5**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracBerry (www.nysipm.cornell.edu/trac/about/about_berry.asp) or similar software.	**3**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated in paper files and not electronically or by using published software.	**1**
Records of pesticide applications are kept, but are incomplete and not well organized.	**0**
COMMENTS:	

6.4 Are Worker Protection Standards being followed?	BMP rating

All workers receive required WPS training **AND** All WPS requirements are implemented(e.g., signage, wash stations, etc.)	**5**
All workers receive required WPS training **AND** Most WPS requirements are implemented (e.g., signage, wash stations, etc.)	**3**
Most workers receive required WPS training **AND** Most WPS requirements are implemented(e.g., signage, wash stations, etc.)	**1**
Some workers receive required WPS training **AND** Some WPS requirements are implemented	**0**
COMMENTS:	

6.5 Does the pesticide applicator have and maintain a pesticide applicators license?	**BMP rating**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** Is the only individual who mixes, loads and applies pesticides (restricted use or general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**5**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** may occasionally supervise another individual who mixes, loads and applies pesticides (general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**3**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Only mixes, loads and applies general use pesticides on the farm	**1**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Isn't sure if one is required for applying pesticides as needed on the farm	**0**

COMMENTS:

7. Pest Management Practices

7.1 Is access to current pest information and recommendations maintained?	BMP rating
A resource library containing reliable pest identification and diagnostic information (e.g., NRAES Strawberry Production Guide, Cornell Berry Diagnostic Tool) is accessible (in print or electronically) on the farm to assist in identifying the cause of a problem. ***AND*** A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A current relevant newsletter subscription is maintained to stay abreast of new or emerging pest problems (*e.g., Massachusetts Berry Notes*). ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**5**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**3**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** Pesticide labels are read and understood thoroughly.	**1**
Pest Management decisions are based solely on historical approaches ***AND*** No up-to-date management materials are maintained.	**0**

COMMENTS:

7.2 Are pests monitored appropriately?	BMP rating
Currently recommended approaches to assess pest presence and potential for damage are used for all pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed	**5**

Currently recommended approaches to assess pest presence and potential for damage are used for most of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**3**
Currently recommended approaches to assess pest presence and potential for damage are used for a few of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**1**
No monitoring is done. ***AND*** Pest control is applied on a calendar basis.	**0**
COMMENTS:	

7.3 Are control measures selected appropriately?	**BMP rating**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings) **AND** Selected to preserve beneficial organisms (e.g., predatory mites and other beneficials) whenever possible.	**5**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings)	**3**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible)	**1**

Control measures are selected according to recommendations made by chemical salesman **AND** Widest target range **AND** Lowest cost	**0**
COMMENTS:	

8. Continuing Education

8.1 Is/are the management decision-makers keeping up-to-date with Best Management Practices in commercial strawberry production?	**BMP rating**
The management decision maker(s) attend 3 or more berry related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.). ***AND*** A current relevant newsletter subscription (*e.g., Massachusetts Berry Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**5**
The management decision maker(s) attend 3 or more berry related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.).	**3**
The management decision maker(s) are members of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.).	**1**
The management decision maker(s) don't attend any meetings ***OR*** Are members of any grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.). ***OR*** Subscribe to any newsletter subscription (*e.g., Massachusetts Berry Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**0**
COMMENTS:	

Best Management Practices for Raspberry/Blackberry Production

1. Management Considerations for Sites with High Leaching or Runoff Potential
2. Preplant Considerations
3. Site and Soil Considerations for Established Plantings
4. Nutrient Management for Established Plantings
5. Plant Culture and Irrigation Practices
6. Pesticides Application and Records
7. Pest Management Practices
8. Continuing Education

Soil Leaching and Runoff Potential

Background

Fruit production sites are extremely variable. Soil textures range from sandy and gravelly loams to heavy clay. Depth of the rooting layer ranges from a less than a foot to 6 feet or more. Differences in soil parent material have resulted in soil pH ranging from 4.0 to 7.0. As a result of this diversity, the potential for leaching and runoff varies greatly – even on the same farm. This worksheet is designed to:

1. Compare the relative risk of ground and surface water contamination among different rasp/blackberry fields on your farm.
2. Identify the fields on which you may want to consider using more extensive water protection practices.
3. Set priorities for adopting soil management practices, constructing soil conservation structures, and making changes to nutrient or pesticide management practices.
4. This is applicable for both established plantings and preplant situations.

Page 2 will allow you to enumerate and classify the risk potential for each field. If the assessment shows a high or moderate risk of sedimentation, ground or surface water contamination, you will want to consider possible ways to modify that risk.

If you already know the leaching potential of your soil, you may skip to page 3.

Site Characteristics Worksheets - Instructions

1. If you know that your field has high leaching or runoff potential, you may skip this section.
2. Obtain a scaled map of the field(s) to be assessed. Overlay a soils map to determine the soils that are present on the land. Identify any relevant watershed areas.
    a. *This step may be done using a GIS computer program if one is available. Find the landowner's property on the map of the watershed. If possible, turn on property boundaries from tax maps. Turn on the land uses and soils for the area. You can now print out a copy of this for use.*
3. Identify production fields or natural divisions with similar soils and slopes. Mark the location of each area on the map that was done in step 1. Identify the predominant soil type and average slope in each area.
4. From the county soil survey, fill out the table on page 2 for each field. This will identify if a block has a high potential to leach pesticides or fertilizers into groundwater or a high potential for surface runoff that may carry fertilizers or pesticides into surface waters.

Soil Hydrologic Group	Description
A	**Low runoff potential – high leaching potential**. Mostly deep coarse-textured soils such as sandy loams, gravels, coarse gravelly loams.
B	**Moderately low runoff potential – moderately high leaching potential**. Mostly permeable loams.
C	**Moderately high runoff potential – moderately low leaching potential**. Mostly fine-to-medium textured soils and/or those with imperfect drainage.
D	**High runoff potential – low leaching potential**. Mostly very fine-textured soils and/or those with poor drainage.

Rating of Runoff / Leaching Potential of Fields

	Soil Hydrologic Group A B C D	Rating 1 2 3 4	Average Field Slope < 3% 3 – 6% 7 – 12% > 12%	Rating 1 2 3 4	
Field ID					**Sum of Ratings**
1.					
2.					
3.					
4.					

Sum of Ratings - Results

2 – 3 = **High leaching potential**. Use caution when making ground-directed herbicide or fertilizer applications especially when heavy rainfall is expected. Split applications of nitrogen fertilizers are recommended.

4 – 5 = **Intermediate conditions**. The site may be intermediate in both the risk of runoff and leaching potential.

6 – 8 = **High runoff potential**. Installation of filter strips around field is highly recommended. Delay application of pre-emergence herbicides and fertilizers when >1" of rainfall is forecast.

1. Management Considerations for Sites with High Leaching or Runoff Potential	
1.1 If site has a <u>high leaching potential</u>, is a plan in place to minimize this risk?	**BMP rating**
A management plan is in place to reduce the use of pesticides and fertilizers with high leaching potential, and appropriate herbicide application rates are used to limit movement. ***AND*** Nitrogen rates are adjusted by using split applications or fertigation, and applications of ground-directed fertilizers and herbicides are delayed when heavy rains are expected.	**5**
Other, explain	**3**
Other, explain	**1**
Herbicide, insecticide, fungicide, and fertilizer applications are made on a cost and need only basis with no consideration to leaching potential. ***OR*** No knowledge of which inputs are most prone to leaching, and herbicide rates are not adjusted according to soil texture. ***OR*** No plan is in place to address leaching.	**0**
COMMENTS:	
1.2 If site has a <u>high runoff potential</u>, is a plan in place to mitigate the runoff?	**BMP rating**
A conservation plan is in place that addresses runoff with appropriate soil conservation structures (e.g. diversions, filter strips, drainage). ***AND*** Application of herbicides, fungicides, insecticides, and fertilizers is delayed if rainfall is forecasted within the drying time of the application.	**5**
Other, explain	**3**
Other, explain	**1**

Soil conservation practices (e.g. diversions, filter strips, drainage) are not considered. ***AND*** Weather conditions and runoff are not considered prior to application of pesticides and fertilizers. (i.e. No management plan exists for reducing erosion and runoff.)	**0**
COMMENTS:	

2. Preplant Considerations

2.1 Are complete soil nutrient analyses done before planting?	**BMP rating**
Soil analyses are done on all distinct portions of the site, the slope is sampled separately from the flat area and different soil types are sampled separately.	**5**
More than one soil analysis is done, but the site is not thoroughly sampled.	**3**
Only one complete soil analysis is done although the site is not uniform.	**1**
Only pH is tested: a complete soil analysis is not done. ***OR*** No soil analyses are done.	**0**
COMMENTS:	

2.2 Are soil samples sent for nematode analysis before planting?	**BMP rating**
Prior to planting, samples are collected according to laboratory instructions and sent for nematode analysis.	**5**
Other, explain	**3**
Other, explain	**1**
Nematode analysis is not done.	**0**
COMMENTS:	

2.3 Is preplant soil compaction addressed?	**BMP rating**
Soil compaction is directly evaluated. ***AND*** If soils have impermeable layers or hard pans, subsoiling is performed the year prior to planting. ***OR*** Soils are gravelly with no perched water tables or clay layers requiring subsoiling.	**5**
Soil compaction is not directly evaluated ***BUT*** Subsoiling is done the year prior to planting.	**3**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils are well-drained gravels or gravelly loams in hydrologic classes A and B, which are less prone to compaction.	**1**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils have silt or clay layers, and/or perched water tables. ***OR*** Soils are in hydrologic classes C and D, which are prone to compaction.	**0**
COMMENTS:	

2.4 Are drainage problems addressed?	**BMP rating**
Soils are well drained to excessively well drained and no tiling is required. ***OR*** Pattern tiling is established, with tile lines parallel to rows at an adequate density for the soil texture.	**5**
Soils are evaluated and drainage requirements are determined before planting. ***AND*** Tile drainage is designed and installed on poorly drained areas or in heavy soils.	**3**
No preplant design or evaluation for tiling is done. ***BUT*** Tile lines installed in observably wet areas.	**1**

Soil drainage is not considered preplant. ***AND*** Soils are poorly drained, no tile drainage present even in wet spots and low areas. ***AND*** Standing water persists after rainfall.	**0**
COMMENTS:	
2.5 If necessary, is soil pH adjusted?	**BMP rating**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***AND*** If the total amount recommended is >6 tons per acre, the lime is split between two applications in the year prior to planting.	**5**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***AND*** Lime applications are *not* split if >6 tons per acre is required.	**3**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***OR*** Less than 3 tons per acre of lime is applied after planting.	**1**
Soil pH is not adjusted before planting. ***OR*** Soil pH is not known. ***OR*** More than 3 tons per acre of lime is applied after planting.	**0**
COMMENTS:	
2.6 For sites with low soil organic matter (<3%), is additional organic matter added?	**BMP rating**
Organic matter is supplied through one of the following methods: cover crops (particularly with sorghum/sudan hybrids); compost; or manure, preferably composted.	**5**
Other, explain	**3**

Other, explain	**1**
Organic matter is not added, particularly on sandy sites.	**0**
COMMENTS:	

2.7 For sites previously planted to rasp/blackberries, was a crop rotation plan carried out before replanting to rasp/blackberries?	**BMP rating**
Land was not previously in rasp/blackberries. **OR** Land was planted to rasp/blackberries in the past and rotated to non-related (i.e., non-rosaceous) crops or cover crops for 6 years before replanting to rasp/blackberries **AND** Only non-solonaceous crops were included in the rotation. **AND/OR** Cover crops used were selected for specific properties (e.g., marigolds for suppressing nematodes, sudangrass for suppressing weeds and/or adding organic matter).	**5**
Land was previously planted to rasp/blackberries and rotated to non-related crops or cover crops for 4 years before replanting to rasp/blackberries **AND** Only non-solonaceous crops were included in the rotation. **AND/OR** Cover crops used were selected for specific properties (e.g., marigolds for suppressing nematodes, sudangrass for suppressing weeds and/or adding organic matter).	**3**
Land was previously planted to rasp/blackberries and rotated to non-related crops or cover crops for 2 years before replanting to rasp/blackberries	**1**
Land was previously planted to rasp/blackberries and replanting to rasp/blackberries without rotating to a different crop or fallow period.	**0**
COMMENTS:	

3. Site and Soil Considerations for Established Plantings

3.1 Is pH adjusted if necessary?	**BMP rating**

Soil test is performed in the current year and lime is added according to recommendations. ***AND*** No more than 2-3 tons per acre is applied per year.	**5**
Other, explain	**3**
Soil test is performed in the current year and lime is added according to recommendations. ***AND*** More than 3 tons per acre is applied in one application.	**1**
Soil tests are never taken and lime is added systematically or not at all.	**0**
COMMENTS:	
3.2 How is soil compaction addressed if evident?	**BMP rating**
Equipment is chosen or modified to minimize compaction (e.g. lightest equipment possible, wider or larger diameter tires, tire pressure is as low as possible). ***AND*** In compacted areas, subsoiling is completed every other year in the tire tracks, or deep-rooting cover crops are planted to help restore soil structure. ***AND*** Equipment use is avoided when soils are saturated.	**5**
In compacted areas, subsoiling is completed every two to three years. ***AND*** Equipment use is usually avoided when soils are saturated.	**3**
Compaction status is not known. ***AND*** Equipment is sometimes used when soil is saturated.	**1**
Compaction status is not known. ***AND*** Equipment is regularly used when soil is saturated.	**0**
COMMENTS:	
3.3 How is soil erosion addressed if evident?	**BMP rating**

No soil erosion is evident. **AND/OR** Straw mulch is applied in row middles and maintained throughout the growing season. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips). ***AND*** Buffer/filter strips are established around all water bodies, wetlands, and outlet ends of concentrated flow areas.	**5**
Other, explain	**3**
An annual cover crop is established in row middles. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips), but some erosion is still evident. ***AND/OR*** No buffer/filter strips are established around any water bodies, wetlands, and outlet ends of concentrated flow areas.	**1**
No cover crop is established. ***AND/OR*** Erosion is evident and no corrective measures are taken.	**0**
COMMENTS:	

3.4 Is biodiversity of soil microorganisms considered when making soil management decisions?	**BMP rating**
A conscious effort is made to increase and diversify the soil microbial populations with 3 or 4 of the following methods: • Annual application of compost or other organic matter • Reduction in or elimination of preemergent herbicide use • Avoiding the overuse of postemergent herbicides	**5**
At least 2 of the bulleted points listed above are used to benefit soil microbial populations.	**3**
One of the bulleted points listed above are used to benefit soil microbial populations.	**1**
No effort is made to improve soil microbiology.	**0**
COMMENTS:	

4. Nutrient Management for Established Plantings

4.1 Are fertilizer applications based on leaf tissue analysis and soil tests?	BMP rating
Leaf tissue tests are performed annually, soil tests are performed every 3 years and both are used to guide fertilizer applications.	5
A leaf tissue test only if performed once in 3 years and used to modify fertilizer program if indicated.	3
A soil test only is performed once in 3 years and used to modify fertilizer program if indicated.	1
No soil or tissue tests are performed on established plantings.	0
COMMENTS:	

4.2 Are Nitrogen applications made to avoid excessive spring foliage growth which can increase disease and pest problems?	BMP rating
Half the annual Nitrogen fertilizer (as determined by tissue analysis the previous year) is applied in May **AND** The second half of annual Nitrogen fertilizer is applied in June (no N-fertilization takes place after early July). **OR** Nitrogen fertilization is provided from slow release sources such as aged compost using application rates calculated to avoid Nitrogen over-fertilization.	5
The full annual Nitrogen fertilization (as determined by tissue analysis the previous year) is applied as a soluble fertilizer in a single application in May.	3
Other, explain	1
A standard amount of Nitrogen fertilization (not determined by tissue analysis) is applied in a single application without regard to avoiding late season timing.	0
COMMENTS:	

5. Plant Culture, pruning and Irrigation Practices

5.1 Is the planting pattern designed to optimize air circulation and drying conditions for foliage and fruit?	**BMP rating**
The row width when at the base of the canes does not exceed 2 ft. **AND** Rows are spaced to allow for at least 3 ft. of open space between fully grown row canopies. **AND** Rows are oriented with prevailing winds for optimal drying conditions	**5**
Other, explain	**3**
The row width at the base of the canes exceeds 2 ft. **BUT** Rows are spaced to allow for at least 3 ft. of open space between fully grown row canopies.	**1**
The row width at the base of the canes exceeds 2 ft. **AND** Rows are spaced to allow for less than 3 ft. of open space between fully grown row canopies.	**0**
COMMENTS:	

5.2 Rasp/blackberry rows are pruned for overall plant health and productivity?	**BMP rating**
Pruning takes place in late winter/early spring to remove spent floricanes and thin overwintering canes to allow for good air circulation and light penetration and to remove diseased, insect infested or damaged canes from the fruiting beds.	**5**
Pruning takes place anytime in the dormant season to remove spent floricanes and thin overwintering canes to allow for good air circulation and light penetration and to remove diseased, insect infested or damaged canes from the fruiting beds.	**3**
Other, explain	**1**
Pruning takes place anytime in the dormant season only to remove spent floricanes.	**0**
COMMENTS:	

5.3 Is irrigation supplied to plant rows?	**BMP rating**

Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development. **AND** A water use plan is used which minimizes disease development, optimizes water use efficiency, and minimizes erosion and run-off.	**5**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development.	**3**
Overhead irrigation is supplied to plant rows for to deliver water when needed for plant growth and fruit development.	**1**
No irrigation is supplied to plant rows.	**0**
COMMENTS:	

6. Pesticides Application and Records

- *Only pesticides approved and registered for use in rasp/blackberries in the Massachusetts are used.*
- *Pesticide drift is minimized.*
- *Re-entry and pre-harvest intervals are adhered to.*

6.1 Is the Insecticide/fungicide sprayer is calibrated regularly?	**BMP rating**
The insecticide/fungicide sprayer is calibrated before the start of the season following an established protocol. **AND** Insecticide/fungicide sprayer is recalibrated at least once midway through the growing season.	**5**
Other, explain	**3**
The insecticide/fungicide sprayer is calibrated before the start of the season.	**1**
The insecticide/fungicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.2 Is the herbicide sprayer is calibrated regularly?	**BMP rating**

The herbicide sprayer is calibrated before the start of the growing season following an established protocol. **AND** The herbicide sprayer is recalibrated midway through the growing season.	**5**
Other, explain	**3**
The herbicide sprayer is calibrated before the start of the growing season.	**1**
The herbicide sprayer is not calibrated regularly.	**0**
COMMENTS:	
6.3 Are spray records are maintained and organized?	**BMP rating**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracBerry (www.nysipm.cornell.edu/trac/about/about_berry.asp) or similar software. **AND** Win-PST analysis (http://www.wsi.nrcs.usda.gov/products/W2Q/pest/winpst.html) is conducted for all pesticides considered for use on the farm.	**5**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracBerry (www.nysipm.cornell.edu/trac/about/about_berry.asp) or similar software.	**3**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated in paper files and not electronically or by using published software.	**1**
Records of pesticide applications are kept, but are incomplete and not well organized.	**0**
COMMENTS:	
6.4 Are Worker Protection Standards being followed?	**BMP rating**

All workers receive required WPS training **AND** All WPS requirements are implemented(e.g., signage, wash stations, etc.)	**5**
All workers receive required WPS training **AND** Most WPS requirements are implemented (e.g., signage, wash stations, etc.)	**3**
Most workers receive required WPS training **AND** Most WPS requirements are implemented(e.g., signage, wash stations, etc.)	**1**
Some workers receive required WPS training **AND** Some WPS requirements are implemented	**0**
COMMENTS:	

6.5 Does the pesticide applicator have and maintain a pesticide applicators license?	**BMP rating**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** Is the only individual who mixes, loads and applies pesticides (restricted use or general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**5**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** may occasionally supervise another individual who mixes, loads and applies pesticides (general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**3**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Only mixes, loads and applies general use pesticides on the farm	**1**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Isn't sure if one is required for applying pesticides as needed on the farm	**0**

COMMENTS:

7. Pest Management Practices

7.1 Is access to current pest information and recommendations maintained?	BMP rating
A resource library containing reliable pest identification and diagnostic information (e.g., NRAES Rasp/blackberry Production Guide, Cornell Berry Diagnostic Tool) is accessible (in print or electronically) on the farm to assist in identifying the cause of a problem. ***AND*** A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A current relevant newsletter subscription is maintained to stay abreast of new or emerging pest problems (*e.g., Massachusetts Berry Notes*). ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**5**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**3**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** Pesticide labels are read and understood thoroughly.	**1**
Pest Management decisions are based solely on historical approaches ***AND*** No up-to-date management materials are maintained.	**0**
COMMENTS:	

7.2 Are pests monitored appropriately?	BMP rating
Currently recommended approaches to assess pest presence and potential for damage are used for all pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed	**5**

Currently recommended approaches to assess pest presence and potential for damage are used for most of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**3**
Currently recommended approaches to assess pest presence and potential for damage are used for a few of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**1**
No monitoring is done. ***AND*** Pest control is applied on a calendar basis.	**0**
COMMENTS:	
7.3 Are control measures selected appropriately?	**BMP rating**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings) **AND** Selected to preserve beneficial organisms (e.g., predatory mites and other beneficials) whenever possible.	5
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings)	3
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible)	1

Control measures are selected according to recommendations made by chemical salesman **AND** Widest target range **AND** Lowest cost	0
COMMENTS:	

8. Continuing Education

8.1 Is/are the management decision-makers keeping up-to-date with Best Management Practices in commercial rasp/blackberry production?	**BMP rating**
The management decision maker(s) attend 3 or more berry related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.). ***AND*** A current relevant newsletter subscription (*e.g., Massachusetts Berry Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**5**
The management decision maker(s) attend 3 or more berry related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.).	**3**
The management decision maker(s) are members of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.).	**1**
The management decision maker(s) don't attend any meetings ***OR*** Are members of any grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Blueberry Growers Association, etc.). ***OR*** Subscribe to any newsletter subscription (*e.g., Massachusetts Berry Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**0**

COMMENTS:

Best Management Practices for Wine and Table Grape Production

1. Management Considerations for Sites with High Leaching or Runoff Potential
2. Preplant Considerations
3. Site and Soil Considerations for Established Plantings
4. Nutrient Management for Established Plantings
5. Plant Culture and Irrigation Practices
6. Pesticides Application and Records
7. Pest Management Practices
8. Continuing Education

Soil Leaching and Runoff Potential

Background

Fruit production sites are extremely variable. Soil textures range from sandy and gravelly loams to heavy clay. Depth of the rooting layer ranges from a less than a foot to 6 feet or more. Differences in soil parent material have resulted in soil pH ranging from 4.0 to 7.0. As a result of this diversity, the potential for leaching and runoff varies greatly – even on the same farm. This worksheet is designed to:

1. Compare the relative risk of ground and surface water contamination among different grape vineyards on your farm.
2. Identify the fields on which you may want to consider using more extensive water protection practices.
3. Set priorities for adopting soil management practices, constructing soil conservation structures, and making changes to nutrient or pesticide management practices.
4. This is applicable for both established plantings and preplant situations.

Page 2 will allow you to enumerate and classify the risk potential for each field. If the assessment shows a high or moderate risk of sedimentation, ground or surface water contamination, you will want to consider possible ways to modify that risk.

If you already know the leaching potential of your soil, you may skip to page 3.

Site Characteristics Worksheets - Instructions

1. If you know that your field has high leaching or runoff potential, you may skip this section.
2. Obtain a scaled map of the field(s) to be assessed. Overlay a soils map to determine the soils that are present on the land. Identify any relevant watershed areas.
    a. *This step may be done using a GIS computer program if one is available. Find the landowner's property on the map of the watershed. If possible, turn on property boundaries from tax maps. Turn on the land uses and soils for the area. You can now print out a copy of this for use.*
3. Identify production fields or natural divisions with similar soils and slopes. Mark the location of each area on the map that was done in step 1. Identify the predominant soil type and average slope in each area.
4. From the county soil survey, fill out the table on page 2 for each field. This will identify if a block has a high potential to leach pesticides or fertilizers into groundwater or a high potential for surface runoff that may carry fertilizers or pesticides into surface waters.

Soil Hydrologic Group	Description
A	**Low runoff potential – high leaching potential**. Mostly deep coarse-textured soils such as sandy loams, gravels, coarse gravelly loams.
B	**Moderately low runoff potential – moderately high leaching potential**. Mostly permeable loams.
C	**Moderately high runoff potential – moderately low leaching potential**. Mostly fine-to-medium textured soils and/or those with imperfect drainage.
D	**High runoff potential – low leaching potential**. Mostly very fine-textured soils and/or those with poor drainage.

Rating of Runoff / Leaching Potential of Fields

	Soil Hydrologic Group A B C D	Rating 1 2 3 4	Average Field Slope < 3% 3 – 6% 7 – 12% > 12%	Rating 1 2 3 4	
Field ID					**Sum of Ratings**
1.					
2.					
3.					
4.					

Sum of Ratings - Results

2 – 3 = **High leaching potential**. Use caution when making ground-directed herbicide or fertilizer applications especially when heavy rainfall is expected. Split applications of nitrogen fertilizers are recommended.

4 – 5 = **Intermediate conditions**. The site may be intermediate in both the risk of runoff and leaching potential.

6 – 8 = **High runoff potential**. Installation of filter strips around field is highly recommended. Delay application of pre-emergence herbicides and fertilizers when >1" of rainfall is forecast.

1. Management Considerations for Sites with High Leaching or Runoff Potential	
1.1 If site has a <u>high leaching potential</u>, is a plan in place to minimize this risk?	**BMP rating**
A management plan is in place to reduce the use of pesticides and fertilizers with high leaching potential, and appropriate herbicide application rates are used to limit movement. ***AND*** Nitrogen rates are adjusted by using split applications or fertigation, and applications of ground-directed fertilizers and herbicides are delayed when heavy rains are expected.	**5**
Other, explain	**3**
Other, explain	**1**
Herbicide, insecticide, fungicide, and fertilizer applications are made on a cost and need only basis with no consideration to leaching potential. ***OR*** No knowledge of which inputs are most prone to leaching, and herbicide rates are not adjusted according to soil texture. ***OR*** No plan is in place to address leaching.	**0**
COMMENTS:	
1.2 If site has a <u>high runoff potential</u>, is a plan in place to mitigate the runoff?	**BMP rating**
A conservation plan is in place that addresses runoff with appropriate soil conservation structures (e.g. diversions, filter strips, drainage). ***AND*** Application of herbicides, fungicides, insecticides, and fertilizers is delayed if rainfall is forecasted within the drying time of the application.	**5**
Other, explain	**3**
Other, explain	**1**

Soil conservation practices (e.g. diversions, filter strips, drainage) are not considered. ***AND*** Weather conditions and runoff are not considered prior to application of pesticides and fertilizers. (i.e. No management plan exists for reducing erosion and runoff.)	**0**
COMMENTS:	

2. Preplant Considerations

2.1 Are complete soil nutrient analyses done before planting?	**BMP rating**
Soil analyses are done on all distinct portions of the site, the slope is sampled separately from the flat area and different soil types are sampled separately.	**5**
More than one soil analysis is done, but the site is not thoroughly sampled.	**3**
Only one complete soil analysis is done although the site is not uniform.	**1**
Only pH is tested: a complete soil analysis is not done. ***OR*** No soil analyses are done.	**0**
COMMENTS:	

2.2 Are soil samples sent for nematode analysis before planting?	**BMP rating**
Prior to planting, samples are collected according to laboratory instructions and sent for nematode analysis.	**5**
Other, explain	**3**
Other, explain	**1**
Nematode analysis is not done.	**0**
COMMENTS:	

2.3 Is preplant soil compaction addressed?	**BMP rating**
Soil compaction is directly evaluated. ***AND*** If soils have impermeable layers or hard pans, subsoiling is performed the year prior to planting. ***OR*** Soils are gravelly with no perched water tables or clay layers requiring subsoiling.	**5**
Soil compaction is not directly evaluated ***BUT*** Subsoiling is done the year prior to planting.	**3**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils are well-drained gravels or gravelly loams in hydrologic classes A and B, which are less prone to compaction.	**1**
Soil compaction is not directly evaluated. ***AND*** Preplant subsoiling is not done. ***AND*** Soils have silt or clay layers, and/or perched water tables. ***OR*** Soils are in hydrologic classes C and D, which are prone to compaction.	**0**
COMMENTS:	

2.4 Are drainage problems addressed?	**BMP rating**
Soils are well drained to excessively well drained and no tiling is required. ***OR*** Pattern tiling is established, with tile lines parallel to rows at an adequate density for the soil texture.	**5**
Soils are evaluated and drainage requirements are determined before planting. ***AND*** Tile drainage is designed and installed on poorly drained areas or in heavy soils.	**3**
No preplant design or evaluation for tiling is done. ***BUT*** Tile lines installed in observably wet areas.	**1**

Soil drainage is not considered preplant. ***AND*** Soils are poorly drained, no tile drainage present even in wet spots and low areas. ***AND*** Standing water persists after rainfall.	**0**
COMMENTS:	
2.5 If necessary, is soil pH adjusted?	**BMP rating**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***AND*** If the total amount recommended is >6 tons per acre, the lime is split between two applications in the year prior to planting.	**5**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***AND*** Lime applications are *not* split if >6 tons per acre is required.	**3**
In the year prior to planting, soil pH is adjusted with lime so the top 16" of soil is between 5.5 and 6.5. ***OR*** Less than 3 tons per acre of lime is applied after planting.	**1**
Soil pH is not adjusted before planting. ***OR*** Soil pH is not known. ***OR*** More than 3 tons per acre of lime is applied after planting.	**0**
COMMENTS:	
2.6 For sites with low soil organic matter (<3%), is additional organic matter added?	**BMP rating**
Organic matter is supplied through one of the following methods: cover crops (particularly with sorghum/sudan hybrids); compost; or manure, preferably composted.	**5**
Other, explain	**3**

Other, explain	**1**
Organic matter is not added, particularly on sandy sites.	**0**
COMMENTS:	

3. Site and Soil Considerations for Established Plantings

3.1 Is pH adjusted if necessary?	**BMP rating**
Soil test is performed in the current year and lime is added according to recommendations. ***AND*** No more than 2-3 tons per acre is applied per year.	**5**
Other, explain	**3**
Soil test is performed in the current year and lime is added according to recommendations. ***AND*** More than 3 tons per acre is applied in one application.	**1**
Soil tests are never taken and lime is added systematically or not at all.	**0**
COMMENTS:	

3.2 How is soil compaction addressed if evident?	**BMP rating**
Equipment is chosen or modified to minimize compaction (e.g. lightest equipment possible, wider or larger diameter tires, tire pressure is as low as possible). ***AND*** In compacted areas, subsoiling is completed every other year in the tire tracks, or deep-rooting cover crops are planted to help restore soil structure. ***AND*** Equipment use is avoided when soils are saturated.	**5**
In compacted areas, subsoiling is completed every two to three years. ***AND*** Equipment use is usually avoided when soils are saturated.	**3**

Compaction status is not known. ***AND*** Equipment is sometimes used when soil is saturated.	**1**
Compaction status is not known. ***AND*** Equipment is regularly used when soil is saturated.	**0**
COMMENTS:	
3.3 How is soil erosion addressed if evident?	**BMP rating**
No soil erosion is evident. **AND/OR** Straw mulch is applied in row middles and maintained throughout the growing season. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips). ***AND*** Buffer/filter strips are established around all water bodies, wetlands, and outlet ends of concentrated flow areas.	**5**
Other, explain	**3**
An annual cover crop is established in row middles. ***AND*** Where erosion is evident corrective measures are taken (e.g. grass waterway, diversions, filter strips), but some erosion is still evident. ***AND/OR*** No buffer/filter strips are established around any water bodies, wetlands, and outlet ends of concentrated flow areas.	**1**
No cover crop is established. ***AND/OR*** Erosion is evident and no corrective measures are taken.	**0**
COMMENTS:	
3.4 Is biodiversity of soil microorganisms considered when making soil management decisions?	**BMP rating**

A conscious effort is made to increase and diversify the soil microbial populations with 3 or 4 of the following methods: • Annual application of compost or other organic matter • Reduction in or elimination of preemergent herbicide use • Avoiding the overuse of postemergent herbicides	**5**
At least 2 of the bulleted points listed above are used to benefit soil microbial populations.	**3**
One of the bulleted points listed above are used to benefit soil microbial populations.	**1**
No effort is made to improve soil microbiology.	**0**
COMMENTS:	

4. Nutrient Management for Established Plantings

4.1 Are fertilizer applications based on leaf tissue analysis and soil tests?	**BMP rating**
Leaf tissue tests are performed annually, soil tests are performed every 3 years and both are used to guide fertilizer applications.	**5**
A leaf tissue test only if performed once in 3 years and used to modify fertilizer program if indicated.	**3**
A soil test only is performed once in 3 years and used to modify fertilizer program if indicated.	**1**
No soil or tissue tests are performed on established plantings.	**0**
COMMENTS:	

4.2 Are Nitrogen applications made to avoid excessive spring foliage growth which can increase disease and pest problems?	**BMP rating**

Half the annual Nitrogen fertilizer (as determined by tissue analysis the previous year) is applied at 3" to 5" shoot growth. **AND** The second half of annual Nitrogen fertilizer is applied at bloom (no N-fertilization takes place after early July). **OR** Nitrogen fertilization is provided from slow release sources such as aged compost using application rates calculated to avoid Nitrogen over-fertilization.	**5**
The full annual Nitrogen fertilization (as determined by tissue analysis the previous year) is applied as a soluble fertilizer in a single application 3" – 5" shoot growth.	**3**
Other, explain	**1**
A standard amount of Nitrogen fertilization (not determined by tissue analysis) is applied in a single application without regard to avoiding late season timing.	**0**
COMMENTS:	

5. Plant Culture, pruning and Irrigation Practices

5.1 Is the planting pattern designed to optimize air circulation and drying conditions for foliage and fruit?	**BMP rating**
Rows are spaced to allow for at least 3 ft. of open space between fully grown row canopies. **AND** Rows are oriented with prevailing winds for optimal drying conditions	**5**
Rows are spaced to allow for at least 3 ft. of open space between fully grown row canopies. **BUT** Row are not oriented with prevailing winds for optimal drying conditions	**3**
Other - explain	**1**
Rows are spaced to allow for less than 3 ft. of open space between fully grown row canopies. **AND** Row are not oriented with prevailing winds for optimal drying conditions	**0**
COMMENTS:	

5.2 Grape rows are pruned for overall plant health and productivity?	**BMP rating**
Pruning takes place in late winter/early spring to remove previous season's growth leaving the appropriate bud count for each variety for balanced vigor (http://ohioline.osu.edu/b919/0008.html) **and** to allow for good air circulation, light penetration and to remove diseased, insect infested or damaged canes from the vines.	**5**
Pruning takes place in late winter/early spring to remove previous season's growth without concern for vine balance but to allow for good air circulation and light penetration and to remove diseased, insect infested or damaged canes from the vines.	**3**
Other, explain	**1**
Pruning takes place anytime in the dormant season without concern for balanced vigor or removal of overwintering insects or disease inoculum.	**0**
COMMENTS:	

5.3 Is irrigation supplied to plant rows?	**BMP rating**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development. **AND** A water use plan is used which minimizes disease development, optimizes water use efficiency, and minimizes erosion and run-off.	**5**
Drip irrigation is supplied to plant rows to deliver water when needed for plant growth and fruit development.	**3**
Overhead irrigation is supplied to plant rows for to deliver water when needed for plant growth and fruit development.	**1**
No irrigation is supplied to plant rows.	**0**
COMMENTS:	

6. Pesticides Application and Records

- *Only pesticides approved and registered for use in grapes in the Massachusetts are used.*
- *Pesticide drift is minimized.*
- *Re-entry and pre-harvest intervals are adhered to.*

6.1 Is the Insecticide/fungicide sprayer is calibrated regularly?	**BMP rating**
The insecticide/fungicide sprayer is calibrated before the start of the season following an established protocol. **AND** Insecticide/fungicide sprayer is recalibrated at least once midway through the growing season.	**5**
Other, explain	**3**
The insecticide/fungicide sprayer is calibrated before the start of the season.	**1**
The insecticide/fungicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.2 Is the herbicide sprayer is calibrated regularly?	**BMP rating**
The herbicide sprayer is calibrated before the start of the growing season following an established protocol. **AND** The herbicide sprayer is recalibrated midway through the growing season.	**5**
Other, explain	**3**
The herbicide sprayer is calibrated before the start of the growing season.	**1**
The herbicide sprayer is not calibrated regularly.	**0**
COMMENTS:	

6.3 Are spray records are maintained and organized?	**BMP rating**

Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracGrape (www.nysipm.cornell.edu/trac/about/about_grape.asp) or similar software. **AND** Win-PST analysis (http://www.wsi.nrcs.usda.gov/products/W2Q/pest/winpst.html) is conducted for all pesticides considered for use on the farm.	**5**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated using TracGrape (www.nysipm.cornell.edu/trac/about/about_grape.asp) or similar software.	**3**
Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated in paper files and not electronically or by using published software.	**1**
Records of pesticide applications are kept, but are incomplete and not well organized.	**0**
COMMENTS:	

6.4 Are Worker Protection Standards being followed?	**BMP rating**
All workers receive required WPS training **AND** All WPS requirements are implemented(e.g., signage, wash stations, etc.)	**5**
All workers receive required WPS training **AND** Most WPS requirements are implemented (e.g., signage, wash stations, etc.)	**3**
Most workers receive required WPS training **AND** Most WPS requirements are implemented(e.g., signage, wash stations, etc.)	**1**
Some workers receive required WPS training **AND** Some WPS requirements are implemented	**0**
COMMENTS:	

6.5 Does the pesticide applicator have and maintain a pesticide applicators license?	**BMP rating**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** Is the only individual who mixes, loads and applies pesticides (restricted use or general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**5**
The farm's pesticide applicator has the appropriate pesticide applicators license for the farm **AND** may occasionally supervise another individual who mixes, loads and applies pesticides (general use) on the farm **AND** maintains the necessary recertification credits annually to keep the license current	**3**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Only mixes, loads and applies general use pesticides on the farm	**1**
The farm's pesticide applicator does not have a pesticide applicators license **AND** Isn't sure if one is required for applying pesticides as needed on the farm	**0**
COMMENTS:	

7. Pest Management Practices

7.1 Is access to current pest information and recommendations maintained?	**BMP rating**

A resource library containing reliable pest identification and diagnostic information (e.g., Wine Grape Production Guide for Eastern North America, Pocket Guide for Grape IPM in the North Central and Eastern U.S.) is accessible (in print or electronically) on the farm to assist in identifying the cause of a problem. ***AND*** A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A current relevant newsletter subscription is maintained to stay abreast of new or emerging pest problems (*e.g., New England Grape Notes*). ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**5**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** A certified crop consultant is employed to help identify pest problems. ***AND*** Pesticide labels are read and understood thoroughly.	**3**
A current version of the *New England Small Fruit Pest Management Guide is on hand*. ***AND*** Pesticide labels are read and understood thoroughly.	**1**
Pest Management decisions are based solely on historical approaches ***AND*** No up-to-date management materials are maintained.	**0**
COMMENTS:	

7.2 Are pests monitored appropriately?	**BMP rating**
Currently recommended approaches to assess pest presence and potential for damage are used for all pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed	**5**
Currently recommended approaches to assess pest presence and potential for damage are used for most of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**3**

Currently recommended approaches to assess pest presence and potential for damage are used for a few of the pests. ***AND*** Recommended economic threshold levels (insects and weeds) or disease model recommendations are used to determine when to control measures are needed ***AND*** Other pests are controlled on a calendar basis.	**1**
No monitoring is done. ***AND*** Pest control is applied on a calendar basis.	**0**
COMMENTS:	
7.3 Are control measures selected appropriately?	**BMP rating**
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings) **AND** Selected to preserve beneficial organisms (e.g., predatory mites and other beneficials) whenever possible.	5
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible) **AND** Selected according to recommendations to alternate or rotate classes in order to lessen the risk of resistance development (see FRAC, IRAC, and HRAC listings)	3
Control measures are selected according to current recommendations **AND** Matched by efficacy for the target pests(s) and the severity of the problem (i.e., reduced risk materials used whenever possible)	1
Control measures are selected according to recommendations made by chemical salesman **AND** Widest target range **AND** Lowest cost	0

COMMENTS:

8. Continuing Education

8.1 Is/are the management decision-makers keeping up-to-date with Best Management Practices in commercial grape production?	BMP rating
The management decision maker(s) attend 3 or more viticulture related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Farm Winery & Growers Association, etc.). ***AND*** A current relevant newsletter subscription (*e.g., New England Grape Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**5**
The management decision maker(s) attend 3 or more viticulture related workshops, twilight meetings or conferences during the current year ***AND*** Is a member of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Farm Winery & Growers Association, etc.).	**3**
The management decision maker(s) are members of one of the relevant grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Farm Winery & Growers Association, etc.).	**1**
The management decision maker(s) don't attend any meetings ***OR*** Are members of any grower associations in New England (e.g., New England Vegetable and Berry Growers Association, Massachusetts Fruit Growers Association, Massachusetts Farm Winery & Growers Association, etc.). ***OR*** Subscribe to any newsletter subscription (*e.g., New England Grape Notes*) is maintained to stay abreast of relevant topics, new research findings, meeting dates, etc.	**0**

COMMENTS:

INTRODUCTION

These guidelines are not intended to be regulations and are not enforceable by any state or local agency

Poorly stored pesticides and improper mixing/loading practices can present a potential risk to our health and to the integrity of the environment. The quality of surface water, groundwater and soil can be degraded in areas where pesticides are stored under inappropriate conditions, improperly mixed and loaded into application tanks and where equipment is washed and rinsed after application. Accidents involving spills or leakages may have serious health and environmental consequences. Over the past several years, the Pesticide Bureau of the Department of Food and Agriculture (DFA) has received numerous phone calls from farmers, golf course superintendents and other pesticide users looking for guidance on building pesticide storage facilities. Questions concerning proper mixing and loading procedures have also been common. The purpose of this document is, very simply, to provide guidance to individuals looking for information on appropriate techniques and approaches for the mixing, loading and storage of pesticides. This document was prepared with input from written resources, individuals and organizations with a broad range of expertise and experience. It is a compilation of the best information available regarding the mixing, loading and storage of pesticides. The result is a solid body of guidance which represents a general consensus on how pesticide mixing, loading and storage issues should be approached. It is important to remember however that mixing, loading and storage needs will vary greatly from situation to situation and site to site. No document could specify exactly what approach should be taken in each situation. As such, it should be kept in mind that this document is intended as general guidance only. These are recommendations, not standards or regulations and as such can be adjusted to meet individual needs. These recommendations are designed to assist pesticide users in managing their storage areas and conduct their mixing/loading operations in ways that will help minimize exposure to pesticides and reduce the risks to public health and the environment. These are not intended to be regulations and are not enforceable by any state or local agency.

Storage

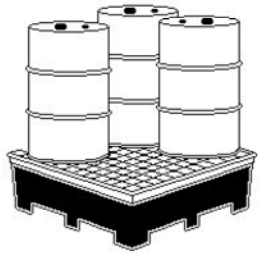
Safety is the key element in pesticide storage. The safest approach to any pesticide problem is to limit the amounts and types of pesticides stored. The amounts and types of pesticides stored should be maintained at the level that is immediately required and should not be stored beyond immediate needs.

Selecting a Storage Location

An existing or proposed area should be carefully evaluated to determine its suitability for pesticide handling and storage. In particular the potential harm to human health and the environment due to spills, contaminated runoff or fires should be assessed. If possible, the area should be located at least four hundred feet (preferably down hill or down gradient) from any public or private drinking water supplies and two hundred feet (preferably down hill or down gradient) from surface water. Separation from water resources should be greater in areas of sandy soil or fractured bedrock. Whenever feasible, the area should not be located in a 100 year floodplain. Runoff from adjacent areas resulting from a 25 year 24 hour storm should be diverted around the facility. The site location should be accessible in the event of an emergency situation. The pesticide storage area should be located away from direct sunlight, freezing temperatures and extreme heat.

The area should be located at least four hundred feet from any drinking water supply and two hundred feet from surface water

Temperatures in the storage area should be kept between 40F and 100F. Pesticides should not be stored outdoors. Where practical, the mixing/loading area should be located close to the storage facility to minimize the distance that chemicals are carried. Consideration should also be given to the additional area required by a mixing/loading pad when selecting the site for storage.



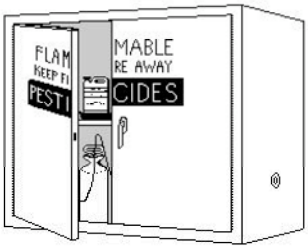
Storage Practices

Pesticide storage shall be restricted to a first story room or area which has direct access to the outside (according to the Board of Fire Prevention). Pesticides cannot be stored in basements. Pesticides should be stored in accordance with their label requirements in their original container with the label clearly visible. They should always be kept off the ground to prevent the accumulation of water in or under the containers. Separation of pesticides by hazard and function is essential. Flammable pesticides should be stored separately from non-flammable pesticides, in a fire proof cabinet for example. Dry pesticides should be stored separately from liquid pesticides to avoid wetting from spills. Fungicides, herbicides and insecticides should be stored in separate locations of the storage area to prevent cross contamination and accidental misuse. Pesticides should be stored away from fertilizer, food, feed, potable water supplies, veterinary supplies, seeds and personal protective equipment to avoid cross-contamination. Particular care should be taken if storing phenoxy herbicides due to their volatility. Pesticides shall not be stored in the same place as ammonium nitrate fertilizer (according to the Board of Fire Prevention). Exposure to sunlight can cause chemical breakdown. Pesticides should not be stored in front of windows, unless the windows are covered. Because shelf life is difficult to predict, pesticides should not be stored longer than two years.

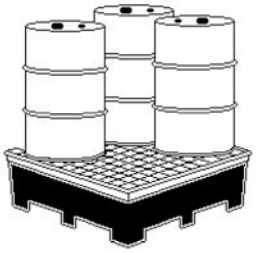
Pesticide storage shall be restricted to a first story room or area which has direct access to the outside. Pesticides cannot be stored in basements

Storage of Medium Quantities of Pesticides

(less than or equal to 500 lbs or 220 gallons)



Flammable pesticides should be stored separately from non-flammable pesticides in a fire proof cabinet

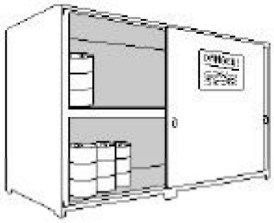


Storage Inside an Existing Building

For storage of medium quantities of pesticides inside an existing building, metal cabinets work well. Metal cabinets should be double walled and constructed with 18-gauge sheet metal. Steel cabinets for storing hazardous materials such as pesticides are available commercially in different dimensions of various capacities. Capacities range from one gallon cans to five gallon cans and fifty five gallon drums. Frequently, cabinets feature built in secondary containment systems such as deep, leak-proof sumps. Wooden cabinets can also be used but should be constructed from 1" thick exterior grade plywood and finished with a chemically resistant product that permits easy cleanup. Shelves can be wooden (if finished with a chemically resistant product) or metal. The door sill to the cabinets should be high enough -at least 5"- to contain up to 5 gallons of spilled liquid. The cabinets should be locked at all times and identified as a place of pesticide storage. The cabinets should be located along an outside wall in an area away from extreme heat or freezing. In the absence of cabinets, storage containers should be placed on impermeable shelves (steel or painted wood) with a lip to catch minor spills or leaks. Storing the containers in plastic leak proof trays to contain any leaks is recommended. Other options include spill containment pallets or floor pallets. Access should be unimpeded. Leaks should be detectable. If containers are in danger of leaking, they should be placed in an oversized plastic container or plastic lined (leak proof) cardboard box with vermiculite or other non flammable absorbent material for spill protection.

Storage of Large Quantities of Pesticides

(more than 500 lbs or 220 gallons)



For storage of large quantities of pesticides (more than 500 lbs or 220 gallons), use of a separate facility is a good idea. Two options for storing large quantities of pesticides should be considered where possible:

1) The acquisition of a Hazardous Materials Storage (HMS) Building

2) The construction of a new Pesticide Storage Facility.

(1) Hazardous Material Storage (HMS) Building

Free standing hazardous materials storage buildings composed of heavy duty steel frames with twelve gauge steel roof and walls are available commercially. The building should ideally have a two hour fire rating. They generally provide double stacking and vertical storage of fifty five gallon capacity drums. Secondary containment is achieved by means of sumps. Doors are self closing and can be locked. The walls have air vents or ventilation fans for improved circulation and relief of gaseous vapor build up. Generally the capacities of the HMS buildings vary from five to forty 55 gallon capacity drums.

(2) Construction of a New Pesticide Storage Facility

(general recommendations)

It is important to consult with an engineer or licensed contractor familiar with the state building code requirements before implementing any plan. Before construction begins, consult with local agencies that deal with planning, zoning, wetlands, health and fire. Areas used for the storage of pesticides shall be constructed in accordance with the Board of Fire Prevention Regulations (527 CMR 37.00), the State Building Code (780 CMR) and the BOCA Mechanical Codes (527 CMR 12.00 Appendix A). A properly designed storage area should be built with regard for worker safety and protection of the environment and public health. It should, at a minimum, facilitate the secure, dry storage of pesticides; safe working conditions for workers with easy access to worker Personal Protective Equipment; secondary containment of incidental spills due to normal mixing/ loading practices and secondary containment of large accidental spills.

Areas used for the storage or mixing of pesticides shall be constructed in accordance with the Board of Fire Prevention Regulations (527 CMR 37.00), the State Building Code (780 CMR) and the BOCA Mechanical Codes (527 CMR 12.00 Appendix A)

HOLLOW MASONRY DEFINITION

<75% solid cross section
or
>25% void

Hollow Masonry Block
Cored Brick
Block Tile

The storage facility shall be constructed in such a way that run-off from fire streams will not contaminate streams, ponds, groundwater, croplands or buildings

SOLID MASONRY DEFINITION

>75% solid cross-section
or
<25% void

Solid Masonry Brick
Solid Masonry Block
Clay Tile

Containment
The building should provide adequate within-building spill containment. In the event of an accident or major spillage, the building should be capable of containing 125% of the volume of the largest container. This can be achieved by surrounding the floor with a curb or by a grated trench which drains to a sump. If possible the floor should slope slightly to the center. A change in slope of, at most, 0.06 inches of drop per foot of run (0.5%) is advisable.

These measures will also prevent water or other liquids from seeping or flowing onto the storage area.

The storage facility shall be constructed in such a way that run-off from fire streams will not contaminate streams, ponds, groundwater, croplands or buildings.

Walls
The storage building should be separated as much as is reasonably possible from other use areas. The building should be designed to prevent against potential fires due to storage of flammable pesticides within the building and from fire in adjacent buildings. A fire wall slows the spread of fire from one area to another. It is recommended that a storage building with a 1-hour fire wall should be located at least fifty feet from other buildings. For a 2-hour fire wall, the set back distance should be twenty five feet. For a 4-hour fire wall, there is no minimum setback distance. The building should be accessible from all sides for emergency and fire fighting equipment.

Fire Rating	Wall Type	Wall Type	Wall Type
1 Hour Wall	3" Hollow Masonry	4" Solid Masonry	3" Solid Concrete
2 Hour Wall	4" Hollow Masonry	6" Solid Masonry	4" Solid Concrete
4 Hour Wall	6" Hollow Masonry	10" Solid Masonry	6" Solid Concrete

Gypsum wallboards of 5/8" thickness on both sides of the wall constitute a one hour rated firewall. Two gypsum wallboards on both sides are considered to be 2 hour fire rated fire walls.

The interior wall surfaces should be impervious to pesticides and easily cleaned. Suitable wall liners are painted steel, aluminum, fiberglass, or high density plastic reinforced plywood panels.

Doors
The doors should be windowless, steel (solid core), 36" wide, set in a steel frame and open to the outside.

Floors & Concrete Specifications
The storage building floors should be water tight, chemically impervious and skid resistant. Concrete floors with an impervious sealant or some other material of comparable strength and impermeability should be used. The following specifications should be used for concrete:

- Type I or Type II high quality cement with 5 - 7.5% air entrainment (this improves water tightness) and compressive strength of 4,000 - 4,500 psi;
- Water - cement ratio of 0.40-0.45 for a stiff (1.5" - 3") slump; a relatively dry mix for maximum strength, pesticide and fertilizer resistance, freeze/thaw resistance and water tightness;

Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete

While concrete is durable, it will deteriorate over time. Liquid fertilizers are the main cause of concrete deterioration. However, pesticides can contaminate concrete and leak through cracks into groundwater. Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete. Among the coatings commercially available are epoxies, urethanes, polyesters, vinyls, chlorosulfonated polyethylene, and polyureas. The appropriate type of coating will depend on the types of pesticides and fertilizers being stored and should be determined in consultation with a distributor.

Lighting
Lighting should be bright enough so that labels may be easily read. The lighting and fan should be turned on by the same switch.

Electrical Design
Electrical equipment and wiring should be designed to prevent sparks. The wires should be shielded. An exterior electrical service disconnect in a locked National Electric Manufacturers Association (NEMA) rated, weather proof box should be provided.

Temperature
Area temperatures should be kept below 100 deg F and above pesticide

freezing points. An electrical heater can be used to keep the temperature above 40 deg F during the winter. Open flames should never be used. Air conditioning may be needed during the summer to prevent the volatilization of pesticides, if this is likely to be a problem. If the storage area is outside, the area must be enclosed in order to protect against the elements, particularly precipitation, freezing temperatures. Outside storage is not recommended in Massachusetts.

For personal safety and protection, good air ventilation should be present at the facility

Ventilation design

For personal safety and protection, good air ventilation should be present at the facility. The area should have a continuously operating ventilation system sufficient to prevent the accumulation of vapors and to control temperature. Ventilation should be provided by means of fans. The fans should operate off the same switch as the lighting system. An air inlet should be located within 12" of the floor to facilitate the escape of heavier than air vapors. During occupancy, the ventilation system should provide 6 air changes/hour.

Bulk Containers

Storage containers and appurtenances such as valves, fittings, pipes and hoses, should be installed and maintained so as to prevent the discharge of liquid pesticides. As such they should be structurally sound, resistant to changes in temperature extremes and be constructed of materials that are resistant to corrosion, puncture or cracking. Stainless steel, fiberglass, polyethylene, and lined ferrous metal are acceptable. Valves on storage containers should be locked or otherwise secured except during times of authorized access.

Mixing and Loading Facilities

The mixing and loading of pesticides should not occur within four hundred feet of any private or public drinking water supply or two hundred feet of surface water

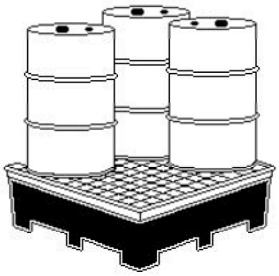
Contamination of soil, groundwater and surface water can result from small quantities of pesticides spilled regularly in areas where pesticides are mixed and loaded into applicator tanks and where equipment is washed and rinsed after application. Spills or overflows can lead to the accumulation of pesticides in the soil and drinking water supplies.

Mixing / Loading Location

Mixing and loading should be avoided in areas where a spill, a leak or overflow could allow pesticides to get into water systems. The mixing and loading of pesticides should not occur within four hundred feet of any private or public drinking water supply or two hundred feet of surface water. No pesticide application equipment or mix tank should be filled directly from any source waters unless a back siphon prevention device is present. Mixing and loading should not occur on gravel driveways or on other surfaces that allow spills to move quickly through the soil.

Mixing / Loading Practices

Mixing or loading of pesticides should be avoided in areas where a spill, leak or overflow could allow pesticides to get into water systems. All transfers of pesticides between containers, including mixing, loading and equipment cleaning, should be conducted over a spill containment surface designed to intercept, retain and recover spillage, leakage and wash water.



MIXING SAFELY

1. Wear the protective equipment.
2. Mix in a well ventilated area.
3. Pour pesticide down the side of the tank ..... this avoids splashing.
4. Make sure you have a solid footing while pouring.
5. Do your calculations prior to mixing.
6. Mix during daylight hours if possible.
7. Water supply should have a back flow prevention device - to prevent back flow into the water supply.
8. Water should be carefully added to the pesticide mix by pouring down the side of the tank.
9. Do not submerge the end of the water supply hose into the pesticide mix as it could back siphon.
10. Work in pairs.
11. Wash gloves before removing them.

Courtesy of Ward Management Company

Appropriate personal protective equipment (PPE) should be worn before opening a pesticide container. The label should be checked for Agricultural Use Restrictions. PPE should include front protection such as a bib top apron made of butyl, nitrile, or foil laminate material. A face shield, shielded safety glasses or goggles should be worn. When pouring any pesticide from its container, container and pesticide should be kept below face level. A respirator will ensure protection against dusts or vapors. The container should be closed after each use. A tank should never be left unattended while it is being filled. If the pesticide user should splash or spill pesticides on his person, he should stop the operation, wash thoroughly with a mild liquid detergent and water, put on clean PPE and clean up the spill.

Containment needs depend on the quantities of pesticides that are being mixed and loaded. If mixing small quantities, a tarpaulin can be sufficient to contain any spills. Spills can be then cleaned up with an absorbent material. If mixing large quantities regularly, the construction of a mixing/loading pad is an option to consider. The important point to keep in mind, whichever approach is used, is that incidental spills or accidental spills can be contained and cleaned up. If no spill containment is available, pesticides should be mixed in the field away from sensitive resources and in a different area each year.

Appropriate personal protective equipment (PPE) should be worn before opening a pesticide container

Containment needs can be achieved in one of three ways:

1) Mobile Containment Systems
2) Closed Mixing Systems
3) Construction of a Mixing/Loading pad

1.O Mobile Containment Systems

If mixing pesticides in granular formulations, loading over a tarpaulin that can contain any spillage of materials is adequate.

A recommended strategy is to use a mobile containment system. Mobile containment systems, such as a basin or pad of a chemically compatible construction material that contains spills are economical, flexible and efficient approaches to mixing and loading.

Several types of portable, temporary, synthetic drive-over mixing/loading pads are available commercially. Generally the pads are vinyl or nylon reinforced elastomer pads or steel pads and vary in size from 4 X 8 feet to 34 X 74 feet. Most have a flexible wall designed to be self-supporting. The material can be decontaminated. The pads are lightweight, easily deployed, durable and reusable.

The pad is rolled over a rock-free level surface. The sprayer is driven over the berm onto the pad. The spray material is loaded and the sprayer is driven off. Spillages are collected with a sump pump, squeegee, or sponge and mop. The spilled material can be collected and returned to the tank.

A sound option would be to haul water to the field or site and do all pesticide mixing onsite on a mobile pad. Sprayers and equipment could also be rinsed in the field to avoid concentrating residues from repeated rinsing near wells. The mixing site should change each year within the field of application.

Absorbent material such as re-usable gelling agents, vermiculite, clay, pet litter or activated charcoal should be on hand along with a garbage can and shovel to quickly contain and clean up any spills. The spilled pesticide should be contained - it should not be hosed down. Absorbing materials should be used to soak up the pesticide which can then be shoveled into a leak proof drum.

Areas used for storage or mixing of pesticides should be constructed in accordance with Board of Fire Prevention Regulations (527 CMR 37.00) , the State Building Code (780 CMR) and the BOCA Mechanical Codes (527 CMR 12.00 Appendix A)

2.0 Closed Mixing Systems

An excellent option is the use of a closed mixing system (CMS). A CMS transfers pesticides from sealed containers to mixing tanks without exposing the worker to the pesticides. The CMS can accurately measure quantities, rinse containers and transfer the mixed pesticide into applicator tanks. Using a CMS greatly reduces the hazards of exposure to concentrated pesticides.

3.0 Construction of a Mixing/ Loading Pad

It is important to consult with an engineer or licensed contractor familiar with the state building code requirements before implementing any plan. Before construction begins, consult with local agencies that deal with planning, zoning, wetlands, health and fire.

If pesticides are often mixed and loaded in the same place, or equipment is cleaned in the one spot, a permanent pesticide mixing/ loading pad is a sound option. Spill clean ups can be made easier, and pesticide waste can be reduced. They can also prevent the harm that spills and runoff can cause to the environment or to people. The area should be located at least four hundred feet (preferably down hill) from any public or private drinking water supplies and two hundred feet (preferably down hill) from surface water. It should not be located within any residential area or other sensitive area (such as feedlots, animal shelters, play areas, schools).

Design

The design of the pad should be a function of the operations performed at the site - the number and volume of different pesticides stored and applied, the rinsing procedures, the size of the spray boom- and also the weather conditions, especially the levels of precipitation and freezing conditions. The pad should be located adjacent to the storage area.

It is recommended that the pad be constructed of an impervious material such as sealed concrete. The pad should remain intact under freezing conditions. The following concrete specifications should be followed to ensure a water tight pad and good surface durability:

- Type I or Type II high quality cement with 5 - 7.5% air entrainment (this improves water tightness) and compressive strength of 4,000 - 4,500 psi;
- Water- cement ratio of 0.40-0.45 for a stiff (1.5" - 3") slump; a relatively dry mix for maximum strength, pesticide and fertilizer resistance, freeze/thaw resistance and water tightness;
- The subgrade (original ground) upon which the pad will be placed must be dense, uniform and relatively free draining to provide a good foundation for the concrete pad. If the subgrade is not adequate a sub-base material should be installed consisting of 4 inches of well compacted clean sand, gravel or sand and gravel mixture;
- The subgrade or sub-base should be moistened immediately prior to concrete placement to minimize shrinkage and cracking potential;
- Large coarse aggregate (1 to 1.5 inches) which permits a lower water content and reduces the potential for cracking should be used;
- Reinforcing steel should be placed two inches from the top of the pad. Reinforcing bars (supported #4 bars at 15 to 18 inch spacing) are superior to wire mesh for proper location of the steel in the slab and to allow workers to step between the bars. Reinforcing steel will keep shrinkage cracks closed if properly located;
- A high level of workmanship should be ensured during concrete placement and curing of the pad.

While concrete is durable, it will deteriorate over time. Pesticides can contaminate concrete and leak through cracks into groundwater. Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete

While concrete is durable, it will deteriorate over time. Pesticides can contaminate concrete and leak through cracks into groundwater. Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete. Among the coatings commercially available are epoxies, urethanes, polyesters, vinyls, chlorosulfonated polyethylene, and polyureas. The appropriate type of coating will depend on the types of pesticides being used and should be determined in consultation with a distributor.

Containment Volume
The total mixing / loading area containment volume should be 1.25 times the volume of the largest tank to be loaded in the area. If the area is not protected from contact with precipitation, the containment volume should be equal to the volume generated by a 2 year 24 hour storm (2.9 - 3.6 inches of rainfall). If the rainwater mixes with a single known pesticide or compatible pesticides (i.e., pesticides with at least one common use site on their labels) the mixture can be applied to the field at or below the label rate.

The pad should be curbed to a sufficient height in order to contain spills, leaks, releases or other discharges that are generated during the mixing and loading of pesticides and to prevent water or other liquids from flowing onto and off of the surface.

To avoid rainwater mixing with pesticides, it is recommended that the area be roofed. Roof overhangs should be at least a thirty degree angle from vertical from the edge of the mixing/loading pad in all directions. As an alternative to roof overhangs, heavy plastic strips or plastic sheeting can be installed to prevent rain from entering the pad.

To avoid rainwater mixing with pesticides, it is recommended that the area be roofed. Roof overhangs should be at least a thirty degree angle from vertical, from the edge of the mixing/loading pad in all directions

A well secured heavy tarpaulin can serve as a low cost alternative to a roof. Pads should be constructed with fastening points such as eye hooks to allow quick and secure anchoring of the tarp. It is recommended that a device to elevate the center of the tarp is placed under the tarp to allow rain water to drain off. A greenhouse frame covered with a three year co-polymer film can also be a low cost alternative to a roof. Greenhouse frames are available in widths of up to forty feet. Clean surface and roof water should be diverted away from the pad by a waterway.

Containment needs may be further met by constructing the pad in such a way that it slopes (at least 2%) to a single liquid tight sump.

Sump Designs
The pad should slope to a water tight sump or catch basin. The purpose of a sump is to collect the spilled material and facilitate its reuse. Collected rinsates should be pumped to an above ground holding tank or reservoir and reused for mixing subsequent loads. The sump pump should be capable of transferring the liquid to the holding tank from the sump at a rate equivalent to the fastest sump filling rate. The tanks should not be filled beyond 95% of their capacity to allow for thermal expansion and must be placed on a concrete or other impervious surfaced floor on pallets or on a raised platform to allow the detection of leaks from, or water in or under, the pesticide container.

A single sump can be placed monolithically with the mixing/loading pad or a precast concrete or prefabricated steel sump could be installed before the concrete pad is placed. Precast concrete sumps are built in a range of sizes with capacities up to 100 gallons. A double lined stainless steel sump allows the monitoring by inspection of potential leaks from the sump. Most have a capacity of thirty gallons.

The sump should be kept clean to avoid the creation of sludge due to dirt, mud, trash and rocks. Sludge is considered to be hazardous waste if contaminated by unknown or incompatible pesticides

The sump should be kept clean to avoid the creation of sludge due to dirt, mud, trash and rocks. Sludge is considered to be a hazardous waste if contaminated by unknown or incompatible pesticides. If the sludge is contaminated by only one pesticide or a compatible mix, the material can be applied to the land at or below the label rate. To reduce sludge problems in sumps where applicator vehicles are washed, some facilities may require two sumps in series. Sumps should be kept clean as contaminated soil and debris in sumps creates a serious hazardous waste disposal problem. In addition, the sump should be covered with a structural grate to ensure safety. The grate should be covered with a dust cover. The sump should be kept covered and cleaned out especially during spraying season.

Washing and Rinsing Operations
Washing and rinsing of pesticide residues from application equipment, mixing equipment or other items used in storing, handling or transporting pesticides should occur on the pad.

Protection of Water Supplies
No pesticide application equipment or mix tank should be filled directly from any source waters unless a back siphon prevention device is present.

Non-Liquid Pesticides
If non-liquid pesticides are mixed or loaded the spill containment surface may consist of a tarpaulin made of non-absorbent materials which is of adequate thickness to withstand all forseeable loading conditions.

Recommended Safety Practices

Pesticide Handling Instructions

Materials Safety Data Sheets for each pesticide should be posted in a prominent location. At a minimum the employer should have posted the product label and physical and health hazards associated with the pesticides being used. Agricultural enterprises are required by law to post the labels of the pesticides in use. The measures employees can take to protect themselves from these hazards, including safety precautions and protective work procedures, should be posted.

Emergency Response Plan

An emergency response plan should be developed. Such a plan lists actions to take and personnel to contact in the event of a spill or accident. The plan should begin with a current listing of the pesticides used or stored at the facility and should include the following information:

- Names and quantities of pesticides;
- Location of the property including a map with directions;
- Names, addresses and telephone numbers of the owner and key employees;
- Plan of the facility showing pesticides locations, flammable materials, electrical service, water supply, fuel storage tanks, fire hydrants, storm drains, and nearby wetlands, ponds, or streams;
- Location of emergency equipment supplies including breathing equipment and protective equipment;

Copies of the emergency response plan should be located near the entrance to the pesticide facility and with business records. Copies should also be given to the local police department and fire department.

Copies of the emergency response plan should be located near the entrance to the pesticide facility and with business records

Contacts should include the following: fire department; police; spill clean up firm; nearest hospital; pesticide bureau; board of health; owner of the facility;

The plan should be available in both English and the language or languages understood by workers if this is not English.

Fire Prevention

An automatic smoke detection system or smoke and heat detection system should be installed. The appropriate fire prevention and emergency procedures should be devised in consultation with the local fire department. Suitable methods for extinguishing fires should be installed, such as the

appropriate type and number of fire extinguishers. The number and placement of fire extinguishers should conform with the National Fire Protection Association Standard No. 10. All electrical fixtures and appliances should be non-sparking units approved for use in facilities storing flammable and combustible liquids.

In the event of a fire it is frequently more environmentally sound to allow the fire to burn itself out if it can be contained within the area. This avoids the likelihood of pesticides being released into the ground as a result of water being added.

Personal Safety

Personal protection equipment such as respirators, chemical resistant (CR) gloves, CR footwear, coveralls with long sleeves, protective eyewear, CR headgear, CR aprons and a first-aid kit should be available immediately outside the storage area. The first-aid kit should include the following items: adhesive strips, tape, ammonia inhalant, eye pads, burn cream, gauze bandages and tweezers. Gloves should be made of rubber, neoprene or other chemical resistant material.

It is essential that protective eyewear be worn when mixing/loading. The protective eyewear should consist of safety glasses that provide front, brow and temple protection, goggles or a face shield

It is essential that protective eyewear be worn during mixing/loading. The protective eyewear should consist of safety glasses that provide front, brow and temple protection, goggles or a face shield.

Workers should be instructed in the correct procedure for the removal of contaminated clothing.

Eye wash stations or portable eye wash bottles should be easily accessed by each person engaged in the operation and should be capable of flushing eyes for a minimum of fifteen minutes. At a minimum, a hose and nozzle should be on hand. Routine wash up facilities, equipped with soap, hand cleanser and single use paper towels should be available near the storage area.

Record Keeping

All discharges to the environment or spills should be recorded. The records should include the date and time of the incident and the cleanup.

Accident Response

An absorbent material such as re-usable gelling agents, vermiculite, clay, pet litter or activated charcoal should be on hand along with a garbage can and shovel to quickly contain and clean up any spills.

Security

The storage cabinets should be kept locked and the door to the storage area should contain a weather proof sign warning of the existence and danger of pesticides inside. The door should be kept locked. The sign should be visible at a distance of twenty five feet and should read as follows:

DANGER
PESTICIDE STORAGE AREA
ALL UNAUTHORIZED PERSONS KEEP OUT
KEEP DOORS LOCKED WHEN NOT IN USE

The storage cabinets should be kept locked and the door to the storage area should contain a weather proof sign warning of the existence and danger of pesticides inside

The sign should be posted in both English and the language or languages understood by workers if this is not English.

The following checklist should assist you in quickly assessing your facility

Pesticide Safety Checklist	Yes	No
GENERAL RECOMMENDATIONS		
Clean, neat pesticide storage site		
MSDS posted for each pesticide		
SAFETY		
Smoke detectors / detection system		
Appropriate numbers of fire extinguishers		
Personal Protection Equipment available outside storage area		
First Aid Kit		
Eye wash stations or portable eye wash bottles		
Wash up facilities		
ACCIDENT RESPONSE		
Emergency Response Plan with on-site pesticide inventory		
Posted emergency phone number		
Absorbent materials, shovel and bucket		
RECORD KEEPING		
Accurate storage log maintained		
All discharges to the environment recorded		
Inspection and maintenance records		
PESTICIDE CONTAINERS		
Insecticides, herbicides and fungicides separated		
Pesticides stored in original containers with purchase date and legible labels		
Pesticides stored off floor		
"No smoking" signs posted		
SECURITY		
Storage room posted with sign: Danger - Keep Out		
Storage site well lit and ventilated		
Storage Room locked		
Safety Equipment separated from pesticides		

Funding Options For Farmers

Environmental Quality Incentives Program (EQIP)

EQIP provides technical, education and financial assistance to eligible farmers to address soil, water and related natural resource concerns on their land in an environmentally beneficial and cost effective manner. The program provides assistance to farmers in complying with Federal, State and tribal environmental laws and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation. The purposes of the program are achieved through the implementation of a conservation plan which includes structural, vegetative and land management practices on eligible land. Five to ten year contracts are made to implement the plans with eligible producers. Cost share payments may be made to implement one or more eligible structures such as mixing, loading pads.

Contact: United States Department of Agriculture, Natural Resources Conservation Service, 451 West Street, Amherst, Massachusetts, 01002-4350. Telephone: 413-253-4350

United States Department of Agriculture, Natural Resources Conservation Service
451 West Street
Amherst,
MA 01002-2995
Tel: 413-253-4350

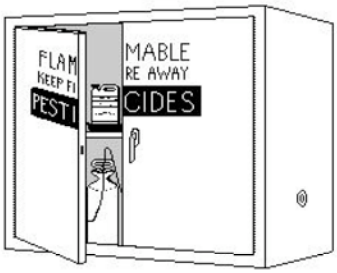
Agricultural Environmental Enhancement Program

Beginning in the winter of 1999, the Massachusetts Department of Food and Agriculture's new **Agricultural Environmental Enhancement Program** will grant $200,000 a year to farmers to purchase materials to protect water quality from the potential impacts of agricultural practices. Eligible materials include pesticide storage facilities and mixing/loading pads, fencing, culverts, seed and gutters.

Contact: Massachusetts Department of Food and Agriculture, 100 Cambridge Street, Boston, Massachusetts 02202. Telephone: (617)727-3000. Fax: (617)727-7235.

Massachusetts Department of Food and Agriculture
100 Cambridge Street,
Boston, MA 02202
Tel: 617-727-3000
Fax: 617-727-7235

Equipment Distributors



1) Grainger Industrial Supplies Inc.
54 New Market Square
Boston, MA 02118
www.grainger.com 888-WWG-4MASS

2) Safety Strategy
Manchester
MA, 01944 978-526-7715

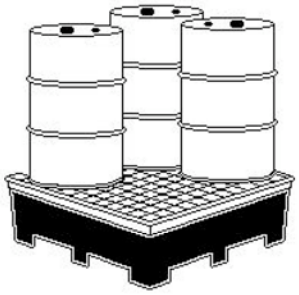
3) Albeco Fasterner & Supply Corp
44 Border St.
West Newton, MA 02465 617-965-8840

4) Environmental Equipment Systems
Division of Turf, Products Corp
157 Moody Rd.
Enfield, CT 06083 800-243-4355

5) Haz Mat Containment Corp. Inc
712 Bancroft Rd., No. 216
Walnut Creek, CA 94598 510-943-5250

6) Safety Storage, Inc.
2301 Bert Dr.
Hollister, CA 95023
www.safetystorage.com 408-637-7405

7) Global Occupational Safety
22 Harbor Park Dr.
Port Washington, NY 11050 800-433-4848



8) Eagle Manufacturing Company
2400 Charles St.
Wellsburg, WV 26070 304-737-3171

9) Hunter Agri-Sales
Box 2
Coatesville, IN 46121 317-539-4400

Acknowledgements

A great deal of the information in this document is drawn from the following document which is the definitive guide to pesticide storage, mixing and loading and is highly recommended.

Kammel, David W., Noyes, Ronald T., Riskowski, Gerald L., Hofman, Vernon L., 1991
Designing Facilities for Pesticides and Fertilizer Containment, First Edition, MWPS-37
MidWest Plan Service, Iowa State University, Ames, Iowa

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The Cape Cod Cranberry Growers Association
The New England Plant Protection Association
Massachusetts Department of Environmental Protection
United States Environmental Protection Agency
The Green Industry Alliance
Steve Ward of Ward Management Co. Inc.

The following publications were also used as reference guides

1) Ross, David S., Bartok, John W. 1995. On-Farm Agrichemical Handling Facilities
NRAES, CES, Ithaca

2) Conference Proceedings, National Symposium on Pesticides and Fertilizer Containment
Design and Management. MWPS-C1. 1992.
MidWest Plan Service, Iowa State University, Ames, Iowa

3) Dean, Thomas W., Ray A. Bucklin. 1995.
Permanently - Sited Storage Facilities in Florida
Florida Cooperative Extension Service

4) Storrs, CT. 1990
Pesticide Storage
Connecticut Extension System

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United States Environmental Protection Agency

How To Comply With the Worker Protection Standard For Agricultural Pesticides

What Employers Need To Know

Revised September 2005
Reprinted June 2006

THE IMPORTANCE OF THIS MANUAL

Regulatory agencies will enforce the requirements of the federal Worker Protection Standard (Code of Federal Regulations, Title 40, Part 170) when you use a pesticide product with labeling that refers to the Worker Protection Standard. If you do not comply with the Worker Protection Standard requirements, you will be in violation of federal law, since it is illegal to use a pesticide product in a manner inconsistent with its labeling. This manual provides information to help you comply with the requirements of the federal Worker Protection Standard (WPS) for agricultural pesticides, 40 CFR part 170, as published in 1992 and as amended in 1995, 1996, and 2004. EPA may issue additional guidance about the Worker Protection Standard and the Worker Protection Standard may be amended in the future. Check with your state or tribal agency responsible for pesticides for further information and updates.

This 2005 updated *Worker Protection Standard for Agricultural Pesticides — How To Comply Manual*, EPA 735-B-05-002 supersedes the 1993 version, EPA 735-B-93-001. Changes to the Worker Protection Standard have made the 1993 version obsolete and its continued use may lead an employer to be out of compliance with this regulation.

Additional Worker Protection Requirements in Your Area

Some states, tribes, or local governments with jurisdiction over pesticide enforcement may have additional worker protection requirements beyond the requirements described in the federal manual. Check with these agencies to obtain the information you need to comply with all applicable state, tribal, or local requirements.

Reproduction of the Manual

This manual may be reproduced, but if this manual is altered it may no longer provide the information to help employers comply with the requirements of the federal Worker Protection Standard.

Material Appended to the Manual

States, tribes, or local governments with jurisdiction over pesticide enforcement may elect to append additional worker protection requirements to the federal manual. These additions may only be appended at the end of the federal manual, after the index. Any additional material should be clearly identified as state, tribal, or local requirements.

WHO NEEDS TO READ THIS MANUAL?

You probably need to comply with the WPS if you are a:

- **Manager or owner** of a farm, forest, nursery, or greenhouse, ***or***
- **Labor contractor** for a farm, forest, nursery, or greenhouse, ***or***
- **Custom (for-hire) pesticide applicator** or **independent crop consultant** hired by a farm, forest, nursery, or greenhouse operator.

Most WPS provisions are protections that you as an **employer** must provide to **your own employees** and, in some instances, to **yourself**. The WPS covers two types of employers, which it defines according to the type of work their employees do:

Worker employer — If you hire or contract for people to do agricultural worker tasks, or if you do them yourself, the WPS considers you a worker employer. In general, agricultural workers are persons who (1) do hand labor tasks, such as weeding, planting, cultivating, and harvesting, or (2) do other tasks involved in the production of agricultural plants, such as moving or operating irrigation equipment (see p. 10 for complete definition). Units 3 and 4 of this manual describe the WPS protections you must provide to the agricultural workers you employ.

Handler employer — If you hire people to do pesticide handling tasks, or if you do them yourself, the WPS considers you a handler employer. In general, pesticide handlers are persons who mix, load, apply, or do other tasks that bring them into direct contact with pesticides (see p. 10 for complete definition). You must provide WPS protections to all your pesticide handler employees, whether or not they are certified as applicators of restricted-use pesticides. Units 3 and 5 of this manual describe the WPS protections you must provide to the pesticide handlers you employ.

- *The same employee may be a worker at some times and a handler at other times, depending on the type of task being performed.*
- *You may be both a handler employer and a worker employer, depending on the tasks that you and your employees do.*
- *Both general-use pesticides and restricted-use pesticides are covered by the WPS.*

ABOUT THIS MANUAL

This "How To Comply" manual will:

- Help you determine whether you are covered by the WPS,
- Give you detailed information on how to comply with the WPS requirements, including exceptions, restrictions, exemptions, options, and examples, and
- Provide you with a "Quick Reference Guide" — a simplified route to compliance that focuses on **maximum** requirements.

Important definitions and other special explanations are enclosed in shaded boxes. Reading them will help you better understand the WPS requirements and how they apply to you.

LABELING OVERRIDES WPS

If the pesticide product labeling contains specific instructions or requirements that conflict with the requirements of the Worker Protection Standard, **follow the instructions or requirements on the labeling**. For example, some pesticide labeling may:

- Prohibit any early-entry activity, including short-term and emergency tasks.
- Allow an early-entry activity that the WPS does not allow.
- Require the use of personal protective equipment even if closed systems are used for mixing and loading.

EXCEPTIONS TO LABELING STATEMENTS

The WPS allows certain exceptions to three specific pesticide labeling requirements: **personal protective equipment (p. 62)**, **restricted-entry intervals (p. 36)**, and **double notification (p. 33)** (the requirement on some labeling for both oral warnings **and** posting treated areas). The WPS statements in the Agricultural Use Requirements box on the product labeling will tell you that the WPS contains these exceptions.

Entry during a restricted-entry interval is permitted only in a few strictly limited circumstances; see Early Entry, p. 47

For more information about the Worker Protection Standard, or if you have questions or concerns about pesticides, contact the agency responsible for regulating pesticides in your area or the EPA Regional Office nearest you.

EPA Headquarters
EPA Office of Pesticide Programs
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460
www.epa.gov/pesticides

EPA National Agriculture Compliance Assistance Center
901 North 5th Street
Kansas City, KS 66101
(888) 663-2155
www.epa.gov/agriculture

EPA Office of Compliance
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460
(202) 564-2280
www.epa.gov/compliance

EPA Regions
Region 1 (MA, CT, RI, NH, VT, ME)
U.S. Environmental Protection Agency, Region 1
Pesticides Program (CPT)
Office of Ecosystem Protection
1 Congress St., Suite 1100
Boston, MA 02114-2023
(888) 372-7341
www.epa.gov/NE/eco/pest/

Region 2 (NY, NJ, PR, VI)
U.S. Environmental Protection Agency, Region 2
Pesticide Team
MS-500
2890 Woodbridge Ave., Building #5
Edison, NJ 08837
(908) 321-6769
www.epa.gov/pesticides/local/region2/index.htm

Region 3 (PA, MD, VA, WV, DE)
U.S. Environmental Protection Agency, Region 3
Waste and Chemicals Management Division
Mail Code 3WC00
1650 Arch St.
Philadelphia, PA 19103-2029
(800) 438-2474
www.epa.gov/reg3wcmd/pesticides.htm

Region 4 (GA, NC, SC, AL, MS, KY, FL, TN)
U.S. Environmental Protection Agency, Region 4
Pesticides Section
Sam Nunn Atlanta Federal Center
61 Forsyth St, SW
Atlanta, GA 30303-3104
(404) 562-8968
www.epa.gov/pesticides/local/region4/index.htm

Region 5 (IL, MI, MN, IN, OH, WI)
U.S. Environmental Protection Agency, Region 5
Pesticide Program Section (DT-8J)
77 West Jackson Blvd.
Chicago, IL 60604
(312) 353-2192
www.epa.gov/reg5rcra/ptb/pest/

Region 6 (TX, OK, AR, LA, NM)
U.S. Environmental Protection Agency, Region 6
Pesticides Program
6PD-P
1445 Ross Ave., Suite 1200
Dallas, TX 75202-2733
(800) 887-6063
www.epa.gov/earth1r6/6pd/pd p/pest.htm

Region 7 (MO, KS, IA, NE)
U.S. Environmental Protection Agency, Region 7
Pesticide Branch (PEST)
501 N. 5th St.
Kansas City, KS 66101
(913) 551-7033
www.epa.gov/Region7/pesticides/index.htm

Region 8 (CO, MT, ND, SD, UT, WY)
U.S. Environmental Protection Agency, Region 8
Pesticide Program (8P-P3T)
999 18th St., Suite 300
Denver, CO 80202-2466
(800) 227-8917
www.epa.gov/Region8/toxics_pesticides/pests/pesthome.html

Region 9 (CA, NV, AZ, HI, GU)
U.S. Environmental Protection Agency, Region 9
Pesticides Section (CED-5)
75 Hawthorne St.
San Francisco, CA 94105
(415) 947-8704
www.epa.gov/pesticides/local/region9/index.htm

Region 10 (WA, OR, ID, AK)
U.S. Environmental Protection Agency, Region 10
Pesticides Unit (ECO-084)
1200 Sixth Ave.
Seattle, WA 98101-1128
(206) 553-1918
yosemite.epa.gov/R10/ECOCOMM.NSF/webpage/Pesticides

Helpful Web Sites

EPA Office of Pesticide Programs Worker Protection Standard page:
www.epa.gov/oppfead1/safety/workers/workers.htm

EPA Office of Pesticide Programs Agricultural Worker Protection Standard 40 CFR Parts 156 & 170 Interpretive Policy Questions and Answers
www.epa.gov/pesticides/safety/workers/wpsinterpolicy.htm

EPA Ag Center Worker Protection Standard page:
www.epa.gov/agriculture/twor.html

EPA Ag Center Worker Protection Standard publications page:
www.epa.gov/agriculture/awor.html

Directory of State Regulators
aapco.ceris.purdue.edu/htm/directories.htm

State Pesticide Educators Directory
www.ipmcenters.org/contacts/PSEPdirectory.cfm

June 2006

United States Environmental Protection Agency

How To Comply With the Worker Protection Standard For Agricultural Pesticides

What Employers Need To Know

- Farms
- Forests
- Nurseries
- Greenhouses

CONTENTS

Unit 1 — Quick Reference Guide 1
Unit 2 — An Introduction to the Worker Protection Standard 5
What Is The Worker Protection Standard? 7
Does the Worker Protection Standard Apply to You? 9
Who Does the WPS Protect? 10
Which Pesticide Uses Are Covered? 12
Which Pesticide Uses Are Not Covered? 13
Who Must Protect Workers and Handlers? 14
Unit 3 — What Employers Must Do for Both Workers and Handlers ... 17
Information at a Central Location 19
Pesticide Safety Training 21
Decontamination Supplies 24
Employer Information Exchange 26
Emergency Assistance 27
Unit 4 — Further Requirements for Employers of Workers 29
Part A – Protections for All Agricultural Workers 31
Notice About Applications 33
Restrictions During and After Applications 36
Part B – Special Application Restrictions in Nurseries and Greenhouses 39
Special Application Restrictions in Nurseries 41
Special Application Restrictions in Greenhouses 43
Part C – Early Entry 45
Early-Entry Work Situations 47
General Protections for Early-Entry Workers 52
Training and Instructions for Early-Entry Workers 53
Decontamination Supplies for Early-Entry Workers 54
Personal Protective Equipment for Early-Entry Workers 56
UNIT 5—Further Requirements for Employers of Handlers 57
Restrictions During Applications and Monitoring Handlers 59
Specific Instructions for Handlers 60

Equipment Safety 61
Personal Protective Equipment (PPE) 62
Exceptions to PPE Requirements 66
Unit 6 — Owner Exemptions and Crop Advisors 69
Agricultural Owner Exemptions 71
Protections for Crop Advisors 74
APPENDIX A — Criteria for WPS Materials 81
APPENDIX B — Sample Forms, Fact Sheets and Checklists 91
Appendix C — Quick Reference Guide to the Worker Protection Standard 117
Index 125

UNIT 1
QUICK REFERENCE GUIDE

This 2-page Quick Reference Guide to the Worker Protection Standard lists the *maximum* WPS requirements. Fulfilling these maximum requirements help you comply, but it may cause you to do more than is required in some situations. If you want to look at exceptions or want more information or examples for certain provisions, refer to the page numbers listed in the Quick Reference Guide.

The Guide in this unit is presented on 2 pages to allow you to view all the requirements together. For a large-print version of the same text, see Appendix C.

QUICK REFERENCE GUIDE TO THE WORKER PROTECTION STANDARD (WPS) INCLUDING ALL REVISIONS THROUGH 2004

The WPS is a federal regulation designed to protect **agricultural workers** (people involved in the production of agricultural plants) and **pesticide handlers** (people mixing, loading, or applying pesticides or doing other tasks involving direct contact with pesticides) (see p. 10). The guide on these two pages presents the *maximum* WPS requirements. It does not include exceptions that may permit you to do less or options that may involve different requirements. Each section below lists pages in this manual where you can find out about exceptions and options. For more information about your responsibilities, read pp. 9-15. There are some exemptions for owners of agricultural establishments and members of their immediate family (pp. 71-73).

DUTIES FOR *ALL* EMPLOYERS

Anti-Retaliation ..... (p. 15)
Do not retaliate against a worker or handler who attempts to comply with the WPS

Information at a Central Location ..... (pp. 19-20)
1. In an easily seen central location on each agricultural establishment, display close together:
   - EPA WPS safety poster,
   - name, address, and telephone number of the nearest emergency medical facility,
   - these facts about each pesticide application [from before each application begins until 30 days after the restricted-entry interval (REI)]:
     - product name, EPA registration number, and active ingredient(s),
     - location and description of treated area,
     - time and date of application, and REI.

2. Tell workers and handlers where the information is posted, and allow them access.
3. Tell them if emergency facility information changes and update the posted information.
4. Keep the posted information legible.

Pesticide Safety Training ..... (pp. 21-23)
Unless they possess a valid EPA-approved training card, train **handlers and workers** before they begin work and at least once each 5 years:
- use written and/or audiovisual materials,
- use EPA WPS handler training materials for training handlers,
- use EPA WPS worker training materials for training workers,
- have a certified applicator conduct the training orally and/or audiovisually in a manner the employees can understand, using easily understood terms, and respond to questions.

Decontamination Supplies ..... (pp. 24-25)
1. Establish accessible decontamination supplies located together within 1/4 mile of all workers and handlers. Supply:
   - enough water for routine and emergency whole-body washing and for eyeflushing,
   - plenty of soap and single-use towels,
   - a clean coverall.

2. Provide water that is safe and cool enough for washing, for eyeflushing, and for drinking. Do not use tank-stored water that is also used for mixing pesticides.
3. Provide **handlers** the same supplies where personal protective equipment (PPE) is removed at the end of a task.
4. Provide the same supplies at each mixing and loading site.
5. Make at least 1 pint eyeflush water immediately accessible to each **handler**.
6. Do not put **worker** decontamination supplies in areas being treated or under an REI.
7. In areas being treated, put decontamination supplies for **handlers** in enclosed containers.

Employer Information Exchange ..... (p. 26)
1. Before any application, commercial handler employers must make sure the operator of the agricultural establishment where a pesticide will be applied is aware of:
   - location and description of area to be treated,
   - time and date of application,
   - product name, EPA registration number, active ingredient(s), and REI,
   - whether the product label requires both oral warnings and treated area posting,
   - all other safety requirements on labeling for workers or other people.

2. Operators of agricultural establishments must make sure any commercial pesticide establishment operator they hire is aware of:
   - specific location and description of all areas on the agricultural establishment where pesticides will be applied or where an REI will be in effect while the commercial handler is on the establishment,
   - restrictions on entering those areas.

Emergency Assistance ..... (p. 27)
When any handler or worker may have been poisoned or injured by pesticides:
1. Promptly make transportation available to an appropriate medical facility.
2. Promptly provide to the victim and to medical personnel:
   - product name, EPA registration number, and active ingredient(s),
   - all first aid and medical information from label,
   - description of how the pesticide was used,
   - information about victim's exposure.

ADDITIONAL DUTIES FOR WORKER EMPLOYERS

Restrictions During Applications (p. 36)
1. In areas being treated with pesticides, allow entry only to appropriately trained and equipped handlers.
2. Keep nursery workers at least 100 feet away from nursery areas being treated.
3. Allow only handlers to be in a greenhouse:
   - during a pesticide application,
   - until labeling-listed air concentration level is met or, if no such level, until after 2 hours of ventilation with fans.

(Also see nursery restrictions and greenhouse restrictions) (pp 41-42, 43-45)

Restricted-Entry Intervals (REIs) (p. 36)
During any REI, do not allow **workers** to enter a treated area and contact anything treated with the pesticide to which the REI applies.
(Also see early entry by workers) (pp. 36-37, 47-56)

Notice About Applications (p. 33)
1. Orally warn workers **and** post treated areas if the pesticide labeling requires.
2. Otherwise, **either** orally warn workers or post entrances to treated areas. Tell workers which method is in effect.
3. Post all greenhouse applications.

Posted Warning Signs (p. 33)
1. Post legible 14" x 16" WPS-design signs just before application; keep posted during REI; remove before workers enter and within 3 days after the end of the REI.
2. Post signs so they can be seen at all entrances to treated areas, including entrances from labor camps.

Oral Warnings (p. 35)
1. Before each application, tell workers who are on the establishment (in a manner they can understand):
   - location and description of treated area,
   - REI, and not to enter during REI.
2. Workers who enter the establishment after application starts must receive the same warning at the start of their work period.

ADDITIONAL DUTIES FOR HANDLER EMPLOYERS

Application Restrictions and Monitoring ..... (p. 59)
1. Do not allow handlers to apply a pesticide so that it contacts, directly or through drift, anyone other than trained and PPE-equipped handlers.
2. Make sight or voice contact at least every 2 hours with anyone handling pesticides labeled with a skull and crossbones.
3. Make sure a trained handler equipped with labeling-specified PPE maintains constant voice or visual contact with any handler in a greenhouse who is doing fumigant-related tasks, such as application or air-level monitoring.

Specific Instructions for Handlers ..... (p. 60)
1. Before handlers do any handling task, inform them, in a manner they can understand, of all pesticide labeling instructions for safe use.
2. Keep pesticide labeling accessible to each handler during entire handling task.
3. Before handlers use any assigned handling equipment, tell them how to use it safely.
4. When commercial handlers will be on an agricultural establishment, inform them beforehand of:
   - areas on the establishment where pesticides will be applied or where an REI will be in effect,
   - restrictions on entering those areas.

(The agricultural establishment operator must give you these facts.)

Equipment Safety ..... (p. 61)
1. Inspect pesticide handling equipment before each use, and repair or replace as needed.
2. Allow only appropriately trained and equipped handlers to repair, clean, or adjust pesticide equipment that contains pesticides or residues.

Personal Protective Equipment (PPE) ..... (pp. 62-65)
(See exceptions to PPE) (pp. 66-67)

Duties Related to PPE ..... (p. 62)
1. Provide handlers with the PPE the pesticide labeling requires for the task, and be sure it is:
   - clean and in operating condition,
   - worn and used correctly,
   - inspected before each day of use,
   - repaired or replaced as needed.
2. Be sure respirators fit correctly.
3. Take steps to avoid heat illness.
4. Provide handlers a pesticide-free area for:
   - storing personal clothing not in use,
   - putting on PPE at start of task,
   - taking off PPE at end of task.
5. Do not allow used PPE to be worn home or taken home.

Care of PPE ..... (p. 62)
1. Store and wash used PPE separately from other clothing and laundry.
2. If PPE will be reused, clean it before each day of reuse, according to the instructions from the PPE manufacturer unless the pesticide labeling specifies other requirements. If there are no other instructions, wash in detergent and hot water.
3. Dry the clean PPE before storing, or hang to dry.
4. Store clean PPE away from other clothing and away from pesticide areas.

Replacing Respirator Purifying Elements ..... (p. 63)
1. Replace dust/mist filters:
   - when breathing becomes difficult,
   - when filter is damaged or torn,
   - when respirator label or pesticide label requires (whichever is shorter), ***or***
   - at the end of day's work period, in the absence of any other instructions or indications.
2. Replace vapor-removing cartridges/canisters:
   - when odor/taste/irritation is noticed,
   - when respirator label or pesticide label requires (whichever is shorter), ***or***
   - at the end of day's work period, in the absence of any other instructions or indications.

Disposal of PPE ..... (p. 63)
1. Discard coveralls and other absorbent materials that are heavily contaminated with undiluted pesticide having a "DANGER" or "WARNING" signal word.
2. Follow federal, state, and local laws when disposing of PPE that cannot be cleaned correctly.

Instructions for People Who Clean PPE ..... (p. 63)
Inform people who clean or launder PPE:
   - that PPE may be contaminated with pesticides,
   - of the potentially harmful effects of exposure to pesticides,
   - how to protect themselves when handling PPE,
   - how to clean PPE correctly.

UNIT 2

AN INTRODUCTION TO THE WORKER PROTECTION STANDARD

What Is the Worker Protection Standard? 7

Does the Worker Protection Standard Apply to You? 9

Who Does the WPS Protect? 10

Which Pesticide Uses Are Covered? 12

Which Pesticide Uses Are Not Covered? 13

Who Must Protect Workers and Handlers? 14

WHAT IS THE WORKER PROTECTION STANDARD?

The Worker Protection Standard (WPS) is a regulation issued by the U.S. Environmental Protection Agency. It covers pesticides that are used in the production of agricultural plants on farms, forests, nurseries, and greenhouses. The WPS requires you to take steps to reduce the risk of pesticide-related illness and injury if you (1) use such pesticides, or (2) employ workers or pesticide handlers who are exposed to such pesticides.

If you are an agricultural pesticide user and/or an employer of agricultural workers or pesticide handlers, the WPS requires you to provide to your employees and, in some cases, to yourself and to others:

- information about exposure to pesticides,
- protections against exposures to pesticides, and
- ways to mitigate exposures to pesticides.

INFORMATION

To ensure that employees will be informed about exposure to pesticides, the WPS requires:

- **Pesticide safety training** — for workers and handlers,
- **Pesticide safety poster** — to be displayed for workers and handlers,
- **Access to labeling information** — for pesticide handlers and early-entry workers, and
- **Access to specific information** — centrally located application information of pesticide treatments on the establishment.

PROTECTION

To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to:

- **prohibit handlers from applying a pesticide in a way that will expose workers or other persons**,
- **exclude workers from areas being treated** with pesticides,
- **exclude workers from areas that remain under a restricted-entry interval (REI)**, with narrow exceptions.
- **protect early-entry workers** who are doing permitted tasks in treated areas during an REI, including special instructions and duties related to correct use of PPE,
- **notify workers** about treated areas so they can avoid inadvertent exposures, and
- **protect handlers during handling tasks**, including monitoring while handling highly toxic pesticides, and duties related to correct use of PPE.

MITIGATION

To mitigate pesticide exposures that employees receive, the WPS requires:

- **Decontamination supplies** — providing handlers and workers an ample supply of water, soap, and towels for routine washing and emergency decontamination,
- **Emergency assistance** — making transportation available to a medical care facility if an agricultural worker or handler may have been poisoned or injured by a pesticide, and providing information about the pesticide(s) to which the person may have been exposed.

These key terms have very specific meanings in the WPS. Note that these definitions may be different from definitions found in other state and federal laws and regulations.

Terms You Need to Know

These definitions will help you determine whether you are affected by the Worker Protection Standard.

Agricultural plants: Plants grown or maintained for commercial or research purposes. Examples: food, feed, and fiber plants, trees, turfgrass, flowers, shrubs, ornamentals, and seedlings.

Farms: Operations, other than nurseries or forests, that produce agricultural plants outdoors.

Forests: Operations that produce agricultural plants outdoors for wood fiber or timber products.

Greenhouses: Operations that produce agricultural plants indoors in an area that is enclosed with nonporous covering and that is large enough to allow a person to enter. Examples: polyhouses, mushroom houses and caves, and rhubarb houses, as well as traditional greenhouses. Malls, atriums, conservatories, arboretums, and office buildings that grow or maintain plants primarily for decorative or environmental benefits are **not** included.

Nurseries: Operations that produce agricultural plants outdoors for:

- transplants to another location, or
- flower or fern cuttings.

Examples: flowering and foliage plants or trees; tree seedlings; live Christmas trees; vegetable, fruit, and ornamental transplants; and turfgrass produced for sod.

DOES THE WORKER PROTECTION STANDARD APPLY TO YOU?

You need the information in this manual if:

- **You own or manage a farm, forest, nursery, or greenhouse where pesticides are used in the production of agricultural plants**.

Even if you are the owner of the farm, forest, nursery, or greenhouse and you or members of your family do all the work there, you are a "WPS employer." You must comply with ***some*** of the requirements described in this manual, such as restricted-entry intervals and personal protective equipment, and ***all*** the specific requirements listed in the pesticide labeling. See Agricultural Owner Exemptions, pp. 71-73.

- **You hire or contract for the services of agricultural workers** to do tasks related to the production of agricultural plants on a farm, forest, nursery, or greenhouse. This includes labor contractors and others who contract with growers to supply agricultural laborers.
- **You operate a business in which you (or people you employ) apply pesticides** that are used for the production of agricultural plants on any farm, forest, nursery, or greenhouse.

Commercial pesticide handlers and their employees are included with respect to such pesticides even if the pesticide handling task (mixing, loading, disposal, etc.) takes place somewhere other than the farm, forest, nursery, or greenhouse — at the commercial handling establishment or an airport hangar, for example.

- **You operate a business in which you (or people you employ) perform tasks as a crop advisor** on any farm, forest, nursery, or greenhouse.

"Crop advisor" means any person who is assessing pest numbers or damage, pesticide distribution, or the status, condition, or requirements of agricultural plants. Examples include crop consultants and scouts. For a description of WPS provisions for crop advisors, see pp. 74-80.

If you are in any of these categories, you must comply with the Environmental Protection Agency's Worker Protection Standard (40 CFR, part 170) including all revisions through 2004.

WHO DOES THE WPS PROTECT?

The WPS requires employers to take steps to protect two types of agricultural employees: **workers** and **pesticide handlers**. The terms "worker" and "pesticide handler" are defined very specifically in the WPS, and employers of persons who meet these definitions must comply with the WPS. Depending on the tasks being performed, you may need to provide the same employee with worker protections on some occasions and pesticide handler protections on other occasions.

Owners of agricultural establishments and members of their immediate family are exempt from many WPS requirements. See Agricultural Owner Exemptions pp. 71-73.

Under the WPS, you may be both a worker and an employer of workers.

WORKERS

A worker is anyone who: (1) is employed (including self-employed) for any type of compensation and (2) is doing tasks, such as harvesting, weeding, or watering, relating to the production of agricultural plants on a farm, forest, nursery, or greenhouse. This term does ***not*** include persons who are employed by a commercial establishment to perform tasks as crop advisors (see Protections for Crop Advisors, pp. 74-80).

Under the WPS, you may be both a handler and an employer of handlers.

PESTICIDE HANDLERS

A pesticide handler is anyone who: (1) is employed (including self-employed) for any type of compensation by an agricultural establishment or a commercial pesticide handling establishment that uses pesticides in the production of agricultural plants on a farm, forest, nursery, or greenhouse, and (2) is doing any of the following tasks:

- mixing, loading, transferring, or applying pesticides,
- handling opened containers of pesticides,
- acting as a flagger,
- cleaning, handling, adjusting, or repairing the parts of mixing, loading, or application equipment that may contain pesticide residues,
- assisting with the application of pesticides, including incorporating the pesticide into the soil after the application has occurred,
- entering a greenhouse or other enclosed area after application and before the inhalation exposure level listed on the product labeling has been reached or one of the WPS ventilation criteria have been met to:
  - operate ventilation equipment,
  - adjust or remove coverings, such as tarps, used in fumigation, or
  - check air concentration levels,
- entering a treated area outdoors after application of any soil fumigant to adjust or remove soil coverings, such as tarpaulins,
- performing tasks as a crop advisor:
  - during any pesticide application,
  - before any inhalation exposure level or ventilation criteria listed in the labeling has been reached or one of the WPS ventilation criteria has been met,
  - during any restricted-entry interval,
- disposing of pesticides or pesticide containers.

A person is ***not*** a handler if he or she only handles pesticide containers that have been emptied or cleaned according to instructions on pesticide product labeling or, if the labeling has no such instructions, have been triple-rinsed or cleaned by an equivalent method, such as pressure rinsing.

A person is ***not*** a handler if he or she (1) is ***only*** handling pesticide containers that are unopened ***and*** (2) is ***not***, at the same time, also doing any handling task (such as mixing or loading).

Handlers who are currently certified as applicators of restricted-use pesticides must be given all of the WPS handler protections, except that they need not receive WPS training.

Examples:

- You ***are*** a handler if you are loading unopened water-soluble packets into a mixing tank (because you are mixing and loading the pesticide).
- You are ***not*** a handler if you:
  - purchase pesticides and transport them unopened to an establishment.
  - carry unopened containers into a pesticide storage facility.
  - transport unopened containers to the site where they are to be mixed, loaded, or applied.

WHICH PESTICIDE USES ARE COVERED?

Most pesticide uses involved in the production of agricultural plants on a farm, forest, nursery, or greenhouse are covered by the WPS. This includes pesticides used on plants, and pesticides used on the soil or planting medium the plants are (or will be) grown in. Both general-use and restricted-use pesticides are covered by the WPS. You will know that the product is covered by the WPS if you see the following statement in the Directions for Use section of the pesticide labeling:

> **"AGRICULTURAL USE REQUIREMENTS**
> **Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and 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, notification of workers, and restricted-entry intervals."**

If you are using a pesticide product with labeling that refers to the Worker Protection Standard, you must comply with the WPS. Otherwise, you will be in violation of federal law, since it is illegal to use a pesticide product in a manner inconsistent with its labeling.

WHICH PESTICIDE USES ARE NOT COVERED?

Some pesticide uses are not covered by the WPS, even when the "Agricultural Use Requirements" section is on the labeling. For example, if the pesticide labeling bears an "Agricultural Use Requirements" section, but the product also can be applied to rights-of-way, the rights-of-way use is not covered by the WPS. The WPS does ***not*** cover pesticides applied:

- on pastures or rangelands,
- for control of vertebrate pests such as rodents,
- as attractants or repellents in traps,
- on the portions of agricultural plants that have been harvested, such as in packing houses or on cut timber,
- for mosquito abatement, Mediterranean fruit fly eradication, or similar government-sponsored wide-area public pest control programs,
- on livestock or other animals, or in or around animal premises,
- on plants grown for other than commercial or research purposes, which may include plants in habitations, home fruit and vegetable gardens, and home greenhouses,
- on plants that are in ornamental gardens, parks, golf courses, and public or private lawns and grounds and that are intended only for decorative or environmental benefit,
- in a manner not directly related to the production of agricultural plants, including, for example, control of vegetation along rights of way and in other noncrop areas and structural pest control, such as termite control and wood preservation,
- for research uses of unregistered pesticides.

*Pesticides used on sod farms **are** covered by the WPS.*

The WPS does not cover **workers** who are working in an area where a pesticide has been injected directly into the plants. However, people who **handle** pesticides that are to be applied by direct injection ***are*** covered by the WPS and must receive handler protections.

Direct injection does not include chemigation, soil incorporation, soil injection, hack and squirt, or frill and spray.

WHO MUST PROTECT WORKERS AND HANDLERS?

Employers are responsible for making sure that workers and handlers receive the protections required by the pesticide labeling and the WPS. The term "employer" has a special meaning in the WPS — you are an employer even though you are self-employed or use only members of your own family to do the work on your establishment.

The WPS has very specific definitions for two types of employers. WPS requirements apply only to employers who meet those definitions.

***Compensation** includes pay or wages, payment through services or goods, or barter of services or goods. If only one person receives payment for the joint work of several people, all are considered to be compensated, and are employees under the WPS. For example, under a piece-rate payment system for harvesting crops, even if payment is issued to the head of the family only, all of the family members who harvest crops are considered employees under the WPS.*

WPS EMPLOYER DEFINITIONS

Worker Employers:

Worker employers are people who:

- **employ or contract for the services of workers** (including themselves and members of their family) for any type of compensation to perform tasks related to the production of agricultural plants, or
- **own or operate** an agricultural establishment that uses such workers.

(See definition of "owner," p. 71.)

(See definition of "worker," p. 10.)

If you are a worker employer, you are responsible for providing your agricultural worker employees with the protections that the WPS requires for **workers**. (In the WPS itself, "worker employers" are called "agricultural employers.")

Handler Employers:

Handler employers are people who:

- **employ pesticide handlers** (including members of their family), for any type of compensation, or
- **are self-employed as pesticide handlers**.

(See definition of "pesticide handler," p. 10.)

If you are a handler employer, you are responsible for providing the pesticide handlers you employ with the protections that the WPS requires for **handlers**.

If You Employ Supervisors

You must:

- require them to make sure the workers and handlers they supervise comply with the WPS and receive its protections,
- give them enough information and directions about the WPS requirements to make sure that the workers and handlers they supervise receive the protections required by the WPS, and
- tell them who is responsible for all actions necessary for compliance with the WPS.

Even if you assign an employee to carry out the duties required by the WPS, **you are responsible** for making sure that all those duties are performed.

Retaliation Prohibited

You and your supervisors must not prevent or discourage any worker or handler from complying or attempting to comply with the WPS, and you must not fire or otherwise retaliate against any worker or handler who attempts to comply.

Penalties for Noncompliance

Agricultural and handler employers can be subject to civil and criminal penalties if found not complying with the federal Worker Protection Standard including all revisions through 2004. Failure to comply is a pesticide misuse violation — also known as use of a pesticide in a manner inconsistent with its labeling. Failure to comply with distinct acts of the WPS may result in independently assessable charges, even if the violative acts occurred during one pesticide application.

Currently, a federal civil penalty of up to $1,100 per violation may be assessed against private applicators (owners/operators of agricultural establishments) and other persons, and up to $6,500 per violation against commercial applicators (owners/operators of pesticide handling establishments) and other persons. Since Congress passed the Civil Monetary Penalty Inflation Adjustment Rule under the Debt Collection Improvement Act of 1996, civil penalties have been increased due to inflation and Congress' intent on creating a deterrence to noncompliance. The next civil penalty adjustment is expected to occur in 2009.

Criminal penalties can also be assessed if the WPS is knowingly violated. Federal fines include up to $1,000 per offense and 30 days in jail for private applicators, and up to $25,000 and 1 year in jail for commercial applicators.

Most states and tribes enforce under their own laws and regulations and have their own penalties, which may differ from federal penalties. Pesticide-related ordinances and associated penalties may also be imposed by local governments.

Labeling Overrides WPS

If the pesticide product labeling contains specific instructions or requirements that conflict with the requirements of the Worker Protection Standard, **follow the instructions or requirements on the labeling**. For example, some pesticide labeling may:

- prohibit any early-entry activity, including short-term and emergency tasks,
- allow an early-entry activity that the WPS does not allow,
- require the use of personal protective equipment even if closed systems are used for mixing and loading.

Exceptions to Labeling Statements

The WPS allows certain exceptions to three specific pesticide labeling requirements: **personal protective equipment (p. 62)**, **restricted-entry intervals (p. 36)**, and **double notification (p. 33)** (the requirement on some labeling for both oral warnings **and** posting treated areas). The WPS statements in the Agricultural Use Requirements box on the product labeling will tell you that the WPS contains these exceptions.

UNIT 3

WHAT EMPLOYERS MUST DO FOR BOTH WORKERS AND HANDLERS

Some WPS protections that employers must provide are nearly the same whether the employees are workers or handlers. This unit describes those requirements. Unit 4 describes additional requirements that employers must provide to their employees who are **workers**. Unit 5 describes additional requirements that employers must provide to their employees who are **handlers**. If you employ both workers and handlers, you will need to read all three of these units.

Information at a Central Location 19

Pesticide Safety Training 21

Decontamination Supplies 24

Employer Information Exchange 26

Emergency Assistance 27

INFORMATION AT A CENTRAL LOCATION

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must make sure that certain information, described below, is displayed at a central location whenever (1) any **worker** whom they employ is on their agricultural establishment, and (2) a pesticide is about to be applied or has been recently applied.

When agricultural establishments employ their own handlers, **handler employers** of such establishments must make sure that certain information, described below, is displayed at a central location whenever (1) any **handler** whom they employ is on their agricultural establishment, and (2) a pesticide has been recently applied. However, this information does not need to be displayed if only commercial (custom) pesticide handlers will be on the agricultural establishment.

***Commercial pesticide handler employers** do **not** need to display this information on the commercial pesticide handling establishment.*

SPECIFIC DUTIES

What Information Must Be Displayed?

The following three types of information must be displayed at a central location before a pesticide is applied:

1. **Pesticide-specific application information**, which must include: the location and description of the area to be treated, product name, EPA registration number, and active ingredient(s) of the pesticide, time and date the pesticide is scheduled to be applied, and restricted-entry interval for the pesticide.

2. **Emergency information**, which must include the name, telephone number and address of the nearest emergency medical facility.

3. **A pesticide safety poster**, which must be either the WPS safety poster developed by EPA or an equivalent poster that contains the concepts listed in Criteria for Pesticide Safety Poster, p. 83.

If the pesticide is not applied as scheduled, you must display the corrected time and date before the application takes place. If you are unable to make the correction before the application takes place, make it as soon as possible thereafter.

Where Must the Information Be Displayed?

Display the required information together in a central location on your agricultural establishment where it is readily accessible and can be easily seen and read by workers and handlers.

Exception

If the workplace is a forest, you may display the information **near** the forest. It must be in a location where workers and handlers can easily see and read it and where they are likely to gather or pass by. For example, you might display the information with the decontamination supplies or at an equipment storage site.

When Must the Information Be Displayed?

Display the information whenever **any worker or handler** you employ is on your agricultural establishment and, in the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect. The information may be displayed continuously.

Earlier display: If you post WPS warning signs at treated areas, you must display pesticide-specific information at the central location no later than the time when the warning signs are posted.

Timing of Displaying Application Information

1. If workers or handlers are on your establishment at the start of an application, display the required pesticide-specific information **before the application takes place**.

2. If workers or handlers are ***not*** on your establishment at the start of an application, display pesticide-specific information **no later than the beginning of their first work period**.

3. Continue to display pesticide-specific information when workers or handlers are on your establishment **until:**

- at least 30 days after the restricted-entry interval expires, or
- at least 30 days after the end of the application, if there is no restricted-entry interval for the pesticide.

Other Responsibilities

1. Inform workers and handlers where the information is located.

2. Allow workers and handlers free, unhampered access to the information.

3. Be sure that the poster, emergency information, and application information remain legible during the time they are posted.

4. Promptly inform workers if there is any change in the information on emergency medical facilities and update the emergency information listed with the poster.

PESTICIDE SAFETY TRAINING

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Handler employers must make sure that **handlers** are trained, as described below, about general pesticide safety and about correct ways to handle pesticides.

Worker employers must make sure that **workers** have been trained, as described below, about general pesticide safety. This includes workers who enter treated areas on the farm, forest, nursery, or greenhouse during a restricted-entry interval to perform WPS-permitted tasks.

SPECIFIC DUTIES

Providing Basic Pesticide Safety Information to Untrained Workers

You must provide basic pesticide safety information to **untrained** workers before they enter treated areas on your establishment where, within the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect. You must:

- provide the basic pesticide safety information in a manner that the untrained workers can understand, such as through written materials, oral communication, or other means,
- be able to verify that you provided the workers with the required basic pesticide safety information,
- provide the workers with at least the following information:
  - Pesticides may be on or in plants, soil, irrigation water, or drifting from nearby applications.
  - To prevent pesticides from entering your body:
    - Follow directions and/or signs about keeping out of treated or restricted areas,
    - Wash before eating, drinking, using chewing gum or tobacco, or using the toilet,
    - Wear work clothing that protects your body from pesticide residues,
    - Wash/shower with soap and water, shampoo hair, and put on clean clothes after work,
    - Wash work clothes separately from other clothes before wearing them again,
    - Wash immediately in the nearest clean water if pesticides are spilled or sprayed on your body and then —as soon as possible — shower, shampoo, and change into clean clothes.
    - You will receive more training within 5 days (or at least before your sixth day of work in pesticide-treated areas on this establishment).

Who Must Be Trained?

Each worker and handler must be trained. This requirement is met if the worker or handler:

1. has been trained within the last 5 years as a WPS handler or WPS worker, even if he or she has changed employers, *or*

2. is currently a certified applicator of restricted-use pesticides, *or*

3. is currently trained (as specified in EPA's certification and training regulations) as a handler who works under the supervision of a certified pesticide applicator.

Entry during a restricted-entry interval is permitted only in a few strictly limited circumstances. See Early Entry, p. 47.

How Soon Must They Be Trained?

1. **Handlers** must be trained before they do any handling task.

2. **Early-entry workers who will contact anything** that has been treated with the pesticide which caused the restricted-entry interval must be trained ***before*** they do any early-entry task on your establishment.

3. **Other agricultural workers, including early-entry workers who will *not* contact anything** that has been treated with the pesticide which caused the restricted-entry interval must be trained ***before*** they accumulate more than 5 separate days of entry into treated areas on your establishment where, within the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect. These 5 days of entry need not be consecutive and are not limited to a growing season or calendar year.

   Note: You must provide **untrained** workers with basic pesticide safety information before they enter into treated areas on your establishment where, within the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect (see Providing Untrained Workers Basic Pesticide Safety Information, p. 21).

How Often Must Handlers and Workers Be Trained?

Handlers and workers must be trained at least once every 5 years, counting from the end of the month in which the previous training was completed.

Under the WPS, you may be both a handler and an employer of handlers.

Who Can Conduct Training?

1. The person who conducts **handler** training must:
   - currently be a certified applicator of restricted-use pesticides (in any category of certification),
     or
   - currently be designated as a trainer of certified pesticide applicators or pesticide handlers by a state, federal, or tribal agency having jurisdiction,
     or
   - have completed a pesticide safety train-the-trainer program approved by a state, federal, or tribal agency having jurisdiction.
2. The person who conducts **worker** training must:
   - currently be qualified to present handler training, as described immediately above,
     or
   - currently be trained as a WPS handler,
     or
   - have completed a pesticide safety train-the-trainer program approved by a state, federal, or tribal agency having jurisdiction.

How To Conduct Training

1. Anyone who conducts **worker** or **handler** training must:
   - use written and/or audiovisual materials,
   - present the training orally or audiovisually,
   - present the information in a manner that the trainees can understand, using a translator, if necessary,
   - respond to trainees' questions.
2. Anyone who conducts **worker** training must use non-technical terms.

Content of Training

The pesticide safety training materials for **workers and handlers** must be either:

- WPS training materials developed by EPA,
  or
- equivalent material that contains at least the concepts listed in Criteria for Worker and Handler Training, p. 87, 89.

Handlers who are currently certified as applicators of restricted-use pesticides must be given all of the WPS handler protections, except that they need not receive WPS training.

Verification of Training

If you make sure that a **handler** has an EPA-approved WPS handler training card or that a **worker** has an EPA-approved WPS worker or handler training card, the person does not have to be retrained ***unless*** you are aware, or have reason to know, that the card is invalid.

A WPS training card is invalid if you, the employer:

- are aware, or have reason to know, that the card was not issued according to the criteria in the WPS. For example, you know that the person who gave the training was ***not*** qualified to conduct WPS training, or that the content of the training did ***not*** meet the WPS criteria, or the trainee could ***not*** understand the training when it was given.
  or
- are aware, or have reason to know, that the card was not issued to the person who has the card.
  or
- know that the training for which the card was issued took place more than 5 years before the beginning of the current month (the card has expired).

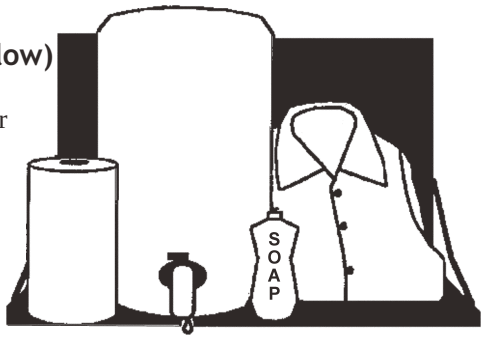
Avoiding Discrimination in Hiring

Even if you do not normally provide training in the particular language of a job applicant, or if a translator is not readily available, you are not exempted from your training responsibilities under the WPS.

Refusing to hire an applicant who cannot understand the language or languages in which you usually provide training may constitute discrimination on the basis of national origin. Such discrimination is actionable under Title VII of the Civil Rights Act of 1964 or the Immigration Reform and Control Act of 1986 (IRCA). If you want information about your responsibilities under Title VII of the Civil Rights Act of 1964, contact the U.S. Equal Employment Opportunity Commission. For details about IRCA anti-discrimination provisions, contact the Special Counsel for Immigration-Related Unfair Employment Practices, U.S. Department of Justice.

DECONTAMINATION SUPPLIES

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)



Handler employers must make sure that decontamination supplies (described below) for washing off pesticides and pesticide residues are provided to **handlers** while they are doing handling tasks.

Worker employers must make sure that decontamination supplies (described below) for washing off pesticide residues are provided to **workers** who are working in a pesticide-treated area and are doing tasks that involve contact with anything that has been treated with the pesticide, including soil, water, or surfaces of plants.

The WPS requires that decontamination supplies be provided regardless of the number of employees. There is **no** *exemption for employers with only a few employees.*

SPECIFIC DUTIES

When Must the Supplies Be Provided?

For **handlers**, for the duration of the handling task.

For **workers**, until 30 days after the end of any restricted-entry interval for that area. If there is no restricted-entry interval, until 30 days after the end of any application in that area.

Note: For ***early-entry workers who will contact*** *anything that has been treated with the pesticide, the decontamination supply requirements are different. See Decontamination Supplies for Early-Entry Workers, p. 54.*

Exception

When the only pesticides used in the treated area are products with a restricted-entry interval of 4 hours or less, the decontamination supplies must be provided until 7 days after the end of the restricted-entry interval. ***Note:*** When products have no restricted-entry interval listed on the label, the decontamination supplies must be provided until 30 days after the end of any application in that area.

For **early-entry workers who will contact** anything that has been treated with the pesticide, the decontamination supply requirements are different. See Decontamination Supplies for Early-Entry Workers, p. 54.

Supplies

Provide workers and handlers with:

1. **Water** — enough for:
   - routine washing, and
   - emergency eyeflushing.
     If the water is stored in a tank, the water ***must not*** *be used for mixing pesticides, unless the tank is equipped with correctly functioning anti-backsiphoning or check valves or other mechanisms (such as air gaps) that prevent pesticides from moving into the tank.*
2. **Soap and single use towels** — enough for workers' or handlers' needs.
3. **For handlers**, ***also*** provide:
   - **enough water for washing the entire body** in case of emergency, and
   - **clean change of clothes**, such as one-size-fits-all coveralls, to put on if the handlers' garments are contaminated and need to be removed right away.

Decontamination and emergency eyeflush water *must, at all times when it is available to workers or handlers, be of a quality and temperature that will not cause illness or injury when it contacts the skin or eyes or if it is swallowed.*

Recommendation: How Much Water Should Be Provided?
Obviously, running water meets the requirement. However, if it is not available, use the following guidelines.

- **Workers:** At least 1 gallon of water is recommended for each worker using the supplies. If you find that 1 gallon per worker is inadequate to last for the entire work period, provide more water or replenish the water as needed during the work period.
- **Handlers:** At least 3 gallons of water is recommended for each handler using the supplies. If you find that 3 gallons per handler is inadequate to last for the entire work period, provide more water or replenish the water as needed during the work period.

Location

1. All decontamination supplies for workers must be located together and all decontamination supplies for handlers must be located together. Decontamination supplies must be reasonably accessible to the workers and handlers. Handlers mixing pesticides must have decontamination supplies at the mixing area.

Exceptions:

- For a pilot who is applying pesticides aerially, the decontamination supplies must be at the aircraft's loading site or in the aircraft.
- For tasks performed more than 1/4 mile from the nearest point reachable by vehicles (cars, trucks, or tractors), the decontamination supplies may be at the access point. In this circumstance, clean water from springs, streams, lakes, or other sources may be used for decontamination if such water is more readily available than the water at the access point.

2. **Worker** decontamination supplies must ***not*** be in an area being treated with pesticides or in an area under a restricted-entry interval.

3. **Handler** decontamination supplies may be located in an area being treated with pesticides (or an area that has a restricted-entry interval in effect), **only if**:

- They are in the area where the handler is doing handling tasks,
  and
- The soap, single-use towels, and clean change of clothing are in closed containers,
  and
- The water is running tap water or is in a closed container.

Emergency Eyeflushing

Provide each **handler** with at least 1 pint of emergency eyeflush water when the pesticide labeling requires protective eyewear for the handling task being performed. The emergency eyeflush water must be **immediately accessible**. For example, it could be carried by the handler or be on a vehicle the handler is using. The water that is supplied for general decontamination may also be used as eyeflush water, if it is immediately accessible.

Decontamination After Handling Tasks

At the site where handlers remove their personal protective equipment (PPE), provide:

- soap,
- clean towels, and
- enough water to allow handlers to wash thoroughly after removing PPE.

EMPLOYER INFORMATION EXCHANGE

BASIC RESPONSIBILITIES (See Also Specific Duties Section Below)

Employers of commercial pesticide handlers must make sure that their customer — the operator of the farm, forest, nursery, or greenhouse — knows certain information, described below, about the pesticide before it is applied on the establishment.

Operators of farms, forests, nurseries, and greenhouses (agricultural employers) must make sure that, whenever a **commercial handler** will be doing pesticide handling tasks (including tasks as a crop advisor) on their establishment, the **commercial handler's employer knows specific information**, described below, concerning treated areas on the agricultural establishment.

If the pesticide is not applied as scheduled, you must display the corrected time and date before the application takes place. ***If you are unable to make the correction before the application takes place, make it as soon as possible thereafter.***

SPECIFIC DUTIES

Information for Establishment Operators

Commercial handler employers must inform their customer — the operator of the farm, forest, nursery, or greenhouse — about:

- the specific location and description of the area(s) on the agricultural establishment that are to be treated with a pesticide,
- time and date the pesticide is scheduled to be applied,
- product name, EPA registration number, and active ingredient(s),
- restricted-entry interval for the pesticide,
- whether the pesticide labeling requires both treated-area posting **and** oral notification, and
- any other specific requirements on the pesticide labeling concerning protection of workers and other persons during or after application.

Operators of agricultural establishments must have this information to protect their employees. See Information at a Central Location, pp. 19-20 and Notice about Applications, pp. 33-35.

Information for Commercial Handler Employers

Operators of agricultural establishments must provide the following information to the commercial pesticide handler employer that they hire:

- Specific location and description of any areas on the agricultural establishment:
  - that may be treated with a pesticide or be under a restricted-entry interval while the commercial handler will be there, *and*
  - that the commercial handlers may be in (or walk within 1/4 mile of).
- Restrictions on entering those areas.

Operators of commercial pesticide handling establishments must have this information to protect their employees. See Specific Instructions for Handlers, p. 60.

EMERGENCY ASSISTANCE

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must provide emergency assistance, described below, to anyone who is or has been employed as a **worker** on their farm, forest, nursery, or greenhouse if there is reason to believe that the worker has been poisoned or injured by a pesticide used on the agricultural establishment — for example, through application, spills, splashes, drift, or contact with pesticide residues.

Pesticide handler employers must provide emergency assistance, described below, to anyone who is or has been employed as a **handler** on their farm, forest, nursery, or greenhouse or on their commercial pesticide handling establishment, if there is reason to believe that the handler has been poisoned or injured by a pesticide as a result of that employment — for example, through application, spills, splashes, drift, handling tasks, or contact with pesticide residues.

SPECIFIC DUTIES

Emergency Transportation

1. Promptly make emergency transportation available to take the **worker** to an emergency medical facility able to provide treatment:
   - from the agricultural establishment, *or*
   - from a labor camp located on the establishment.
2. Promptly make emergency transportation available to take the **handler** to an emergency medical facility able to provide treatment:
   - from the agricultural establishment, *or*
   - from another handling site, such as a commercial handling establishment or an airport hangar.

Employers can "make transportation available" by:

- *taking the employee to the emergency medical facility,* or
- *calling an emergency vehicle, such as an ambulance,* or
- *making sure the employee has a ride to the medical facility with someone else.*

Emergency Information

Provide to the worker or handler or to treating medical personnel, promptly upon request, any obtainable information on:

- product name, EPA registration number, and active ingredients for any product(s) to which the person may have been exposed,
- antidote, first aid, statement of practical treatment and other medical or emergency information from the product labeling,
- description of the way the pesticide was being used, *and*
- circumstances of the worker's or handler's exposure to the pesticide.

UNIT 4

FURTHER REQUIREMENTS FOR EMPLOYERS OF WORKERS

Unit 3 described the WPS protections that employers must provide to both worker and handler employees. This unit describes the additional protections that employers are required to provide to their **worker** employees.

PART A – Protections for All Agricultural Workers 31

PART B - Special Application Restrictions in Nurseries and Greenhouses 39

PART C - Early Entry 45

PART A
PROTECTIONS FOR ALL AGRICULTURAL WORKERS

The requirements described in this part are **in addition** to the protections employers must provide to **both** workers and handlers (Unit 3).

Notice About Applications 33

Restrictions During and After Applications 36

NOTICE ABOUT APPLICATIONS

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Under most circumstances, **worker employers** must make sure that **workers** are notified about areas where pesticide applications are taking place or where restricted-entry intervals are in effect.

SPECIFIC DUTIES

Both Oral Warnings and Posted Signs

Some pesticide labels require you to notify workers ***both*** orally ***and*** with signs posted at entrances to the treated area. If both types of notification are required, the following statement will be in the "Directions for Use" section of the pesticide labeling under the heading "Agricultural Use Requirements":

> "**Notify workers of the application by warning them orally and by posting warning signs at entrances to treated areas**."

Notification on Farms, Forests, and Nurseries

Unless the pesticide labeling requires both types of notification, notify workers ***either*** orally ***or*** by the posting of warning signs at entrances to treated areas. You must inform workers which method of notification is being used.

Notification in Greenhouses

In greenhouses, **you must post all treated areas**, except as described below. If the pesticide labeling requires both types of notification, you must also notify workers orally.

Exceptions to Worker Notification

1. **Oral warnings** need ***not*** be given to:
   - **any** worker on your farm, forest, or nursery who will not be in the treated area, or walk within 1/4 mile of a treated area, during the pesticide application or while the restricted-entry interval is in effect,
   - **any** worker who will not be in your greenhouse during a pesticide application or while a restricted-entry interval is in effect there, ***or***
   - **any** worker who applied (or supervised the application of) the pesticide and is aware of all of the information required to be given in the oral warning.
2. **Treated area posting** is ***not*** required if:
   - **no** workers on your farm, forest, or nursery will be in the treated area, or walk within 1/4 mile of the treated area, during the pesticide application or while the restricted-entry interval is in effect,
   - **no** workers will be in the greenhouse during the pesticide application or while the restricted-entry interval is in effect there, ***or***
   - the **only** workers for whom you need to post applied (or supervised the application of) the pesticide and are aware of all of the information required to be given in the oral warning.

Signs meeting these requirements should be available commercially.

Posted Warning Signs

Use WPS-design signs when you post warnings at entrances to treated areas. For a detailed description, see Requirements for Warning Signs, p. 85.

1. **Location:**
   - **On farms, forests, and nurseries**, post the signs so they can be seen from all points where workers usually enter the treated area, including at least:
     – each access road,
     – each border with any labor camp adjacent to the treated area, and
     – each established walking route that enters the treated area.
     When there are no usual points of worker entry, post the signs in the corners of the treated area or in places where they will be most easily seen.
   - **In greenhouses**, post the signs so they can be seen from all points where workers usually enter the treated area, including doorways, aisles, and other walking routes. When there are no usual points of worker entry to the treated area, post the signs in the corners of the treated area or in places where they will be easily seen.
2. **Timing and Visibility of Warning Signs**:
   - Post signs 24 hours or less before the scheduled application of the pesticide.
   - Keep signs posted during application and throughout the restricted-entry interval (if any),
   - Remove the signs within 3 days after the end of the restricted-entry interval. If there is no restricted-entry interval for that application, remove the signs within 3 days after the end of the application.
   - Keep workers out during the entire time the signs are posted, (except for trained and equipped early-entry workers entering as permitted under WPS).
   - Keep signs visible and legible while they are posted.
3. **Posting Adjoining Areas**

When several adjoining areas are to be treated with pesticides on a rotating or sequential basis, you may post the entire area at the same time. Worker entry, except for early entry permitted by the WPS, is prohibited for the entire area while the signs are posted.

For a detailed description, see Requirements for Warning Signs, p. 85.

4. **Design and Size**
   - Each warning sign must look like this:

Exception:
As an option, you may use warning signs that replace the Spanish words with the same words in another language (other than English) that is read by the largest number of your workers who do not read English. The replacement sign must meet all other requirements for the WPS warning sign.

   - You may put **additional information** on the warning sign, such as the name of the pesticide or the date of application, if it does not lessen the impact of the sign or change the meaning of the required information. If you add the required information in other languages, the words must be translated correctly.

- The signs must be at least 14 inches by 16 inches, and the letters must be at least 1 inch high.

Exception:
On farms and forests, you may use smaller signs if the treated area is too small to accommodate 14- by 16-inch signs. For example, when a single plant needs to be posted, a smaller sign would be appropriate. In nurseries and greenhouses, you may, at any time, use a sign smaller than the standard size. Whenever a small sign is used, there are specific posting distances depending on the size of the lettering and symbol on the sign (see table below).

Signs with the words "DANGER" and "PELIGRO" in letters less than *7/16 inch in height* ***or*** *with any words in letters* less than *1/4 inch in height* ***or*** *with the circle graphic containing an upraised hand and a stern face* less than *1½ inches in diameter do not meet WPS sign requirements.*

Sign Size	Required Height in Inches			Maximum Distance Between Signs*
	Circle Graphic	Lettering for Words "DANGER" & "PELIGRO"	Lettering for Other Words	
7" x 8" (approx.)	3"	7/8"	1/2"	50 feet
4 1/2" x 5" (approx.)	1 1/2"	7/16"	1/4"	25 feet

* This distance requirement is for places where multiple signs are used to post a single treated area, such as a field or a greenhouse section. It does not apply where individual signs are used for separate small treatment areas (such as single potted plants in a greenhouse).

Oral Warnings to Workers

1. **Content**:

Oral warnings must include:

- the location and description of the treated area,
- the time during which entry is restricted, and
- instructions not to enter the treated area until the restricted-entry interval has expired.

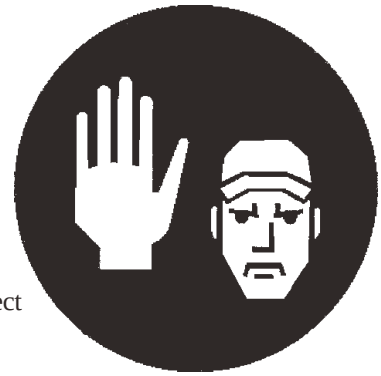
2. **Communication**:

Provide oral warnings to workers in a manner that they can understand.

3. **Timing**:

- Workers who are on your establishment at the start of an application must be orally warned **before the application takes place**.
- Workers who are ***not*** on your establishment at the start of an application must be orally warned **at the beginning of their first work period** if (1) the application is still taking place or (2) the restricted-entry interval for the pesticide is in effect.

RESTRICTIONS DURING AND AFTER APPLICATIONS



BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must take actions, described below, to protect **workers and other persons** during pesticide applications on agricultural establishments. **Worker employers** also must take actions, described below, to protect **workers** during restricted-entry intervals.

SPECIFIC DUTIES

During Applications

1. Keep everyone except appropriately trained and equipped handlers out of areas being treated with pesticides.

2. In nurseries and greenhouses, during some applications, also keep workers and other persons out of the area **immediately around** the area being treated. The size of this "keep-out zone" depends on the pesticide used and the application method. In some greenhouse situations, the greenhouse must be adequately ventilated before workers are allowed to enter (see Special Application Restrictions in Nurseries and Greenhouses, pp. 41 and 43).

Entering either enclosed or outdoor fumigated areas to ventilate, remove tarps or other coverings used in the fumigation, or to measure air concentration levels are ***handling tasks****, not early entry. Only appropriately trained and equipped handlers can do these tasks.*

During Restricted-Entry Intervals

In general, keep workers out of a treated area during the restricted-entry interval. This restriction has only two types of exceptions: (1) early entry **with no contact**, described below, and (2) early entry **with contact** for short-term, emergency, or specially excepted tasks (all described in Early Entry, p. 47). Note, however, that entry into treated areas during a restricted-entry interval is also allowed to perform handling (including crop advisor) tasks as long as the persons entering such areas are trained and equipped as pesticide handlers and receive all other applicable WPS handler protections.

RESTRICTED-ENTRY INTERVAL (REI)

The restricted-entry interval is the time immediately after a pesticide application when entry into the treated area is limited. Some pesticides have one REI, such as 12 hours, for all crops and uses. Other products have different REIs depending on the crop or method of application. When two (or more) pesticides are applied at the same time, and have different REIs, you must follow the longer interval.

Location of REIs on Labeling

The restricted-entry interval is listed on the pesticide labeling:

- under the heading "Agricultural Use Requirements" in the "Directions for Use" section of the pesticide labeling, or
- next to the crop or application method to which it applies.

Arid Area REIs

Some pesticide labeling require a different REI for arid areas. Labeling might say, for example, "72 hours in outdoor areas where average annual rainfall is less than 25 inches a year." You can get information on average annual rainfall for your area from any nearby weather bureau, such as one located at a local airport or one affiliated with the National Oceanographic and Atmospheric Administration.

NO-CONTACT EARLY ENTRY

If workers **will have no contact with anything that has been treated with the pesticide** to which the restricted-entry interval applies, you may permit them to enter pesticide-treated areas when the application is finished.

1. After any inhalation exposure level listed on the product labeling has been reached or any WPS ventilation criteria have been met, you may permit workers into a treated area during an REI if they will ***not*** **touch or be touched by** any pesticide residues, including:

- **on plants**, including both agricultural plants and weeds,
- **on or in soil** or planting medium,
- **in water**, such as irrigation water or water standing in drainage ditches or puddles,
- **in air**, if pesticide remains suspended after application, such as after fumigation or after a smoke, mist, fog, or aerosol application.

*Avoiding contact by using personal protective equipment does **not** qualify as no-contact early entry.*

No-contact early-entry workers do ***not*** have to be provided the special protections required in Early Entry, p. 47. However, they must be provided the following protections offered to other agricultural workers: information at a central location, pesticide safety training for workers, notification, restrictions during applications and during restricted-entry intervals, and emergency assistance. Decontamination supplies, however, need ***not*** be provided to no-contact early-entry workers.

2. The following are examples of situations where a worker would ***not*** be expected to contact pesticide residues in a treated area after sprays, dusts, and vapors have settled out of the air:

- The worker is wearing footwear and is walking in aisles or on roads, footpaths, or other pathways through the treated area where the plants or other treated surfaces cannot brush against the worker and cannot drop or drip pesticides onto the worker.
- The worker is in an open-cab vehicle in a treated area where the plants cannot brush against the worker and cannot drop or drip pesticide onto the worker.
- After a pesticide application that is incorporated or injected into the soil, the worker is doing tasks that do not involve touching or disrupting the soil subsurface.
- The worker is in an enclosed cab on a truck, tractor, or other vehicle.

PART B
SPECIAL APPLICATION RESTRICTIONS IN NURSERIES AND GREENHOUSES

The WPS requires additional restrictions during some pesticide applications in nurseries and greenhouses. This part describes those restrictions.

Special Application Restrictions in Nurseries 41

Special Application Restrictions in Greenhouses 43

SPECIAL APPLICATION RESTRICTIONS IN NURSERIES

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must make sure that, during certain nursery applications, **workers and other persons** do not enter treated areas on the nursery or, in some circumstances, do not enter areas that are near the treated area.

SPECIFIC DUTIES

Application Restrictions on Nurseries

During any application described in column A of Table I, do not allow or direct any person, other than an appropriately trained and equipped handler, to be in the areas on the nursery specified in column B. After the application is finished and during the restricted-entry interval:

- keep workers out of the treated area (the area to which the pesticide was directed),
- you may allow workers in the areas just outside the treated area that were off-limits during the application.

Table I Special Application Restrictions in Nurseries	
COLUMN A **While a Pesticide Is Being Applied:**	**COLUMN B** **Workers and Other Persons Are Prohibited in:**
1. (a) Applied: ■ Aerially, or ■ In an upward direction, or ■ Using a spray pressure greater than 150 pounds per square inch. ***or*** (b) Applied as a: ■ Fumigant, or ■ Smoke, or ■ Mist, or ■ Fog, or ■ Aerosol.	Pesticide-treated area plus 100 feet in all directions on the nursery.
2. (a) Applied downward using: ■ A height of greater than 12 inches from the planting medium; or ■ A fine spray; or ■ A spray pressure greater than 40 pounds per square inch and less than 150 pounds per square inch. ***or*** **(b)** Under circumstances other than (1)(a) or (1)(b) or (2)(a) above but for which the pesticide labeling requires the applicator to wear a respirator.	Pesticide-treated area plus 25 feet in all directions on the nursery.
3. In any other manner.	Pesticide-treated area.

SPECIAL APPLICATION RESTRICTIONS IN GREENHOUSES

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must make sure that **workers and other persons** do not enter specific areas within the greenhouse during — and, in some instances, after — certain greenhouse applications.

SPECIFIC DUTIES

Application Restrictions In Greenhouses

During any application described in column A of Table II, do not allow or dir person, other than an appropriately trained and equipped handler, to be in the specified in column B.

Ventilation Criteria for Greenhouses

1. After some types of pesticide applications listed in column A of Table II, you must make sure that adequate ventilation has occurred before you allow workers to enter the areas specified in column B. If column C indicates that ventilation restrictions apply, **make sure that one of the following ventilation criteria is met**:

- The concentration of the pesticide in the air is measured to be less than or equal to any inhalation exposure level required on the labeling.
- If no inhalation exposure level is listed on the labeling, keep workers out until after:
  - 10 air exchanges, or
  - 2 hours of ventilation using fans or other mechanical ventilating systems, or
  - 4 hours of ventilation using vents, windows or other passive ventilation, or
  - 11 hours with no ventilation followed by 1 hour of mechanical ventilation, or
  - 11 hours with no ventilation followed by 2 hours of passive ventilation, or
  - 24 hours with no ventilation.

2. **After ventilation criteria are met** and until the restricted entry interval expires:

- do not allow workers into the treated area (see Column D on Table II),
- you may allow workers to enter the areas just outside the treated area that were off-limits during the application.

Table II
Special Application Restrictions in Greenhouses

COLUMN A When a Pesticide Is Applied:	COLUMN B Workers and Other Persons Are Prohibited in:	COLUMN C Until:	COLUMN D After the Expiration of Time in Column C Until the Restricted-Entry Interval Expires, the Entry-Restricted Area Is:
1. As a fumigant.	Entire greenhouse plus any adjacent structure that cannot be sealed off from the treated area.	The ventilation criteria on the previous page are met.	No entry restrictions after criteria in column C are met.
2. As a ■ Smoke, or ■ Mist, or ■ Fog, or ■ Aerosol.	Entire enclosed area.	The ventilation criteria on the previous page are met.	Entire enclosed area is the treated area.
3. Under circumstances (other than in 1 or 2) for which the pesticide labeling requires the applicator to wear a respirator.	Entire enclosed area.	The ventilation criteria on the previous page are met.	Pesticide-treated area.
4. Other than in 1, 2, or 3, but: ■ From a height of greater than 12 in. from the planting medium, or ■ As a fine spray, or ■ Using a spray pressure greater than 40 pounds per square inch.	Pesticide-treated area plus 25 feet in all directions within the entire enclosed area.	Application is complete.	Pesticide-treated area.
5. In any other manner.	Pesticide-treated area.	Application is complete.	Pesticide-treated area.

PART C
EARLY ENTRY

The WPS allows entry into a treated area that remains under a restricted-entry interval only in a few narrow work situations. When early entry is permitted under the WPS, special protections must be given to the early-entry workers. This subsection describes those work situations and protections.

Early-Entry Work Situations 47

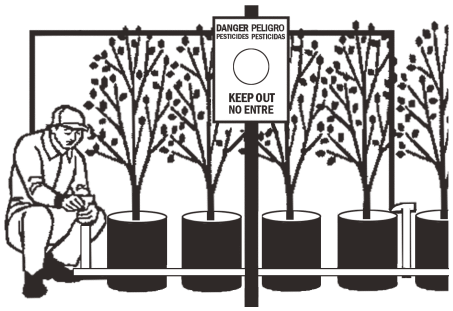
General Protections for Early-Entry Workers 52

Training and Instructions for Early-Entry Workers 53

Decontamination Supplies for Early-Entry Workers 54

Personal Protective Equipment for Early-Entry Workers 56

EARLY-ENTRY WORK SITUATIONS



BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must not allow their **workers** to enter treated areas where they will contact treated surfaces, except in a few very limited work situations.

Worker employers must provide special protections to any of their **workers** who do early-entry tasks involving contact with anything that has been treated with a pesticide, including soil, water, air, and surfaces of plants.

SPECIFIC DUTIES

Early entry involving contact with treated surfaces is permitted in only four work situations:

- **short-term tasks** that last less than 1 hour and do not involve hand labor,
- **limited-contact tasks** that could not have been foreseen, cannot be delayed, and do not involve hand labor,
- **emergency tasks** that take place because of an agricultural emergency, and
- **specific tasks** approved by EPA through a formal exception process.

Employers should make every effort to schedule pesticide applications and worker tasks in a way that will avoid the necessity of early entry of workers into treated areas.

Short-term Tasks With No Hand Labor

Workers may enter treated areas before the restricted-entry interval is over to do short-term jobs that do not involve hand labor, if provided with the protections and PPE required for early entry. Each worker must:

- Wait at least 4 hours after the pesticide application is completed before entering the treated area, ***and***
- Wait at least until any inhalation exposure level listed on the product labeling has been reached or any WPS ventilation criteria have been met, ***and***
- Spend no more than 1 hour in a 24-hour period on short-term early-entry tasks.

For additional protections that must be provided to workers who do short-term early-entry tasks, see pages 52-56.

Hand Labor

Any agricultural activity performed by hand, or with hand tools, that might cause a worker to have substantial contact with surfaces (such as plants, plant parts, or soil) that may contain pesticide residues.

Examples of hand labor tasks include: harvesting, detasseling, thinning, weeding, topping, planting, girdling, caning, sucker removal, pruning, disbudding, roguing, and packing produce into containers in the field.

Limited-Contact Tasks

Tasks where early-entry workers' only contact with treated surfaces — including soil, water, surfaces of plants, crops, and irrigation equipment — is minimal and is limited to their feet, lower legs, hands, and forearms. Hand labor tasks are not limited-contact tasks.

Examples of limited-contact tasks include operating, moving, or repairing irrigation or watering equipment; operating or repairing weather monitoring and frost protection equipment; repairing greenhouse heating, air conditioning, and ventilation equipment; repairing non-application field equipment; maintaining and moving beehives.

Only appropriately trained and equipped pesticide handlers may operate, move, or repair the parts of chemigation equipment that may contain pesticide residues. Chemigation equipment is equipment used to apply pesticides with irrigation water.

For additional protections that must be provided to workers who do limited-contact early-entry tasks, see pages 52-56.

Limited-Contact Tasks That Could Not Have Been Foreseen, Cannot Be Delayed, and Involve No Hand Labor

*Could not have been **foreseen** means that when you made the pesticide application, you could not have anticipated the circumstances that led to the need to perform limited-contact tasks. For example, you do not qualify if you knew that you would need to enter the treated area to perform routine watering during the restricted-entry interval.*

Early-entry workers may enter treated areas to do limited-contact tasks before the restricted-entry interval is over, provided **all the following conditions are met**:

- the early-entry tasks do **not** involve hand labor (see definition in the shaded box on p. 47), ***and***
- the early-entry tasks will not cause workers to have more than minimal contact with treated surfaces, ***and***
- contact with treated surfaces will be limited to the workers' feet, lower legs, hands, and forearms, ***and***
- the need for the early-entry could not have been foreseen, ***and***
- if the early-entry tasks are delayed, the delay would cause significant economic loss, and there are no alternative practices that would prevent the loss, ***and***
- the pesticide product's Agricultural Use Requirement box does **not** contain the following "double notification" statement: "Notify workers of the application by warning them orally and by posting warning signs at entrances to treated area," ***and***
- the pesticide product does **not** contain a restriction prohibiting any person, other than an appropriately trained and equipped handler, from entering during the restricted-entry interval.

You must provide each limited-contact early-entry worker with:

- either the personal protective equipment required on the pesticide labeling for early entry into treated areas *or* a standard set of PPE consisting of coveralls, chemical-resistant gloves, chemical-resistant footwear, and protective eyewear (and make sure the worker wears socks) ***and***

Note: You may eliminate the protective eyewear from the standard set of PPE in any treated area where the pesticide label does not require it for early entry.

- all the protections required for early-entry workers (see p. 56), ***and***
- oral or written notification, in a language that the workers can understand, that:
  - the establishment is relying on this exception to allow workers to enter treated areas to complete limited-contact tasks,
  - no entry is allowed for the first 4 hours after an application, and until applicable ventilation criteria have been met, and until any label-specified inhalation exposure level has been reached,
  - the time the worker spends in any treated area where a restricted-entry interval is in effect cannot exceed 8 hours in any 24-hour period.

You must make sure that each limited-contact early-entry worker:

- waits at least 4 hours after the pesticide application is completed before entering the treated area, ***and***
- waits at least until any inhalation exposure level listed on the product labeling has been reached or any WPS ventilation criteria have been met, ***and***
- spends no more than 8 hours in a 24-hour period on limited-contact early-entry tasks.

Tasks During An Agricultural Emergency

Early-entry workers may enter treated areas before the restricted-entry interval is over to do tasks that are necessary because of an agricultural emergency, if provided with the protections and PPE required for early entry. Each worker must:

- do only those tasks relating to mitigating the emergency, ***and***
- wait at least 4 hours after the pesticide application is completed before entering the treated area, ***and***
- wait at least until any inhalation exposure level listed on the product labeling has been reached or any WPS ventilation criteria have been met.

For additional protections that must be provided to early-entry workers, see pp. 52-56.

1. Declaring a Potential Agricultural Emergency

A state, tribal, or federal agency having jurisdiction must declare that circumstances exist, have occurred, or are forecast that might cause an agricultural emergency where your establishment is located. Such circumstances may include, for example, flooding, hail, high winds, hurricane, tornado, freeze, or frost.

2. Agricultural Emergency on Your Establishment

Once such an agency has declared that circumstances might cause (or might already have caused) an agricultural emergency in your area, you must decide if an agricultural emergency actually exists for any treated areas on your establishment that remain under a restricted-entry interval. **All of the following conditions must be met** before you may let workers go into a treated area where a restricted-entry interval is in effect:

- You could not have anticipated the circumstances that led to the emergency when you made the pesticide application. For example, you do not qualify if weather forecasts **before** the application warned you that the emergency was imminent.
- You had no control over the circumstances that led to the emergency. For example, you do not qualify if you forgot to heat your greenhouse or over-watered with an irrigation system.
- Early entry is the only practice that will prevent or reduce a substantial economic loss involving the crop in that treated area. For example, you do not qualify if you have access to mechanical harvesting equipment that could harvest your crop in lieu of hand-harvesting.
- If early entry does not occur, the loss of profit will be greater than the loss that would be expected on the basis of experience and the variation in crop yields in previous years. The contribution of mismanagement cannot be considered in determining the loss.

EPA-Approved Exceptions

EPA has established a formal regulatory process for considering additional exceptions to the restrictions on entering treated areas during an REI. If any such exceptions are approved, EPA will publish them in the Federal Register and intends to inform state and tribal pesticide agencies, the Cooperative Extension Service, affected commodity, industry, and worker associations, and other interested parties. Check with them or the EPA office in your region for an updated list of approved exceptions and for information about the requirements and limitations of those exceptions.

Summary of Early Entry Requirements				
	Type of Early Entry			
WPS Provision or Requirement	**No Contact (see p. 37)**	**Short-Term (see p. 47)**	**Limited Contact (see p. 48)**	**Agricultural Emergency (see p. 49)**
Entry during application (entry by workers during application is never acceptable)	no entry	no entry	no entry	no entry
Entry before inhalation exposure level or ventilation criteria have been met	no entry	no entry	no entry	no entry
Entry during first 4 hours after application is complete	entry permitted	no entry	no entry	no entry
Need for early entry could have been anticipated	entry permitted	entry permitted	no entry	no entry
Need for early entry could ***not*** have been anticipated	entry permitted	entry permitted	entry permitted (if other triggers are met, see p. 48)	entry permitted (if other triggers are met, see p. 49)
Entry is ***not*** an economic necessity	entry permitted	entry permitted	no entry	no entry
Entry is an economic necessity	entry permitted	entry permitted	entry permitted (if other triggers are met, see p. 48)	entry permitted (if other triggers are met, see p. 49)
Hours of entry permitted per day	no limit	1 hour	8 hours	no limit
Hand labor tasks permitted?	yes	no	no	yes
Pesticide safety training (worker) provided?	yes	yes (no 5-day grace period)	yes (no 5-day grace period)	yes (no 5-day grace period)
Information at central location provided?	yes	yes	yes	yes
Emergency assistance provided?	yes	yes	yes	yes
Notice about applications provided?	yes	yes	yes	yes
Restrictions during applications in effect?	yes	yes	yes	yes
Instructions related to personal protective equipment provided?	no	yes	yes	yes

Summary of Early Entry Requirements (Cont.)				
	Type of Early Entry			
WPS Provision or Requirement	**No Contact (see p. 37)**	**Short-Term (see p. 47)**	**Limited Contact (see p. 48)**	**Agricultural Emergency (see p. 49)**
Labeling information and instructions provided?	no	yes	yes	yes
Early entry decontamination supplies provided?	no	yes	yes	yes
Personal protective equipment provided, cleaned, and maintained?	no	yes	yes	yes

GENERAL PROTECTIONS FOR EARLY-ENTRY WORKERS

BASIC RESPONSIBILITIES (See Also Specific Duties Section Below)

Worker employers must provide several types of protections, described below, to their **early-entry workers** who contact anything that has been treated with a pesticide, including soil, water, air, and surfaces of plants.

SPECIFIC DUTIES

Protections Required By the Pesticide Labeling

Provide any protections required by the pesticide labeling for early-entry tasks.

Required Protections That Are the Same As For Other Workers

Provide protections that are required for all agricultural workers:

- Information at a central location (p. 19),
- Emergency assistance (p. 27),
- Restrictions during applications (p. 36), and
- Notice about applications (p. 33).

These requirements are described in detail in the next several pages.

Special Protections For Early-entry Workers

A few WPS requirements for early-entry workers differ from those for other agricultural workers. Provide special protections to early-entry workers in the following areas:

- Training and instructions,
- Decontamination supplies, and
- Personal protective equipment.

TRAINING AND INSTRUCTIONS FOR EARLY-ENTRY WORKERS

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must make sure that each of their **early-entry workers** is currently trained as a WPS worker and, in addition, receives specific information and instructions, described below.

SPECIFIC DUTIES

Training

Make sure that each early-entry worker is currently trained as a WPS worker (see requirements on p. 21) ***before*** entering a treated area on the agricultural establishment during a restricted-entry interval.

The 5-day grace period for training that applies to other agricultural workers does not apply to early-entry workers.

Instructions Related to Personal Protective Equipment (PPE)

Instruct early-entry workers, in a manner they can understand:

- how to put on, use, and take off early-entry PPE correctly,
- about the importance of washing thoroughly after removing PPE, and
- how to prevent, recognize, and give correct first aid for heat illness (too much heat stress). For more information on heat stress, see chart in Appendix B, p 115.

For definitions of PPE, see page 64.

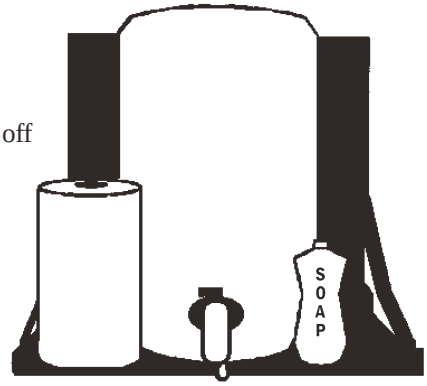
Labeling Information and Instructions

Inform early-entry workers, in a manner they can understand, about the safety information and instructions on the labeling of the pesticide(s) to which the REI applies, including:

- human hazard statements and precautions,
- first aid,
- signs and symptoms of poisoning,
- PPE required for early entry, and
- any other precautions or instructions related to safe use or early entry.

Option: You may allow workers who will do early-entry tasks to read the labeling themselves, if they are able to read and understand it.

DECONTAMINATION SUPPLIES FOR EARLY-ENTRY WORKERS



BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must provide their **early-entry workers** with decontamination supplies for washing off pesticides and pesticide residues.

SPECIFIC DUTIES

Supplies

Provide early-entry workers with:

1. **Water** — enough for:
   - routine washing, and
   - emergency eyeflushing.

   If the water is stored in a tank, the water ***must not*** be used for mixing pesticides, unless the tank is equipped with correctly functioning antibacksiphoning or check valves or other mechanisms (such as air gaps) that prevent pesticides from moving into the tank.
2. **Soap and single use towels** — enough for the needs of early-entry workers.

Decontamination and emergency eyeflush water *must, at all times when it is available to early-entry workers, be of a quality and temperature that will not cause illness or injury when it contacts the skin or eyes or if it is swallowed.*

Recommendation: How Much Water Should Be Provided?

Obviously, running water meets the requirement. However, if it is not available, use the following guidelines.

- **Early-Entry Workers:** At least 1 gallon of water is recommended for each early-entry worker using the supplies. If you find that 1 gallon per early-entry worker is inadequate to last for the entire work period, provide more water or replenish the water as needed during the work period.

Location

Make sure:

1. The decontamination supplies are ***not*** in an area being treated with pesticides.

2. The decontamination supplies are ***not*** in an area under a restricted-entry interval, ***unless*** that location is necessary for the supplies to be reasonably accessible to early-entry workers.

3. The decontamination supplies are reasonably accessible to and not more than 1/4 mile from early-entry workers.

Exception

For tasks performed more than 1/4 mile from the nearest point reachable by vehicle (car, truck, or tractor), the decontamination supplies may be at the access point. In this circumstance, clean water from springs, streams, lakes, or other sources may be used for decontamination if such water is more readily available than the water at the access point.

Emergency Eyeflushing

Provide each early-entry worker with at least 1 pint of emergency eyeflush water when the pesticide labeling requires protective eyewear for early entry. The emergency eyeflush water must be **immediately accessible**. For example, it could be carried by the handler or be on a vehicle the early-entry worker is using. The water that is supplied for general decontamination may also be used as eyeflush water, if it is immediately accessible.

Decontamination at the End of Exposure Period

At the site where early-entry workers take off their PPE, provide :

- soap,
- clean towels, and
- enough water to allow early-entry workers to wash thoroughly after removing their PPE.

PERSONAL PROTECTIVE EQUIPMENT FOR EARLY-ENTRY WORKERS

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Worker employers must provide their **early-entry workers** with the early-entry PPE required by the pesticide labeling, make sure they wear the PPE, and make sure they use the PPE correctly.

SPECIFIC DUTIES

PPE for early-entry activities is listed on the pesticide label in the "Directions for Use" section under the heading "Agricultural Use Requirements."

Duties Related to Personal Protective Equipment

1. Provide the appropriate PPE in clean and operating condition to each early-entry worker.

2. Make sure early-entry workers wear PPE correctly for its intended purpose and use it according to the manufacturer's instructions.

3. Inspect all PPE before each day of use for leaks, holes, tears, or worn places. Repair or discard any damaged equipment.

4. Provide early-entry workers clean places away from pesticide storage and pesticide use areas to:

   - store personal clothing not in use,
   - put on PPE at the start of any exposure period, and
   - take off PPE at the end of any exposure period.

See PPE definitions, p. 64.

5. Take necessary steps to prevent heat illness (too much heat stress) while PPE is being worn.

6. Do not allow early-entry workers to wear home or take home PPE contaminated with pesticides.

Cleaning and Maintaining PPE

For an example of what to tell people who clean PPE, see pp. 95-96.

1. Keep pesticide-contaminated PPE separate from other clothing or laundry, and wash it separately.

2. If PPE will be reused, clean it before each day of reuse according to the instructions from the PPE manufacturer, unless the pesticide labeling specifies different requirements. If there are no such instructions or requirements, wash the PPE thoroughly in detergent and hot water.

3. Thoroughly dry the clean PPE before it is stored, or put it in a well-ventilated place to dry.

4. Store clean PPE separately from personal clothing and away from pesticide-contaminated areas.

Disposal of PPE

Comply with any applicable federal, state, tribal, and local regulations when you dispose of PPE that cannot be cleaned correctly.

Instructions for Persons Who Clean PPE

Inform anyone who cleans or launders PPE:

- that PPE may be contaminated with pesticides,
- of the potentially harmful effects of pesticides,
- how to protect themselves when handling contaminated PPE, and
- how to clean PPE correctly.

For more information about laundering pesticide-contaminated clothing, please visit the Worker Protection Standard topic page on the Ag Center's Web site at: http://www.epa.gov/agriculture/twor.html

UNIT 5

FURTHER REQUIREMENTS FOR EMPLOYERS OF HANDLERS

Unit 3 described the WPS protections that employers must provide to both worker and handler employees. This unit describes the **additional** WPS protections that employers are required to provide only to their handler employees.

Restrictions During Applications and Monitoring Handlers 59

Specific Instructions for Handlers 60

Equipment Safety 61

Personal Protective Equipment 62

Exceptions to PPE Requirements 66

RESTRICTIONS DURING APPLICATIONS AND MONITORING HANDLERS

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Handler employers must make sure that:

- pesticides do not touch **people**, other than appropriately trained and equipped handlers, during pesticide applications, and
- **pesticide handlers** are monitored, as described below, when handling certain types of pesticides.

Pesticide handlers must make sure that pesticides do not touch **people**, other than appropriately trained and equipped handlers, during pesticide applications.

SPECIFIC DUTIES

Restrictions During Applications

Both handler employers and pesticide handlers must make sure that each pesticide is applied so that it does not contact, either directly or through drift, anyone except appropriately trained and equipped handlers.

Monitoring Handlers

1. Pesticides with skull and crossbones

At least once every 2 hours, someone must check on — by sight or by voice communication — any handler who is handling a pesticide that has a skull and crossbones symbol on its label. (For monitoring the handling of fumigants in greenhouses, see immediately below.)

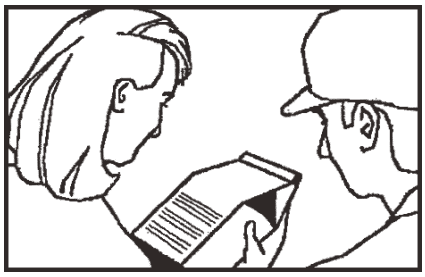
2. Fumigants handled in greenhouses

Someone must maintain constant visual or voice contact with any handler who is applying or otherwise handling a fumigant in a greenhouse. This includes handlers who enter the greenhouse during fumigation to operate ventilation systems, adjust tarps or other coverings used in the fumigation, or check air concentration levels. The person monitoring the fumigant handler must:

- be trained as a pesticide handler, and
- have immediate access to the PPE that the fumigant labeling requires for applicators.

Fumigant
Any pesticide product that is a vapor or gas, or forms a vapor or gas on application, and whose method of pesticidal action is through the gaseous state.

SPECIFIC INSTRUCTIONS FOR HANDLERS



BASIC RESPONSIBILITIES (See Also Specific Duties Section Below)

Handler employers must make sure that, before **handlers** do any handling task, the handlers:

- are given information from the pesticide labeling and have access to the labeling itself, and
- are instructed in the safe operation of the equipment they will be using.

Commercial (custom) handler employers must make sure that, whenever one of their handlers will be doing pesticide handling tasks (including tasks as a crop advisor) on an agricultural establishment, he or she is aware of specific information, described below, concerning pesticide-treated areas on the agricultural establishment.

Option: You may allow handlers to read the labeling themselves, if they are able to read and understand it.

SPECIFIC DUTIES

Labeling Access and Information

1. Inform handlers, in a manner they can understand, about all labeling requirements related to safe use of the pesticide, including at least:
   - the signal word,
   - human hazard statements and precautions,
   - personal protective equipment requirements,
   - first aid instructions,
   - environmental precautions, and
   - any additional precautions about the handling task to be performed.
2. Provide handlers access to the pesticide labeling information during handling tasks.

Safe Operation of Equipment

Make sure that handlers know how to safely and correctly use all equipment they are assigned to use for handling pesticides, including, if applicable, how to avoid drift and how to use chemigation equipment safely.

Instructions for Commercial Pesticide Handlers

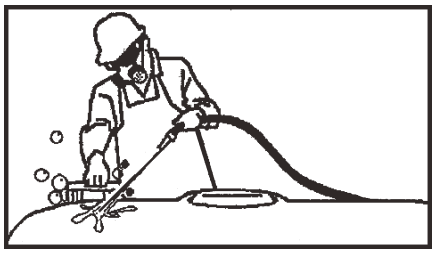
Operators of agricultural establishments are required to make sure that commercial handler employers have this information (p. 26).

Commercial (custom) pesticide handler employers must make sure that their handler employees are informed about:

1. Specific location and description of any areas on the agricultural establishment:
   - that may be treated with a pesticide or be under a restricted-entry interval while the commercial handler will be there, ***and***
   - that the commercial handler may be in (or walk within 1/4 mile of).
2. Restrictions on entering those areas.

For example, if custom applicators are scheduled to use ground equipment to apply a pesticide on a farm, they need to be informed of any nearby areas on the farm that they should stay out of because the area has an REI in effect. Or if commercial crop advisors are scheduled to scout in an area on a farm that remains under an REI, they need to be told what personal protective equipment they must wear while in that area.

EQUIPMENT SAFETY



BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

Handler employers must make sure that equipment used for mixing, loading, transferring, or applying pesticides (pesticide handling equipment) is inspected and repaired and that **persons repairing, cleaning, or adjusting** such equipment are protected or informed, as described below.

SPECIFIC DUTIES

Equipment Inspection

Inspect pesticide handling equipment before each day of use for leaks, clogging, and worn or damaged parts. Repair or replace any damaged equipment.

Protections for Persons Maintaining Equipment

Remove pesticide residues from pesticide handling equipment before anyone other than an appropriately trained and equipped handler is allowed to repair, clean, or adjust it.

Exception

If it is not feasible to remove pesticide residues from pesticide handling equipment, and the people who will be repairing, cleaning, or adjusting the equipment are not your employees (and, therefore, are not handlers for whom you are responsible under the WPS), you must inform them:

- that the equipment may be contaminated with pesticides,
- of the potentially harmful effects of exposure to pesticides, and
- how to correctly handle such equipment.

For an example of what information to give those who clean and maintain equipment for you, see page 97.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

BASIC RESPONSIBILITIES
(See Also Specific Duties Section Below)

In the pesticide labeling, PPE for handling activities is listed in the "Hazards to Humans" section.

Handler employers must make sure that **pesticide handlers**:

- are provided with the PPE the pesticide labeling requires for the task,
- wear the PPE for the entire handling task, and
- use the PPE correctly.

Each pesticide handler is responsible for wearing the required personal protective equipment during the entire handling task.

SPECIFIC DUTIES

Duties Related to Personal Protective Equipment

PPE is coveralls, respirators, protective eyewear, and chemical-resistant suits, gloves, footwear, aprons and headgear. See definitions, p. 64. A chemical-resistance chart is provided in Appendix B, p. 113.

Employers must:

1. Provide handlers with the appropriate PPE in clean and operating condition.

2. Make sure the handlers wear the PPE correctly and use it according to the manufacturer's instructions. If a handler wears a respirator, make sure that it fits the wearer correctly.

3. Inspect all PPE before each day of use for leaks, holes, tears, or worn places, and repair or discard any damaged equipment.

4. Provide handlers with clean places away from pesticide storage and pesticide use areas to:

- store personal clothing not in use,
- put on PPE at the start of any exposure period,
- take off PPE at the end of any exposure period.

5. Take any necessary steps to prevent heat illness (too much heat stress) while PPE is being worn.

6. Do not allow any handler to wear home or take home PPE contaminated with pesticides.

Exceptions to PPE: Handler employers may allow handlers to omit some of the PPE listed on the pesticide labeling for a handling activity if the handlers are using a closed system or are working in a cockpit or in an enclosed cab. See pages 66-67.

Cleaning and Maintaining PPE

Employers must do the following:

1. Keep pesticide-contaminated PPE away from other clothing or laundry, and wash it separately.

2. If PPE will be reused, clean it before each day of reuse according to the instructions from the PPE manufacturer unless the pesticide labeling specifies other requirements. If there are no such instructions or requirements, wash PPE thoroughly in detergent and hot water.

3. Thoroughly dry the clean PPE before it is stored, or put it in a well-ventilated place to dry.

4. Store clean PPE separately from personal clothing and away from pesticide-contaminated areas.

Replacing Respirator Filters, Cartridges, or Canisters

Employers must:

1. Replace dust/mist respirator filters:
   - when breathing resistance becomes excessive,
   - if the filter is damaged or torn,
   - whenever the respirator manufacturer or pesticide labeling says to replace them (if the instructions differ, change the filter at the shorter interval),
   - at the end of each day's work period, if no other instructions or indications of service life are available.
2. Replace gas- and vapor-removing respirator cartridges or canisters:
   - at the first indication of odor, taste, or irritation,
   - when the respirator manufacturer or pesticide labeling says to replace them (if instructions differ, change the cartridge or canisters at the shorter interval),
   - at the end of each day's work period, if no other instruction or indications of service life are available.

Disposal of PPE

Employers must:

1. Discard coveralls or other absorbent materials that have been drenched or heavily contaminated with an undiluted pesticide that has the signal word "DANGER" or "WARNING" on the labeling. They must not be reused.

2. Comply with any applicable Federal, State, Tribal, and local regulations when disposing of PPE that cannot be cleaned correctly.

Instructions for Persons Who Clean PPE

Employers must inform people who clean or launder PPE:

- that the PPE may be contaminated with pesticides,
- of the potentially harmful effects of exposure to pesticides,
- how to protect themselves when handling contaminated PPE, and
- how to clean PPE correctly.

For more information about laundering pesticide-contaminated clothing, please visit the Worker Protection Standard topic page on the Ag Center's Web site at: http://www.epa.gov/agriculture/twor.html

For an example of what to tell people who clean PPE, see page 95.

Personal Protective Equipment (PPE) Definitions

Personal protective equipment:
Apparel and devices worn to protect the body from contact with pesticides or pesticide residues, including: coveralls, chemical-resistant suits, gloves, footwear, aprons, and headgear, protective eyewear, and respirators. *While the following attire is not defined as PPE, the labeling may require pesticide handlers or early-entry workers to wear it for some tasks: long- and short-sleeved shirts, long and short pants, shoes and socks, other items of regular work clothing. If such non-PPE attire is required, the employer must make sure that it is worn.*

Chemical-resistant:
Allows no measurable amount of the pesticide being used to move through the material during use.

Waterproof:
Allows no measurable movement of water (or water-based solutions) through the material during use.

Chemical-resistant footwear:
Chemical-resistant shoes; chemical-resistant boots; or chemical-resistant shoe coverings worn over shoes or boots. *Substitution:* Leather boots may be worn in rough terrain, if chemical-resistant footwear with sufficient durability and a tread appropriate for wear in such terrain is not obtainable.

Protective eyewear:
Goggles, a face shield, or safety glasses with front, brow, and temple protection. *Substitution:* A full-face respirator may be worn instead of protective eyewear.

Chemical-resistant suit:
A loose-fitting, one- or two-piece, chemical-resistant garment that covers, at a minimum, the entire body except head, hands, and feet.

Coverall:
A loose-fitting one- or two-piece garment that covers, at a minimum, the entire body except head, hands, and feet. Coveralls are made of fabric such as cotton or a cotton-polyester blend, and are not chemical-resistant. The pesticide labeling may specify that the coveralls be worn over a layer of clothing. *Substitution:* A chemical-resistant suit may be worn instead of coveralls and any required inner layer of clothing.

Chemical-resistant apron:
An apron that is made of chemical-resistant material and that covers the front of the body from mid-chest to the knees. *Substitution:* If a chemical-resistant suit is worn, no apron is required.

Respirator:
A device that protects the respiratory system. It must be the type listed on the pesticide label (or one that is more protective) and must be appropriate for the pesticide product being used and for the activity being performed. *Substitutions:* A respirator with a canister approved for pesticides or with an organic-vapor cartridge equipped with a pesticide prefilter may be worn instead of a dust/mist filtering respirator.

Personal Protective Equipment (PPE) Definitions (continued)

Chemical-resistant headgear:

A chemical-resistant hood or a chemical-resistant hat with a wide brim.

Gloves:

Hand-coverings that are the type listed on the pesticide label.

- Gloves made of leather, cotton, or other absorbent materials **must not be worn** for handling or early-entry activities unless these materials are listed on the pesticide labeling as acceptable for such use.
- Chemical-resistant gloves with non-separable absorbent lining materials **must not be worn** for handling or early-entry activities. A chemical-resistance chart is provided in Appendix B, p. 113.
- *Substitution:* Leather gloves may be worn over chemical-resistant liners, if chemical-resistant gloves with sufficient durability and suppleness are not obtainable. However, after leather gloves have been worn for protection from pesticide exposure, they may only be worn with chemical-resistant liners and may not be worn for any other use.

Separable glove liners:

Separable glove liners are separate glove-like hand coverings, made of lightweight material, with or without fingers.

- Work gloves made from lightweight cotton or poly-type material are considered to be glove liners, if worn beneath chemical-resistant gloves.
- Unless the pesticide product labeling specifically prohibits their use, separable glove liners may be worn beneath chemical-resistant gloves, *provided* the liners do not extend outside the chemical-resistant gloves that are worn over them.
- Once used for handling or early-entry activities, separable glove liners **must be discarded immediately** after a total of 10 hours of use **or** within 24 hours of first use, whichever occurs first. The liners **must be replaced immediately** if they come into direct contact with pesticides. Pesticide-contaminated liners must be disposed of in accordance with any federal, state, or local regulations.

EXCEPTIONS TO PPE REQUIREMENTS

BASIC RESPONSIBILITIES (See Also Specific Duties Section Below)

Handler employers may allow **handlers** to omit some of the PPE listed on the pesticide labeling for a handling task if the handlers are:

- using a closed system, or
- in an enclosed cab, or
- in a cockpit.

SPECIFIC DUTIES

These exceptions to PPE are allowed unless expressly prohibited by product labeling.

Closed Systems

Closed systems are systems designed by the manufacturer to enclose the pesticide to prevent it from contacting handlers or other people while it is being handled. Such systems must function properly and be used and maintained in accordance with the manufacturer's written operating instructions.

1. When using a closed system to mix or load pesticides with the signal word "DANGER" or "WARNING," handlers need not wear all the PPE listed on the pesticide labeling, but must wear at least:

- long-sleeved shirt and long pants,
- shoes and socks,
- a chemical-resistant apron, and
- protective gloves specified on the pesticide labeling for mixing, loading, and other handling tasks.

Even when reduced PPE is permitted to be worn during a task, handlers must be provided all PPE required by the pesticide labeling for that task and have it immediately available for use in an emergency.

2. When using a closed system to mix or load pesticides with the signal word "CAUTION," handlers need not wear all the PPE listed on the pesticide labeling, but must wear at least:

- long-sleeved shirt and long pants, and
- shoes and socks.

3. When using a closed system to do handling tasks other than mixing and loading with ***any*** pesticide, handlers need not wear all of the PPE listed on the pesticide labeling, but must wear at least:

- long-sleeved shirt and long pants, and
- shoes and socks.

Such closed systems might include closed application systems designed to incorporate pesticides into soil, but only if the system does not allow any pesticide contact with the air throughout the entire application process.

4. When using a closed system that operates under pressure, handlers may wear the reduced PPE specified above, but must **add** protective eyewear.

Enclosed Cabs

Enclosed cabs must have a nonporous barrier that totally surrounds the occupants and prevents contact with pesticides outside of the cab.

Enclosed cabs that provide respiratory protection must have a properly functioning ventilation system that is used and maintained according to the manufacturer's written operating instructions. The cab must be declared in writing by the manufacturer or by a

governmental agency to provide at least as much respiratory protection as the type of respirator listed on the pesticide labeling.

Examples:
Some enclosed-cab systems provide respiratory protection equivalent to a dust/mist filtering respirator and could, therefore, be used as a substitute when that type of respirator is specified on the product labeling. Other enclosed-cab systems are equipped to remove organic vapors as well as dusts and mists and could be used as a substitute when either the dust/mist filtering respirator or an organic-vapor-removing respirator is specified on the product labeling.

1. **Enclosed cabs that do not provide respiratory protection** — In an enclosed cab that does not provide respiratory protection, handlers need not wear all the PPE listed on the pesticide labeling, but must wear at least:

- long-sleeved shirt and long pants,
- shoes and socks, and
- any respirator required for the handling task.

2. **Enclosed cabs that provide respiratory protection** — In an enclosed cab that provides respiratory protection equal to the labeling-required respirator, handlers need not wear all the PPE listed on the pesticide labeling, but must wear at least:

- long-sleeved shirt and long pants, and
- shoes and socks.

3. **In any enclosed cab where reduced PPE is worn** — Handlers must:

- keep immediately available all PPE listed on the labeling for the type of task being performed,
- store the PPE in a chemical resistant container (such as a plastic bag),
- wear the PPE if it is necessary to leave the cab and contact pesticide-treated surfaces in the treated area, and
- take off PPE that was worn in the treated area before reentering the cab in order to prevent contamination of the inside of the cab.

Note: If the PPE that was worn in the treated area needs to be stored inside the enclosed cab, it must be stored in such a way that will prevent contaminating the inside of the cab. One way to achieve this would be to store the contaminated PPE in a chemical-resistant container, such as a plastic bag.

Cockpits

1. **Gloves when entering or leaving an aircraft** — Handlers have the option of whether to wear chemical-resistant gloves when entering or leaving an aircraft used to apply pesticides, *unless* the pesticide product labeling requires chemical-resistant gloves to be worn for these activities. If gloves are worn for such a use, then if they are brought inside the cockpit, handlers must store the used gloves in a enclosed container, such as a plastic bag, to prevent contamination of the inside of the cockpit.

2. **Open cockpits** — In an open cockpit, handlers must wear any gloves, respirator, and body protection listed on the pesticide labeling for application tasks. However, they may wear:

- shoes and socks instead of chemical-resistant footwear,
- a helmet instead of a chemical-resistant hat or hood, and
- a visor instead of protective eyewear.

3. **Enclosed cockpits** — In an enclosed cockpit, handlers need not wear all the PPE listed on the pesticide labeling, but must wear at least:

- long-sleeved shirt and long pants, and
- shoes and socks.

UNIT 6

OWNER EXEMPTIONS AND CROP ADVISORS

The WPS exempts owners of agricultural establishments from many WPS requirements, and it contains specific protections for crop advisors. This unit describes these owner exemptions and crop advisor provisions.

Agricultural Owner Exemptions 71

Protections for Crop Advisors 74

AGRICULTURAL OWNER EXEMPTIONS

Owners of agricultural establishments and members of their immediate family are exempt from many WPS requirements. However, EPA encourages owners to provide themselves and their families with all WPS protections.

Owner: Any person who has a present possessory interest (fee, leasehold, rental, or other) in an agricultural establishment covered by the WPS. A person who has both leased such agricultural establishment to another person and granted that same person the right and full authority to manage and govern the use of such agricultural establishment is ***not*** an owner under the WPS.

Examples:
You do not qualify for the agricultural owner exemptions if:

1. you have rented out or leased out your farm, forest, nursery, or greenhouse to another person ***and*** you have no part in the management or profit/loss from it. The person to whom you have rented or leased your property is the "owner" for the purposes of the WPS.

2. you are hired to operate a farm, forest, nursery, or greenhouse, but the person who owns the property makes some of the decisions as to the management of it or shares in the profit/loss from it.

Immediate family includes only spouse, children, stepchildren, foster children, parents, stepparents, foster parents, brothers, and sisters.

The WPS does ***not*** allow any exemptions for owners of commercial pesticide handling establishments or for persons who operate or manage, but do not own, an agricultural establishment.

Agricultural owners must provide all protections required by the WPS to persons who are *not* members of their immediate family. These persons include:

- workers or handlers who are their employees, and
- persons who clean PPE or repair, clean, or maintain contaminated pesticide handling equipment.

REQUIREMENTS AGRICULTURAL OWNERS MUST COMPLY WITH

The following requirements and provisions ***do*** apply to owners of agricultural establishments and to members of their immediate family:

1. Employer information exchange. (p. 26)
2. Restrictions during handling tasks:
   - Use the personal protective equipment and other work attire listed on the pesticide labeling for the task being performed. (pp. 64-65)
   - Exceptions to personal protective equipment. (pp. 66-67)
3. Restrictions during applications:
   - Make sure that each pesticide is applied so that it does not contact, either directly or through drift, anyone (including you and members of your immediate family), except appropriately trained and equipped handlers. (p. 59)
   - Make sure that you, your family members, and all other persons, except correctly trained and equipped handlers, are kept out of areas being treated with pesticides. (pp. 36-37)
   - Make sure that you, your family members, and all other persons, except correctly trained and equipped handlers, are kept out of areas immediately around the area being treated during certain pesticide applications in nurseries and greenhouses. (p. 39-44)
4. Restrictions during restricted-entry intervals: (p. 36-37)
   - When two (or more) pesticides are applied at the same time, and have different REIs, make sure that you and your family members follow the longer restricted-entry interval. (p. 36)
   - No-contact early entry. (p. 37)
   - Short-term, limited-contact, agricultural emergency, or specially excepted early entry (see explanation below). (p. 47)

If agricultural owners or members of their immediate family enter a treated area and contact treated surfaces during a restricted-entry interval, they must:

- Wait at least 4 hours after the pesticide application is completed before entering the treated area, ***and***
- Wait at least until any inhalation exposure level listed on the product labeling has been reached or any WPS ventilation criteria have been met, ***and***
- Obey the time limitation of 1 hour in 24 hours, if short-term (non-hand-labor) early-entry tasks are being performed or 8 hours in 24 hours, if limited-contact early-entry tasks are being performed, ***and***
- Wear the personal protective equipment specified on the pesticide labeling for early-entry tasks, ***and***
- Follow any other restrictions specified in any special exception under which the early entry takes place, ***and***
- Follow any other restrictions specified in the pesticide labeling for early entry.

EXEMPTIONS FOR AGRICULTURAL OWNERS

Agricultural owners are ***not*** required to provide themselves or members of their immediate family with the following protections of the WPS:

1. Information at a central location (p. 19)
2. Pesticide safety training (pp. 21-23)
3. Decontamination supplies (pp. 24-25)
4. Emergency assistance (p. 27)
5. Notice about applications (pp. 33-35)
6. Monitoring handlers (p. 59)
7. Specific handling instructions (p. 60)
8. Equipment safety (p. 61)
9. All the specific duties related to the care of PPE and management of its use. (p. 62-63)
10. The following duties related to early entry: (p. 53-56)
    - Training and instructions,
    - Decontamination supplies,
    - Specific duties related to the care of PPE and management of its use.

PROTECTIONS FOR CROP ADVISORS

BASIC RESPONSIBILITIES

The WPS requires employers to provide certain protections to their employees who are working as crop advisors.

Crop advisor

Any person who is assessing pest numbers or damage, pesticide distribution, or the status, condition, or requirements of agricultural plants. The term does ***not*** include any person who is performing hand labor tasks, such as weeding, planting, cultivating, or harvesting. Examples of crop advisors are crop consultants, scouts, and integrated pest management monitors.

Independent or commercial crop advisor

Any person who is working as a crop advisor and is employed (including self-employed) by anyone other than the agricultural establishment on which the work is being done. Such a person may be either certified/licensed or uncertified/unlicensed.

Noncommercial crop advisor

Any person who is working as a crop advisor and is employed directly by the agricultural establishment on which the work is being done. Such a person may be either certified/licensed or uncertified/unlicensed.

Certified or licensed crop advisor

Any person who is certified or licensed as a crop advisor by a program acknowledged, in writing, as appropriate by EPA or a state or tribal lead agency for pesticide enforcement. The certification or licensing program must require pesticide safety training that includes at least all the information specified for WPS pesticide handler training (see p. 21).

Direct supervision

A person is considered to be under a certified/licensed crop advisor's direct supervision (and therefore eligible for crop advisor exceptions) only when the crop advisor has informed the person about all of the following:

- the appropriate personal protective equipment,
- the appropriate decontamination supplies,
- how to conduct the crop advising tasks safely,
- the pesticide products and active ingredient(s) applied,
- the method of application,
- the time of application,
- the restricted-entry interval,
- which crop advisor tasks to undertake, and
- how to contact the certified/licensed crop advisor.

Direct supervision does not require that the crop advisor be physically present at all times, but the crop advisor must be readily accessible to the employees at all times.

DUTIES FOR UNCERTIFIED/UNLICENSED CROP ADVISORS

Exemption

Certified/licensed crop advisors and persons performing crop advising tasks under their direct supervision are exempt from certain WPS duties and requirements when specific conditions are met. See Certified/Licensed Crop Advisor Exemption on p. 77.

Required Protections During or Soon After a Pesticide Application

1. Same Protections as Pesticide Handlers

Employers must provide their crop advisors with the WPS protections required for **pesticide handlers *if*** the crop advisor enters an area on an agricultural establishment:

- while a pesticide is being applied,
- before any inhalation exposure level listed in the pesticide labeling has been reached or before one of the ventilation criteria in the WPS or in the pesticide labeling has been reached,
- while a restricted-entry interval is in effect.

2. No Time Limits

Crop advisors may enter an area during a pesticide application or during a restricted-entry interval as long as they are trained as pesticide handlers, are given other pesticide-handler protections (listed below), and are wearing the appropriate personal protective equipment. The restrictions on entry, such as waiting for 4 hours after application is completed or limiting the time spent in the entry-restricted area to 1 hour or any other period, ***do not apply*** to crop advisors.

3. Required Protections

- Information at a central location (p. 19)

  Exception

  Employers of independent (commercial) crop advisors do ***not*** have to provide their crop advisors with information at a central location.

- Pesticide safety training for handlers (p. 21)
- Decontamination supplies (p. 24)
- Emergency assistance (p. 27)
- Monitoring handlers (p. 59)

  Note: After the application is complete, crop advisors entering a treated area during a restricted-entry interval need not be monitored.

- Special instructions for handlers (p. 60)
- Duties related to PPE (p. 62)

4. Personal Protective Equipment During REIs

Early-Entry PPE for Early Entry "With Contact": Crop advisors who enter a treated area during a restricted-entry interval, and whose crop advisor activities involve contact with anything that has been treated with a pesticide, including soil, water, and surfaces of plants, may wear the PPE listed on the pesticide labeling **for early-entry tasks** (instead of the PPE listed for handling tasks), if:

- Application has been completed for at least 4 hours, and
- Any inhalation exposure level listed in the labeling has been reached or any ventilation requirements established by the WPS or pesticide labeling have been met.

Crop advisors may enter treated areas during an application or during a restricted-entry interval if they receive handler-type protections.

No PPE for "No Contact" Early Entry: Crop advisors who enter a treated area during a restricted-entry interval and whose crop advisor activities do ***not*** involve contact with anything that has been treated with the pesticide to which the restricted-entry interval applies are not required to wear personal protective equipment.

Required Protections After the REI

1. Independent (Commercial) Crop Advisors

When independent (commercial) crop advisors enter any area on an agricultural establishment where no application is underway and no restricted-entry interval is in effect, their employers need ***not*** provide them with any WPS protections.

2. Noncommercial Crop Advisors

See p. 74 for definition of certified/licensed crop advisor.

When noncommercial crop advisors (employees of the farm, forest, nursery, or greenhouse) enter any area on the agricultural establishment where no application is underway and no restricted-entry interval is in effect, their employer must provide them with the WPS protections required for **agricultural workers**. For specific information about each of these protections, see the pages referenced below. The protections include:

- Information at a central location (p. 19)
  - certain information (pesticide safety poster, application information, location of emergency facility) must be displayed at a central location whenever (1) the crop advisor is on the agricultural establishment, and (2) a pesticide has recently been applied.
- Pesticide safety training for workers (p. 21)
  - crop advisors must be trained about general pesticide safety before they accumulate 5 days of entry into treated areas on the establishment where, within the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect.
- Decontamination supplies (p. 24)
  - decontamination supplies for washing off pesticide residues must be provided to any crop advisor who is working an area where a pesticide has recently been applied and who is doing tasks that involve contact with anything that has been treated with the pesticide, including soil, water, or surfaces of plants.
- Emergency assistance (p. 27)
  - Emergency assistance must be provided to the crop advisor if there is reason to believe that the employee has been poisoned or injured by a pesticide used on the agricultural establishment — for example, through application, spills, splashes, drift, or contact with pesticide residues.
- Notice about applications (p. 33)
  - with a few exceptions, the crop advisor must be notified about areas on the agricultural establishment where pesticide applications are taking place or where restricted-entry intervals are in effect.
- Restrictions during and after applications (p. 36)
  - the crop advisor must be protected during pesticide applications and during restricted-entry intervals on the agricultural establishment.

DUTIES FOR CERTIFIED/LICENSED CROP ADVISORS: CROP ADVISOR EXEMPTION

Certified/licensed crop advisors and persons performing crop advising tasks under their direct supervision are exempt from certain WPS duties and requirements, provided the certified/licensed crop advisors:

- do not enter, or allow persons under their supervision to enter, treated areas until after application is completed, and
- perform, and make sure that persons under their supervision perform, crop advisor tasks only, including assessing pest numbers or damage, checking pesticide distribution, or determining the status, condition, or requirements of agricultural plants, and
- specifically determine the appropriate personal protective equipment, and the appropriate decontamination supplies and how to conduct the crop advising tasks safely, and
- inform each person under their direct supervision – in a language that the person can understand — about the appropriate personal protective equipment, the appropriate decontamination supplies, and how to conduct the crop advising tasks safely, and
- using an established practice of communication, inform each person under their direct supervision about ***all*** the following:
  - the pesticide product(s) and active ingredient(s) applied,
  - the method of application,
  - the time of application,
  - the restricted entry interval,
  - which crop advisor tasks to undertake,
  - how to contact the certified/licensed crop advisor.

Requirements for Entry During an Application

The certified/licensed crop advisor exemption does not apply when crop advisors or persons under their direct supervision enter an area before application is completed.

Required Protections for Entry During an REI

When crop advisors enter into treated areas while a restricted-entry interval is in effect, they are defined in the WPS as pesticide handlers. When all the conditions of the certified/licensed crop advisor exemption are met, **certified/licensed crop advisors and persons under their direct supervision are exempt from the following WPS handler requirements**:

- Decontamination supplies (p. 24)
- Emergency assistance (p. 27)
- Special instructions for handlers (p. 60)
  Note: Despite this exemption, the WPS does require that any agricultural establishment owner or operator who hires a commercial crop advisor must inform the employer of that advisor about the specific location and description of any areas on the agricultural establishment (1) that may be treated with a pesticide or be under a restricted-entry interval while the commercial crop advisor will be there, ***and*** (2) that the commercial crop advisor may be in (or walk within 1/4 mile of). The operator must also provide information about restrictions on entering those areas.
- Duties related to PPE (p. 62)

For specific information about each of these protections, see the pages referenced.

However, while a restricted-entry interval is in effect, **employers must provide the following WPS protections to certified/licensed crop advisors and persons under such crop advisors' direct supervision**:

- Information at a central location (p. 19)
  - certain information (pesticide safety poster, application information, location of emergency facility) must be displayed at a central location whenever (1) the crop advisor is on the agricultural establishment, and (2) a pesticide has recently been applied.

  Exception
  The requirement above applies only to noncommercial certified/licensed crop advisors (employees of the establishment where they are working). Employers who hire independent (commercial) crop advisors do ***not*** have to provide those crop advisors with information at a central location.

- Pesticide handler training (p. 21)

  Exception
  As a requirement of any approved certification or licensing program, certified/licensed crop advisors have received pesticide safety training equivalent to WPS pesticide handler training. Employers do not need to retrain either commercial or noncommercial certified/licensed crop advisors. However, WPS pesticide handler training IS required for any unlicensed/uncertified crop advisors working under the direct supervision of certified/licensed crop advisors, and they must be retrained at least once every 5 years.

REQUIRED PROTECTIONS AFTER THE REI

1. Independent (Commercial) Crop Advisors

When certified/licensed independent (commercial) crop advisors enter any area on an agricultural establishment where no application is underway and no restricted-entry interval is in effect, their employers need ***not*** provide them with any WPS protections.

2. Noncommercial Crop Advisors

When noncommercial crop advisors (employees of the farm, forest, nursery, or greenhouse) enter any area on the agricultural establishment where no application is underway and no restricted-entry interval is in effect, they are defined in the WPS as agricultural workers. When all the conditions of the certified/licensed crop advisor exemption are met, certified/licensed crop advisors or persons under their direct supervision are exempt from the following WPS agricultural worker requirements:

- Decontamination supplies (p. 24)
- Emergency assistance (p. 27)

However, agricultural employers must provide the following WPS protections to their employees who are certified/licensed crop advisors, or who are persons under such crop advisors' direct supervision, when the employees enter treated areas on the agricultural establishment where no application is underway and when no restricted-entry interval is in effect:

- Information at a central location (p. 19)
  - certain information (pesticide safety poster, application information, location of emergency facility) must be displayed at a central location whenever (1) the crop advisor is on the agricultural establishment, and (2) a pesticide has recently been applied.

- Pesticide safety training and safety information for workers (p. 21)

  Exception

  As a requirement of any approved certification or licensing program, certified/licensed crop advisors have received pesticide safety training equivalent to WPS pesticide handler training. They need not be retrained. However, uncertified/unlicensed crop advisors working under the direct supervision of a certified/licensed crop advisor must receive pesticide safety training and safety information for workers and must be retrained within 5 years.

- Notice about applications. (p. 33)
  - with a few exceptions, the crop advisor must be notified about areas on the agricultural establishment where pesticide applications are taking place or where restricted-entry intervals are in effect.
- Restrictions during and after applications (p. 36)
  - the crop advisor must be protected during pesticide applications and during restricted-entry intervals on the agricultural establishment.

Summary of WPS Requirements for Employers of Crop Advisors

WPS Provision	Uncertified and Unlicensed Crop Advisor						Certified or Licensed Crop Advisor					
	Noncommercial (Employed Directly by Ag Establishment)			Independent (Commercial)			Noncommercial (Employed Directly by Ag Establishment)			Independent (Commercial)		
	During Application	During REI	After REI Expires	During Application	During REI	After REI Expires	During Application	During REI	After REI Expires	During Application	During REI	After REI Expires
Information at a Central Location	YES	YES	YES	NO	NO	NO	Not applicable	YES	YES	Not applicable	NO	NO
Pesticide Safety Training & Information	YES (handler)	YES (handler)	YES (worker)	YES (handler)	YES (handler)	NO	Not applicable	YES (handler)	YES (worker)	Not applicable	YES (handler)	NO
Decontamination Supplies	YES (handler)	YES (handler)	YES (worker)	YES (handler)	YES (handler)	NO	Not applicable	NO	NO	Not applicable	NO	NO
Emergency Assistance	YES (handler)	YES (handler)	YES (worker)	YES (handler)	YES (handler)	NO	Not applicable	NO	NO	Not applicable	NO	NO
Monitoring Handlers	YES	NO	NO	YES	NO	NO	Not applicable	NO	NO	Not applicable	NO	NO
Special Instructions for Handlers	YES	YES	NO	YES	YES	NO	Not applicable	NO	NO	Not applicable	NO	NO
Duties Related to PPE	YES	YES	NO	YES	YES	NO	Not applicable	NO	NO	Not applicable	NO	NO
Notice About Applications	NO	NO	YES	NO	NO	NO	Not applicable	NO	YES	Not applicable	NO	NO
Restrictions During and After Applications	NO	NO	YES	NO	NO	NO	Not applicable	NO	YES	Not applicable	NO	NO

APPENDIX A
CRITERIA FOR WPS MATERIALS

The WPS contains specific criteria for the design of the sign required for treated-area posting and for the content of the safety poster, worker training materials, and handler training materials. This appendix lists those criteria.

EPA has developed a safety poster, warning sign, and worker and handler training programs to meet the requirements of the WPS. You may use these materials, or you may use alternative materials that meet the criteria as listed in this appendix.

Criteria for Pesticide Safety Poster 83

Requirements for Warning Signs 85

Criteria for Worker Training..... 87

Criteria for Handler Training 89

CRITERIA FOR PESTICIDE SAFETY POSTER

Each WPS safety poster must convey to workers and handlers:

1. That there are federal rules to protect them, including a requirement for safety training.

2. How to help keep pesticides from getting on or into their bodies. The poster must include the following instructions:

- Avoid getting on your skin or into your body any pesticides that may be on plants and soil, in irrigation water, or drifting from nearby applications.
- Wash before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Wear work clothing that protects your body from pesticide residues, such as long-sleeved shirts, long pants, shoes, socks, and hats or scarves.
- Wash or shower with soap and water, shampoo your hair, and put on clean clothes after work.
- Wash work clothes separately from other clothes before wearing them again.
- Wash immediately in the nearest clean water if pesticides are spilled or sprayed on your body. As soon as possible, shower, shampoo, and change into clean clothes.
- Follow directions about keeping out of treated or restricted areas.

REQUIREMENTS FOR WARNING SIGNS

1. **Required Words:**
   - The words "DANGER — PELIGRO" and "PESTICIDES — PESTICIDAS" must be located at the top of the sign and "KEEP OUT—NO ENTRE" at the bottom.

     Exception
     As an option, you may use warning signs that replace the Spanish words with the same words in another language (other than English) that is read by the largest number of your workers who do not read English. The replacement sign must meet all of the other requirements for the WPS warning sign.
   - The words must be clearly legible.
2. **Required Design**:
   - A circle containing an upraised hand on the left and a stern face on the right must be near the center of the sign.
   - The background outside the circle must contrast with the inside of the circle.
   - The hand and a large portion of the face must contrast with the inside of the circle.
   - The remainder of the inside of the circle must be red.
   - The length of the hand must be at least twice the height of the smallest letters.
   - The length of the face must be only slightly smaller than the hand.
3. **Additional Information:**

You may put additional information on the warning sign, such as the name of the pesticide and the date of application, if it does not detract from the appearance of the sign or change the meaning of the required information.

4. **Size:**

The signs must be at least 14 inches by 16 inches, and the letters must be at least 1 inch high.

Exception
On farms and in forests, you may use smaller signs if the treated area is too small to accommodate 14- by 16-inch signs. For example, when a single plant needs to be posted, a smaller sign would be appropriate. In nurseries and greenhouses, you may use a sign smaller than the standard size. Whenever a small sign is used, there are specific posting distances depending on the size of the lettering and symbol on the sign (see table on the next page).

Signs with the words "DANGER" and "PELIGRO" in letters less than *7/16 inch in height* ***or*** *with any words in letters* less than *1/4 inch in height* ***or*** *with the circle graphic containing an upraised hand and a stern face* less than *1½ inches in diameter do not meet WPS sign requirements.*

Sign Size	Required Height in Inches			Maximum Distance Between Signs*
	Circle Graphic	Lettering for Words "DANGER" & "PELIGRO"	Lettering for Other Words	
7" x 8" (approx.)	3"	7/8"	1/2"	50 feet
4 1/2" x 5" (approx.)	1 1/2"	7/16"	1/4"	25 feet

* This distance requirement is for places where multiple signs are used to post a single treated area, such as a nursery or a greenhouse section. It does not apply where individual signs are used for separate small treatment areas (such as single potted plants in a greenhouse).

CRITERIA FOR WORKER TRAINING

1. WPS training for workers must include at least the following information:
   - Where and in what form pesticides may be encountered during work activities.
   - Hazards of pesticides resulting from toxicity and exposure, including acute effects, chronic effects, delayed effects, and sensitization.
   - Routes through which pesticides can enter the body.
   - Signs and symptoms of common types of pesticide poisoning.
   - Emergency first aid for pesticide injuries or poisonings.
   - How to obtain emergency medical care.
   - Routine and emergency decontamination procedures, including emergency eyeflushing techniques.
   - Hazards from chemigation and drift.
   - Hazards from pesticide residues on clothing.
   - Warnings about taking pesticides or pesticide containers home.
   - An explanation of the WPS requirements designed to protect workers, including application and entry restrictions, design of the warning sign, posting of warning signs, oral warnings, availability of specific information about applications, and protection against retaliatory acts.
2. WPS worker training materials must use terms that the worker can understand.

CRITERIA FOR HANDLER TRAINING

WPS training for handlers must include at least the following information:

- Format and meaning of information on pesticide labels and in labeling, including safety information such as precautionary statements about human health hazards.
- Hazards of pesticides resulting from toxicity and exposure, including acute effects, chronic effects, delayed effects, and sensitization.
- Routes through which pesticides can enter the body.
- Signs and symptoms of common types of pesticide poisoning.
- Emergency first aid for pesticide injuries or poisonings.
- How to obtain emergency medical care.
- Routine and emergency decontamination procedures, including emergency eyeflushing techniques.
- Need for and appropriate use of personal protective equipment.
- Prevention, recognition, and first aid treatment of heat-related illness.
- Safety requirements for handling, transporting, storing, and disposing of pesticides, including general procedures for spill cleanup.
- Environmental concerns such as drift, runoff, and wildlife hazards.
- Warnings about taking pesticides or pesticide containers home.
- An explanation of WPS requirements that handler employers must follow for the protection of handlers and others, including the prohibition against applying pesticides in a manner that will cause contact with workers or other persons, the requirement to use personal protective equipment, the provisions for training and decontamination, and the protection against retaliatory acts.

APPENDIX B
SAMPLE FORMS, FACT SHEETS, AND CHECKLISTS

Appendix B includes a sample Pesticide Application Information form with space for the pesticide application information the WPS requires to be listed at a central location on each agricultural establishment. The WPS does not specify a format for presenting the information — you may copy this form or design another that meets your needs.

Appendix B also includes several fact sheets to help you comply with sections of the WPS that require you to provide information to others. Although the WPS does not require you to provide this information in written form, you may find that using photocopies of these fact sheets is a convenient way to make sure you convey the necessary information.

Finally, Appendix B includes some checklists and charts you can use as reminders of your WPS duties.

Pesticide Application Information 93

Fact Sheets:

- **Information About Cleaning PPE** 95
- **Working Safely With Pesticide Equipment** 97
- **Agricultural Owners and Operators: Information to Be Provided to Employers of Custom Applicators and Independent Crop Advisors** 99
- **Custom Applicators: Information to Be Provided to Agricultural Establishment Owners and Operators** 101

Checklists:

- **WPS Requirements for Agricultural Workers** 103
- **WPS Requirements for Pesticide Handlers** 105
- **WPS Requirements for Commercial Handlers** 107
- **WPS Exemptions for Agricultural Owners** 109
- **WPS Requirement To Provide Basic Pesticide Safety Information To Untrained Workers** 111

Charts:

- **EPA Chemical Resistance Category Chart** 113
- **Heat Stress: Preventable Measures, Illnesses, and First Aid Treatments** 115

PESTICIDE APPLICATION INFORMATION

AGRICULTURAL ESTABLISHMENT OWNERS AND OPERATORS:

The use of this form is optional, but if the information about an application is entered, it will help you comply with the federal Worker Protection Standard including all revisions through 2004 for information that must be displayed at a central place to inform workers and handlers about specific pesticide applications. For complete information, see p. 19 of the EPA manual "The Worker Protection Standard for Agricultural Pesticides: How To Comply."

	Application #1	Application #2
Area Treated: Location & Description		
Product Name		
EPA Registration Number		
Active Ingredient: Common or Chemical Name		
Application: Month/Day/Time		
Restricted-Entry Interval		
Do Not Enter Until: Month/Day/Time		

Similar data is required by the Federal Recordkeeping Requirements for Certified Applicators of Federally Restricted Use Pesticides (RUP). For more information on the RUP recordkeeping requirements, contact Agricultural Marketing Service, USDA, 8609 Sudley Road, Suite 203, Manassas, VA 20110, (703) 330-7826. Please consult the "USDA Recordkeeping Manual" at the following Web site for a complete list of all USDA record keeping requirements: http://www.ams.usda.gov/science/prb/Prbforms.htm

Some states, tribes, or local governments with jurisdiction over pesticide enforcement may have additional worker protection requirements beyond these requirements. Check with these agencies to obtain the information you need to comply with all applicable state, tribal, or local requirements.

Note to Employers:
This 2-page fact sheet will help you comply with the section of the WPS that requires you to provide information to people (other than your own handlers) who clean PPE for you. You are not required to give them this information in written form, but you may find that photocopying this fact sheet is an easy way to pass along the necessary information.

INFORMATION ABOUT CLEANING PPE

PROTECT YOURSELF FROM PESTICIDES

☐ 1. The clothing and protective equipment items you will be cleaning may have pesticides on them.

☐ 2. Although you may not be able to see or smell the pesticides, they can rub off on you when you touch the clothing and equipment.

☐ 3. If pesticides get on you, they can hurt you. They can:

- cause skin rashes or burns,
- go through your skin and into your body and make you ill,
- burn your eyes,
- make you ill if you breathe them or get them in your mouth.

☐ 4. To avoid harm from the pesticide, you should:

- Pour the clothes from their container into the washer without touching them.
- Handle only the inner surfaces, such as the inside of boots, aprons, or coveralls.
- Do not breathe the steam from the washer and dryer.

☐ 5. Pesticides should not be allowed to stay on your hands:

- When you wash clothing or equipment by hand, use plenty of water and rinse your hands often.
- Wash your hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Wash your hands as soon as you finish handling the clothing or equipment.

☐ 6. You should not allow clothing and equipment with pesticides on them to be washed with regular laundry. The pesticides can rub off on other items.

RECOMMENDED METHODS FOR CLEANING PPE

Cleaning Eyewear and Respirators

Hand-wash reusable respirator facepieces, goggles, face shields, and shielded safety glasses, following manufacturer's instructions. In general, use mild detergent and warm water to wash the items thoroughly. Rinse well. Wipe dry, or hang in a clean area to air dry.

Cleaning Other PPE

☐ 1. Follow the manufacturer's cleaning instructions. If the instructions say only to wash the item, or if there are no cleaning instructions, follow the procedure below.

☐ 2. Recommended procedure for washing most PPE:

a. **Rinse** in a washing machine or by hand.
b. **Wash in a washing machine**, using a heavy-duty detergent and hot water for the wash cycle.
c. **Wash only a few items at a time** to allow plenty of agitation and water for dilution. Use the highest water-level setting.
d. **Rinse twice** using two rinse cycles and warm water.
e. **Use two entire machine cycles** to wash items that are moderately to heavily contaminated.
f. **Run the washer through at least one more entire cycle** without clothing, using detergent and hot water, to clean the machine.

☐ 3. Some plastic or rubber items that are not flat, such as gloves, footwear, and coveralls, must be washed twice — once to clean the outside and a second time after turning the item inside out.

☐ 4. Some items, such as heavy-duty boots and rigid hats or helmets, should be washed by hand using hot water and heavy-duty detergent.

☐ 5. **Hang the items to dry**, if possible. Let them hang for at least 24 hours in an area with plenty of fresh air — preferably outdoors. Do not hang items in enclosed living areas.

☐ 6. You may **use a clothes dryer** for fabric items if it is not possible to hang them to dry. But after repeated use, the dryer may become contaminated with pesticides.

Note to Employers:
This fact sheet will help you comply with the section of the WPS that requires you to provide information to people (other than your own handlers) who clean or maintain you pesticide equipment. You are not required to give them this information in written form, but you may find that photocopying this fact sheet is an easy way to pass along the necessary information.

WORKING SAFELY WITH PESTICIDE EQUIPMENT

☐ 1. The equipment you will be cleaning, adjusting, or repairing may have pesticides on it. Although you may not be able to see or smell the pesticides, they can rub off on you when you touch the equipment.

☐ 2. If pesticides get on you, they can hurt you. They can:

- cause skin rashes or burns,
- go through your skin and into your body and make you ill,
- burn your eyes,
- make you ill if you get them in your mouth.

☐ 3. You should wear work clothing that protects your body from pesticide residues, such as long-sleeved shirts, long pants, shoes, and socks. If possible, avoid touching the parts of the equipment where the pesticide is most likely to be. Or, if practical for the job that you will be doing, consider wearing rubber or plastic gloves and an apron.

☐ 4. You should not let pesticides stay on your hands:

- Wash your hands as soon as you finish handling the equipment.
- Wash your hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Wash or shower with soap and water, shampoo your hair, and put on clean clothes after work.
- Wash work clothes that may have pesticides on them separately from other clothes before wearing them again.

AGRICULTURAL ESTABLISHMENT OWNERS & OPERATORS

Agricultural Establishment Owners and Operators:

The use of this form is optional, but ***if you hire custom applicators or independent crop advisors , you must provide this information to the employers of those persons.*** *This information is necessary to assure that custom applicators and independent crop advisors are protected according to the federal Worker Protection Standard including all revisions through 2004. For complete information, see p. 26 of the EPA manual "The Worker Protection Standard for Agricultural Pesticides: How To Comply."*

INFORMATION TO BE PROVIDED TO EMPLOYERS OF CUSTOM APPLICATORS AND INDEPENDENT CROP ADVISORS

The following information refers to areas that your employees may need to enter, or come with in 1/4 mile of on foot, while working on this agricultural establishment.

	Application #1	Application #2
Areas to be Treated or Under Restricted Entry Intervals: Location & Description		
Entry Restricted Until: Month/Day/Time		
PPE Required for Handlers*		
Early-Entry PPE Required for Workers*		

**The only early entry allowed is that which is permitted by the federal Worker Protection Standard including all revisions through 2004.*

CUSTOM APPLICATORS

Custom (for hire) Applicators:

The use of this form is optional, but ***you must provide this information to the agricultural owners and operators who hire you to apply pesticides.*** *This information is necessary to assure that the grower's employees are protected according to the federal Worker Protection Standard including all revisions through 2004. For complete information, see p. 26 of the EPA manual "The Worker Protection Standard for Agricultural Pesticides: How To Comply."*

INFORMATION TO BE PROVIDED TO AGRICULTURAL ESTABLISHMENT OWNERS AND OPERATORS

	Application #1	Application #2
Area to be Treated: Location & Description		
Product Name		
EPA Registration Number		
Active Ingredient: Common or Chemical Name		
Application: Month/Day/Time*		
Entry Restricted Until: Month/Day/Time		
Are Both Treated Area Posting and Oral Notifications Required?		
Other Label Requirements to Protect Workers, Handlers, and Others		
PPE Required for Handlers**		
Early-Entry PPE Required for Workers**		
Other		

**If the pesticide is not applied as scheduled, the customer must be notified of the corrected time and date before the application takes place. If you are unable to make the correction before the application takes place, make it as soon as possible thereafter.*

***The only early entry allowed is that permitted by the federal Worker Protection Standard including all revisions through 2004.*

CHECKLIST: WPS REQUIREMENTS FOR AGRICULTURAL WORKERS

Have you given your agricultural workers the protections required by the EPA Worker Protection Standard? Use this list as a reminder. Remember that you have duties to persons other than your worker employees. For complete explanations, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

- ☐ 1. Information at a central location (WPS safety poster, application information, location of emergency medical facility) ..... H-T-C pp. 19-20
- ☐ 2. Pesticide safety training for workers ..... H-T-C pp. 21-23
- ☐ 3. Decontamination supplies (water, soap, towels, etc.) ..... H-T-C pp. 24-25
- ☐ 4. Emergency assistance (transportation and information) ..... H-T-C p. 27
- ☐ 5. Restrictions during applications (do not allow workers in area) ..... H-T-C pp. 36-37
- ☐ 6. Special application restrictions in nurseries ..... H-T-C pp. 41-42
- ☐ 7. Special application restrictions in greenhouses ..... H-T-C pp. 43-44
- ☐ 8. Restrictions during restricted-entry intervals (and limitations on early entry) ..... H-T-C pp. 36-37 and 47-56
- ☐ 9. Notice about applications (oral warnings and treated area posting) ..... H-T-C pp. 33-35

CHECKLIST: WPS REQUIREMENTS FOR PESTICIDE HANDLERS

Have you given your pesticide handlers the protections required by the EPA Worker Protection Standard? Use this list as a reminder. Remember that you have duties to persons other than your handler employees. For complete explanations, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

- ☐ 1. Information at a central location (WPS safety poster, application information, location of emergency medical facility) ..... H-T-C pp. 19-20
- ☐ 2. Pesticide safety training for handlers ..... H-T-C pp. 21-23
- ☐ 3. Decontamination supplies (water, soap, towels, change of clothing, etc.) ..... H-T-C pp. 24-25
- ☐ 4. Emergency assistance (transportation and information) ..... H-T-C p. 27
- ☐ 5. Restrictions during applications (do not allow pesticide to contact anyone directly or through drift) ..... H-T-C p. 59
- ☐ 6. Monitoring handlers (if handling skull and crossbones pesticides anywhere or fumigants in greenhouses) ..... H-T-C p. 59
- ☐ 7. Specific instructions for handlers (pesticide label information and how to use application equipment) ..... H-T-C p. 60
- ☐ 8. Equipment safety (inspection and maintenance of application equipment) ..... H-T-C p. 61
- ☐ 9. Personal protective equipment (provide, clean, maintain PPE, and prevent heat illness) ..... H-T-C pp. 62-63
- ☐ 10. Exceptions to personal protective equipment (closed systems, enclosed cabs, and open and enclosed cockpits) ..... H-T-C pp. 66-67

CHECKLIST: WPS REQUIREMENTS FOR COMMERCIAL HANDLERS

Have you given the handler employees of your commercial pesticide handling establishment the protections required by the EPA Worker Protection Standard? Use this list as a reminder. Remember that you have duties to persons other than your handler employees. For complete explanations, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

- ☐ 1. Pesticide safety training for handlers ..... H-T-C pp. 21-23
- ☐ 2. Decontamination supplies (water, soap, towels, change of clothing, etc) ..... H-T-C pp. 24-25
- ☐ 3. Emergency assistance (transportation and information) ..... H-T-C pp. 27
- ☐ 4. Restrictions during applications (do not allow pesticide to contact anyone directly or through drift) ..... H-T-C p. 59
- ☐ 5. Monitoring handlers (if handling skull and crossbones pesticides anywhere or fumigants in greenhouses) ..... H-T-C p. 59
- ☐ 6. Specific instructions for handlers (pesticide label information and how to use application equipment) ..... H-T-C p. 60
- ☐ 7. Equipment safety (inspection and maintenance of application equipment) ..... H-T-C p. 61
- ☐ 8. Personal protective equipment (provide, clean, maintain PPE, and prevent heat illness) ..... H-T-C pp. 62-63
- ☐ 9. Exceptions to personal protective equipment (closed systems, enclosed cabs, and open and enclosed cockpits) ..... H-T-C pp. 66-67

CHECKLIST: WPS EXEMPTIONS FOR AGRICULTURAL OWNERS

Although agricultural owners are encouraged to give WPS protections to themselves and their families,* the WPS does not ***require*** them to provide themselves or members of their immediate family with the following:

- ☐ 1. Information at a central location (WPS safety poster, application information, and location of emergency medical facility) ..... H-T-C pp. 19-20
- ☐ 2. Pesticide safety training for workers or handlers ..... H-T-C pp. 21-23
- ☐ 3. Decontamination supplies (water, soap, towels, change of clothing, etc.) ..... H-T-C pp. 24-25
- ☐ 4. Emergency assistance (transportation and information) ..... H-T-C p. 27
- ☐ 5. Notice about applications (oral warnings and treated area posting) . H-T-C p. 33-35
- ☐ 6. Monitoring handlers (if handling skull and crossbones pesticides anywhere or fumigants in greenhouses) ..... H-T-C p. 59
- ☐ 7. Specific handling instructions (pesticide label information and how to use application equipment)..... H-T-C p. 60
- ☐ 8. Equipment safety (inspection and maintenance of application equipment)..... H-T-C p. 61
- ☐ 9. All the specific duties related to the care of PPE and management of its use (provide, clean, maintain PPE and prevent heat illness) .. H-T-C pp. 62-63
- ☐ 10. The following duties related to early entry: ..... H-T-C pp. 53-56
  - Training and instructions
  - Decontamination supplies
  - Specific duties related to the care of PPE and management of its use.

* *Remember that you must provide all protections required by the WPS to persons who are **not** members of your immediate family.*

CHECKLIST: WPS REQUIREMENT TO PROVIDE BASIC PESTICIDE SAFETY INFORMATION TO UNTRAINED WORKERS

You must provide basic pesticide safety information to **untrained** workers before they enter treated areas on your establishment where, within the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect. For a complete explanation, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

The following is a list of things that you must provide:

☐ 1. Basic pesticide safety information in a manner that the untrained workers can understand, such as through written materials, oral communication, or other means.

☐ 2. Verification that you provided the workers with the required basic pesticide safety information.

☐ 3. At least the following information:

- Pesticides may be on or in plants, soil, irrigation water, or drifting from nearby applications.
- To prevent pesticides from entering your body:
  - Follow directions and/or signs about keeping out of treated or restricted areas,
  - Wash before eating, drinking, using chewing gum or tobacco, or using the toilet,
  - Wear work clothing that protects your body from pesticide residues,
  - Wash/shower with soap and water, shampoo hair, and put on clean clothes after work,
  - Wash work clothes separately from other clothes before wearing them again,
  - Wash immediately in the nearest clean water if pesticides are spilled or sprayed on your body and then — as soon as possible — shower, shampoo, and change into clean clothes.
- You will receive more training within 5 days (or at least before your sixth day of work in pesticide-treated areas on this establishment).

EPA CHEMICAL RESISTANCE CATEGORY CHART

This chart is to be used when PPE section on the pesticide label lists a chemical resistance category. The Worker Protection Standard requires that labels of pesticides used on farms, and in forests, nurseries and greenhouses list the type of personal protective equipment (PPE) that must be worn with each product. Labels will refer to chemical resistance categories (A-H) for PPE. Items in these categories are made of materials that the pesticide cannot pass through during the times indicated below the chart. Choose the category of resistance which best matches the handling task duration. The categories are based on the solvents used in the pesticides, ***not*** the pesticides themselves. Therefore, there will be instances where the same pesticide with two different formulations (wettable powder-WP and emulsifiable concentrate-EC, for example) will require PPE from two different chemical resistance categories.

Selection Category Listed on Pesticide Label	**Types of Personal Protective Material**							
	Barrier Laminate	**Butyl Rubber ≥ 14 mils**	**Nitrile Rubber ≥ mils**	**Neoprene Rubber ≥ 14 mils**	**Natural Rubber ≥14 mils**	**Poly-ethelene**	**Polyvinyl Chloride (PVC) ≥14 mils**	**Viton ≥14 mils**
A (a dry and water-based formulation)	high	high	high	high	high	high	high	high
B	high	high	slight	slight	none	slight	slight	slight
C	high	high	high	high	moderate	moderate	high	high
D	high	high	moderate	moderate	none	none	none	slight
E	high	slight	high	high	slight	none	moderate	high
F	high	high	high	moderate	slight	none	slight	high
G	high	slight	slight	slight	none	none	none	high
H	high	slight	slight	slight	none	none	none	high

HIGH: Highly chemical-resistant. Clean or replace PPE at end of each day's work period. Rinse off pesticides at rest breaks.

MODERATE: Moderately chemical-resistant. Clean or replace PPE within an hour or two of contact.

SLIGHT: Slightly chemical-resistant. Clean or replace PPE within ten minutes of contact.

NONE: No chemical-resistance. Do not wear this type of material as PPE when contact is possible.

HEAT STRESS: PREVENTABLE MEASURES, ILLNESSES, AND FIRST AID TREATMENTS

WAYS TO CONTROL HEAT STRESS IN AGRICULTURAL ENVIRONMENTS

Taken from EPA's "Controlling Heat Stress in Agriculture" (EPA 750-F-95-001)

Key Elements

- Drinking enough water to replace body fluid lost through sweating.
- Gradually adjusting to working in the heat.
- Taking periodic breaks in a shaded or air conditioned area whenever possible.
- Monitoring by supervisors of environmental conditions and workers.

Basic Steps

- Training in how to control heat stress and to recognize, prevent, and treat heat illnesses.
- Accounting for the weather, workload, protective gear to be worn, and condition of the workers.
- Determining minimum amounts of water workers should drink.
- Adjusting work practices for the conditions of each day.
- Giving first aid when workers become ill.

HEAT ILLNESSES AND FIRST AID MEASURES

Chart taken from EPA's "A Guide to Heat Stress in Agriculture" (EPA 750-B-92-001)

Illness	Signs and Symptoms	Cause and Problem	Treatment
Early heat illness	■ Mild dizziness, fatigue, or irritability; decreased concentration; impaired judgement	■ Reduced flow of blood to the brain ■ May lead to heat exhaustion or heat stroke	■ Loosen or remove clothing ■ Rest in shade 30 minutes or more ■ Drink water
Heat rash "prickly heat"	■ Tiny, blister-like red spots on the skin; pricking sensations ■ Commonly found on clothed areas of the body	■ Sweat glands become plugged and inflamed from unrelieved exposure of skin to heat, humidity, and sweat	■ Clean skin, apply mild drying lotion or cornstarch ■ Wear loose clothing ■ Preventable by regular bathing and drying the skin and by periodic relief from humid conditions of work ■ See physician if rash persists
Heat cramps	■ Painful spasms of leg, arm, or abdominal muscles ■ Heavy sweating, thirst ■ Occurs during or after hard work	■ Loss of body salt in sweat ■ May be totally disabling	■ Loosen clothing ■ Drink *lightly* salted beverages ■ Massage ■ Rest

HEAT ILLNESS AND FIRST AID MEASURES (cont.)

Illness	Signs and Symptoms	Cause and Problem	Treatment
Heat exhaustion	■ Fatigue, headache, dizziness, muscle weakness, loss of coordination, fainting, collapse ■ Profuse sweating; pale, moist, cool skin; excessive thirst, dry mouth; dark yellow urine ■ Fast pulse, if conscious ■ Low or normal oral temperature, rectal temperature usually 99.5–101.3 degrees F ■ May also have heat cramps, nausea, urge to defecate, rapid breathing, chills, tingling of the hands or feet, confusion, giddiness, slurred speech, irritability	■ Dehydration, lack of acclimatization; reduction of blood in circulation; strain on circulatory system, reduced flow of blood to the brain ■ Worker may resist treatment ■ May lead to heat stroke	■ Removal to cooler, shaded area as quickly as possible ■ Rest lying down ■ If conscious, have worker drink as much water as possible ■ ***Do not give salt*** ■ If unconscious or if heat stroke is also suspected, treat for heat stroke until proven otherwise ■ Loosen or remove clothing ■ Splash cold water on body ■ Massage legs and arms ■ If worker collapsed, get evaluation by physician, nurse, or EMT before worker leaves for the day; shower in cold water; rest for balance of day and overnight
Heat stroke ***Immediate Treatment Required***	***Life-threatening medical emergency*** ■ Often occurs suddenly ■ Headache, dizziness, confusion, irrational behavior, coma ■ Sweating may slow down or stop ■ Fast pulse, if conscious ■ Rapid breathing ■ Rectal temperature 104 degrees F and over ■ May also have convulsions, nausea, incoherent speech, very aggressive behavior	■ Sustained exertion in heat, lack of acclimatization, dehydration, individual risk factors; reduced flow of blood to the brain and other vital organs, body's temperature-regulating system fails, body can not cool itself ■ Risk of damage to vital organs, including the heart, brain, central nervous system, liver, and kidney ■ Worker may resist treatment ■ ***Brain damage and death can result even with prompt treatment***	■ Move to a shaded area ■ Remove outer clothing/shoes ■ Immediately wrap in wet sheet, pour water on and fan vigorously, avoid over-cooling ■ Treat shock if present, once temperature is lowered ■ If worker vomits, make sure all vomit is cleared from mouth and nose to prevent choking on vomit ■ Transport to nearest medical treatment facility at once ■ While awaiting or during transport, elevate legs, continue pouring on water and fanning ■ If conscious, have worker drink as much water as possible ■ ***Do not give salt***

APPENDIX C

QUICK REFERENCE GUIDE TO THE WORKER PROTECTION STANDARD

Including All Revisions Through 2004

(Large Print Version)

QUICK REFERENCE GUIDE TO THE WORKER PROTECTION STANDARD (WPS) Including All Revisions Through 2004

The WPS is a federal regulation designed to protect **agricultural workers** (people involved in the production of agricultural plants) and **pesticide handlers** (people mixing, loading, or applying pesticides or doing other tasks involving direct contact with pesticides) (see p. 10). The guide on these two pages presents the *maximum* WPS requirements. It does not include exceptions that may permit you to do less or options that may involve different requirements. Each section below lists pages in this manual where you can find out about exceptions and options. For more information about your responsibilities, read pp. 9-15. There are some exemptions for owners of agricultural establishments and members of their immediate family (pp. 71-73).

TOPICS

DUTIES FOR *ALL* EMPLOYERS

- Anti-Retaliation
- Information at a Central Location
- Pesticide Safety Training
- Decontamination Supplies
- Employer Information Exchange
- Emergency Assistance

ADDITIONAL DUTIES FOR WORKER EMPLOYERS

- Restrictions During Applications
- Restricted-Entry Intervals (REIs)
- Notice About Applications
  - Posted Warning Signs
  - Oral Warnings

ADDITIONAL DUTIES FOR HANDLER EMPLOYERS

- Application Restrictions and Monitoring
- Specific Instructions for Handlers
- Equipment Safety
- Personal Protective Equipment (PPE)
  - Duties Related to PPE
  - Care of PPE
  - Replacing Respirator Purifying Elements
  - Disposal of PPE
  - Instructions for People Who Clean PPE

DUTIES FOR *ALL* EMPLOYERS

ANTI-RETALIATION ..... (p. 15)

Do not retaliate against a worker or handler who attempts to comply with the WPS

INFORMATION AT A CENTRAL LOCATION ..... (p. 19-20)

1. In an easily seen central location on each agricultural establishment, display close together:

- EPA WPS safety poster,
- name, address, and telephone number of the nearest emergency medical facility,
- these facts about each pesticide application [from before each application begins until 30 days after the restricted-entry interval (REI)]:
  - product name, EPA registration number, and active ingredient(s),
  - location and description of treated area,
  - time and date of application, and REI.

2. Tell workers and handlers where the information is posted, and allow them access.

3. Tell them if emergency facility information changes and update the posted information.

4. Keep the posted information legible.

PESTICIDE SAFETY TRAINING ..... (pp. 21-23)

Unless they possess a valid EPA-approved training card, train **handlers and workers** before they begin work and at least once each 5 years:

- use written and/or audiovisual materials,
- use EPA WPS handler training materials for training handlers,
- use EPA WPS worker training materials for training workers,
- have a certified applicator conduct the training orally and/or audiovisually in a manner the employees can understand, using easily understood terms, and respond to questions.

DECONTAMINATION SUPPLIES ..... (pp. 24-25)

1. Establish accessible decontamination supplies located together within 1/4 mile of all workers and handlers. Supply:

- enough water for routine and emergency whole-body washing and for eyeflushing,
- plenty of soap and single-use towels,
- a clean coverall.

2. Provide water that is safe and cool enough for washing, for eyeflushing, and for drinking. Do not use tank-stored water that is also used for mixing pesticides.

3. Provide **handlers** the same supplies where personal protective equipment (PPE) is removed at the end of a task.

4. Provide the same supplies at each mixing and loading site.

5. Make at least 1 pint of eyeflush water immediately accessible to each **handler**.

6. Do not put **worker** decontamination supplies in areas being treated or under an REI.

7. In areas being treated, put decontamination supplies for **handlers** in enclosed containers.

EMPLOYER INFORMATION EXCHANGE ..... (p. 26)

1. Before any application, commercial handler employers must make sure the operator of the agricultural establishment where a pesticide will be applied is aware of:

- location and description of area to be treated,
- time and date of application,
- product name, EPA registration number, active ingredient(s), and REI,
- whether the product label requires both oral warnings and treated area posting,
- all other safety requirements on labeling for workers or other people.

2. Operators of agricultural establishments must make sure any commercial pesticide establishment operator they hire is aware of:

- specific location and description of all areas on the agricultural establishment where pesticides will be applied or where an REI will be in effect while the commercial handler is on the establishment,
- restrictions on entering those areas.

EMERGENCY ASSISTANCE ..... (p. 27)

When any handler or worker may have been poisoned or injured by pesticides:

1. Promptly make transportation available to an appropriate medical facility.
2. Promptly provide to the victim and to medical personnel:

- product name, EPA registration number, and active ingredient(s),
- all first aid and medical information from label,
- description of how the pesticide was used,
- information about victim's exposure.

ADDITIONAL DUTIES FOR WORKER EMPLOYERS

RESTRICTIONS DURING APPLICATIONS ..... (p. 36)

1. In areas being treated with pesticides, allow entry only to appropriately trained and equipped handlers.

2. Keep nursery workers at least 100 feet away from nursery areas being treated.

3. Allow only handlers to be in a greenhouse:

   - during a pesticide application,
   - until labeling-listed air concentration level is met or, if no such level, until after 2 hours of ventilation with fans.

(Also see nursery restrictions and greenhouse restrictions) (pp 41-42, 43-45)

RESTRICTED-ENTRY INTERVALS (REIs)..... (p. 36)

During any REI, do not allow **workers** to enter a treated area and contact anything treated with the pesticide to which the REI applies.

(Also see early entry by workers) (p. 36-37, 47-56)

NOTICE ABOUT APPLICATIONS ..... (p. 33)

1. Orally warn workers **and** post treated areas if the pesticide labeling requires.

2. Otherwise, **either** orally warn workers **or** post entrances to treated areas. Tell workers which method is in effect.

3. Post all greenhouse applications.

Posted Warning Signs ..... (p. 33)

1. Post legible 14" X 16" WPS-design signs just before application; keep posted during REI; remove before workers enter and within 3 days after the end of the REI.

2. Post signs so they can be seen at all entrances to treated areas, including entrances from labor camps.

Oral Warnings..... (p. 35)

1. Before each application, tell workers who are on the establishment (in a manner they can understand):

   - location and description of treated area,
   - REI, and not to enter during REI.

2. Workers who enter the establishment after application starts must receive the same warning at the start of their work period.

ADDITIONAL DUTIES FOR HANDLER EMPLOYERS

APPLICATION RESTRICTIONS AND MONITORING ..... (p. 59)

1. Do not allow handlers to apply a pesticide so that it contacts, directly or through drift, anyone other than trained and PPE-equipped handlers.

2. Make sight or voice contact at least every 2 hours with anyone handling pesticides labeled with a skull and crossbones.

3. Make sure a trained handler equipped with labeling-specified PPE maintains constant voice or visual contact with any handler in a greenhouse who is doing fumigant-related tasks, such as application or air-level monitoring.

SPECIFIC INSTRUCTIONS FOR HANDLERS ..... (p. 60)

1. Before handlers do any handling task, inform them, in a manner they can understand, of all pesticide labeling instructions for safe use.

2. Keep pesticide labeling accessible to each handler during entire handling task.

3. Before handlers use any assigned handling equipment, tell them how to use it safely.

4. When commercial handlers will be on an agricultural establishment, inform them beforehand of:

- areas on the establishment where pesticides will be applied or where an REI will be in effect,
- restrictions on entering those areas.

(The agricultural establishment operator must give you these facts.)

EQUIPMENT SAFETY ..... (p. 61)

1. Inspect pesticide handling equipment before each use, and repair or replace as needed.

2. Allow only appropriately trained and equipped handlers to repair, clean, or adjust pesticide equipment that contains pesticides or residues.

PERSONAL PROTECTIVE EQUIPMENT (PPE) ..... (pp. 62-65)

(See exceptions to PPE) (pp. 66-67)

Duties Related to PPE ..... (p. 62)

1. Provide handlers with the PPE the pesticide labeling requires for the task, and be sure it is:

- clean and in operating condition,
- worn and used correctly,
- inspected before each day of use,
- repaired or replaced as needed.

2. Be sure respirators fit correctly.

3. Take steps to avoid heat illness.

4. Provide handlers a pesticide-free area for:

- storing personal clothing not in use,
- putting on PPE at start of task,
- taking off PPE at end of task.

5. Do not allow used PPE to be worn home or taken home.

Care of PPE ..... (p. 62)

1. Store and wash used PPE separately from other clothing and laundry.

2. If PPE will be reused, clean it before each day of reuse, according to the instructions from the PPE manufacturer unless the pesticide labeling specifies other requirements. If there are no other instructions, wash in detergent and hot water.

3. Dry the clean PPE before storing, or hang to dry.

4. Store clean PPE away from other clothing and away from pesticide areas.

Replacing Respirator Purifying Elements ..... (p. 63)

1. Replace dust/mist filters:
   - when breathing becomes difficult,
   - when filter is damaged or torn,
   - when respirator label or pesticide label requires (whichever is shorter), ***or***
   - at the end of day's work period, in the absence of any other instructions or indications.
2. Replace vapor-removing cartridges/canisters:
   - when odor/taste/irritation is noticed,
   - when respirator label or pesticide label requires (whichever is shorter), ***or***
   - at the end of day's work period, in the absence of any other instructions or indications.

Disposal of PPE ..... (p. 63)

1. Discard coveralls and other absorbent materials that are heavily contaminated with undiluted pesticide having a "DANGER" or "WARNING" signal word.

2. Follow federal, state, and local laws when disposing of PPE that cannot be cleaned correctly.

Instructions for People Who Clean PPE ..... (p. 63)

Inform people who clean or launder PPE:

- that PPE may be contaminated with pesticides,
- of the potentially harmful effects of exposure to pesticides,
- how to protect themselves when handling PPE,
- how to clean PPE correctly.

INDEX

A

agricultural emergency 47, 49, 72
agricultural employer 14, 26, 78
agricultural owner 9, 10, 69, 71-73, 91, 101, 109 *See also employer*
agricultural plants ii, 3, 7-9, 10, 12, 13, 14, 37, 53 74, 77, 119
agricultural worker ii, 3, 7, 9, 12, 14, 22, 31, 37, 52, 53, 76, 78, 91, 103, 119
  requirements checklist 29
air exchanges 43
anti-retaliation 3, 119, 120 *See also retaliation*
apparel 64
application information 7, 19, 20, 76, 78, 91, 93, 103
application restrictions 4, 29, 36, 39, 41, 42, 43, 44, 103, 119, 123
applicator 3, 11, 15, 21, 22, 23, 42, 44, 59, 60, 91, 93, 99, 103, 120
arid areas 36

B

boots 95. *See also footwear*

C

central location 3, 17, 19, 20, 26, 37, 52, 73, 75, 78, 80, 91, 103, 105, 109, 119, 120.
certified applicator 3, 21, 22, 93, 120
certified crop advisor 78
charts 91
checklists, *See also forms*
  requirements for pesticide handlers 91
  exemptions for agricultural workers
  WPS requirements for agricultural workers 103
  WPS requirements for pesticide handlers 105
  WPS requirements for commercial handlers 107
  WPS exemptions for agricultural owners 109
  WPS requirement to provide basic pesticide safety information to untrained workers 111
chemical-resistant 48, 62, 64, 65, 66, 67
chemigation 13, 47, 60, 87
closed system 15, 62, 66, 105, 107
clothing. *See also personal protective equipment*
cockpits 67, 105, 107
commercial crop advisor 60, 74, 76, 77, 78
commercial pesticide handler 9, 19, 26
  requirements checklist 60. *See also pesticide handler*
commercial pesticide handling establishment 10, 19, 27, 71, 107
coveralls 4, 24, 48, 62, 63, 64, 95, 96, 124
crop advisor 9, 10, 26, 36, 60, 69, 74-80, 91, 99
crop consultant 9, 74
custom applicator 60, 91, 99, 101

D

decontamination 12, 19, 17, 24, 25, 37, 45, 52, 54, 55, 73, 75, 76, 77, 78, 80, 103, 105, 107, 109, 119, 120, 121
  for workers 3
  water quantity 7
direct supervision 74, 75, 77, 78, 79
discrimination 23
displaying application information 20
disposal 4, 63, 119, 124
  of personal protective equipment 9
double notification 15, 48
drift 4, 21, 27, 59, 60, 72, 76, 83, 87, 89, 105, 107, 111, 123

E

early entry 22, 34, 36, 37, 45, 47-49, 50, 51, 53, 55, 65, 72, 73, 75, 76, 99, 101, 103, 109, 122
  with no contact 4, 29
emergency 3, 7, 17, 19, 25, 27, 49, 50-52, 55, 73, 75-8, 80, 87, 89, 103, 105, 107, 109, 119, 121
emergency assistance 3, 7, 12, 27, 37, 50, 52, 73, 75, 76, 77, 78, 103, 105, 107, 109, 119, 121
emergency information 19, 20, 27
emergency medical facility 3, 19, 27, 103, 105, 109, 120
employers 3, 4, 10, 17, 26, 27, 47, 62 63, 75, 78, 80, 91, 95, 97, 99, 119, 120, 122, 123
  information exchange 14
enclosed cabs 66, 67, 105, 107
equipment 3, 4, 9, 10, 12, 15, 19, 25, 36, 47, 53, 57, 60-62, 64, 65, 73, 75, 77, 89, 91, 95, 97, 105, 107, 109, 119, 123
  instructions for nonemployees 45
eyeflush water 3, 24, 25, 54, 55, 120
eyewear 25, 48, 55, 62, 64, 66, 67, 96

F

face shield 64, 96
farms 7, 8, 12, 13, 26, 33, 34, 35, 85, 113
flagger 10
footwear 37, 48, 62, 64, 67, 96
forests 7, 8, 12, 26, 33, 34, 35, 85, 113
  specific provisions for 8

forms 59, 93 *See also checklists*
forms, factsheets, and checklists 91
application information 93
fact sheets:
information about cleaning PPE 95
working safely with pesticide equipment 97
agricultural owners and operators information to be provided to employers of custom applicators and independent crop advisors 99
custom applicators information to be provided to agricultural establishment owners and operators 101
checklists:
WPS requirements for agricultural workers 103
WPS requirements for pesticide handlers 105
WPS requirements for commercial handlers 107
WPS exemptions for Agricultural owners 109
WPS requirement to provide basic pesticide safety information to untrained workers 111
charts:
EPA chemical resistance category chart 113
heat stress — preventable measures, illnesses, and first aid treatments 115
information for employers of custom applicators 91
fumigant 4, 10, 42, 44, 59, 60, 105, 107, 109, 123

G

gloves 48, 62, 64-67, 96, 97
goggles 64, 96
greenhouses 7, 8, 12, 13, 26, 29, 33, 36, 39, 43, 44, 59, 72, 85, 103, 105, 107, 109, 113

H

hand labor 47, 48, 50, 74
handler 3, 4, 5, 10, 11, 14, 17, 21, 23, 24, 25, 26, 57, 59, 60, 61, 62, 66, 67, 75, 80, 81, 89, 91, 99, 101, 105, 119, 123
See also pesticide handler
handler employee 4, 29, 57, 60, 105, 107, 123
handler employer 14, 21, 24, 26, 27, 59, 60-62, 66, 89, 119, 121
headgear 62, 64, 65
heat illness 4, 53, 62, 105, 107, 109, 115, 116, 123
heat stress 53, 62, 91

I

immediate family 3, 10, 71-73, 109, 119
independent crop advisor 91, 99
information exchange 3, 26, 72, 119, 121
integrated pest management monitor 74
irrigation 21, 37, 47, 49, 83, 111

L

labeling 3, 4, 7, 10-15, 25-27, 33, 36, 37, 42, 43, 44, 47-49, 51 52, 53, 55, 59, 60, 63-67, 72, 75, 76, 89, 121-124
exceptions to 9
labor contractor 9
language 23, 34, 50, 48, 77, 85
licensed crop advisor 74-80

M

medical care 87, 89
transportation to. *See also emergency medical facility*
monitoring 4, 7, 47, 59, 73, 74, 75, 80, 105, 107, 109, 115

N

no-contact early entry. *36, 72*
See also early entry
noncommercial crop advisor 74, 76, 78
notification 12, 15, 26, 33, 37, 48, 101
treated-area posting 33
nurseries 7, 8, 12, 26, 29, 33, 34, 36, 39, 41, 42, 72, 85, 103, 113
specific provisions for 8

O

oral warnings 3, 4, 15, 33, 35, 87, 103, 109, 119, 121, 122
owner 3, 9, 10, 14, 15, 69, 71-73, 91, 93, 99, 101, 109, 119
See also employer
owner exemption 9, 10, 69, 71

P

penalties 15
personal protective equipment (PPE) 3, 4, 7, 9, 12, 15, 25, 36, 47, 48, 49, 53, 55, 59, 62, 63, 64, 65, 66, 67, 71, 73, 75, 76, 77, 80, 81, 91, 95, 96, 99, 101, 105, 107, 109, 113, 119, 120, 123, 124
types of 4, 45
See also personal protective equipment
pesticide application information. 93
See also application information

pesticide handler training 59, 60, 75, 78, 91, 105
See also commercial pesticide handler 3, 7, 9, 10, 14, 19, 22, 26, 36, 47, 59, 60, 62, 64, 74, 75, 77-79, 105, 119
pesticide handler employer 19, 26, 27, 60
pesticide uses 5, 12, 13
poster 3, 7, 19, 20, 76, 78, 81, 83, 103, 105, 109, 120 *See also sign*
protective eyewear 25, 48, 55, 62, 64, 66, 67 *See also personal protective equipment*

Q

quick reference guide 3, 117, 119
large print version 117

R

REI 3, 4, 7, 37, 49, 53, 60, 72, 75, 76, 77, 78, 80, 119, 120, 121, 122, 123. *See also restricted entry interval*
respirator 4, 42, 44, 62, 64, 66, 67, 96, 119, 123, 124
maintenance of 63
restricted-entry interval (REI) 3, 4, 7, 9, 10, 12, 15, 19, 20, 21, 22, 24, 25, 26, 33, 34, 36, 37, 41, 45, 47, 48, 49, 53, 54, 60, 72, 74, 75, 76, 77, 78, 79, 103, 111, 119, 120, 122
restrictions during applications. *See also application restrictions*
retaliation 15, 119
prohibition against 3

S

safety glasses 96. *See also eyewear, protection*
safety poster 3, 7, 19, 76, 78, 81, 83, 103, 105, 109, 120
scout 60, 74. *See also crop advisor*
separable glove liners 65
sign size 35, 87
skull and crossbones 4, 59, 105, 107, 109, 123
sod farms 13
supervisors 14, 15, 115

T

training 3, 7, 11, 12, 21, 22, 23, 37, 50 53, 73, 74, 75, 76, 78, 79, 81, 83, 87, 89, 103, 105, 107, 109, 111, 115, 119, 120
verification of 3
translator 22, 23
treated area 3, 4, 7, 10, 15, 20, 21, 24, 26, 33, 34, 35, 36, 37, 41, 42, 43, 44 45, 47, 49, 53, 60, 67, 72, 75, 76, 77, 78, 85, 86, 101, 103, 109, 111, 120, 121, 122
treated area posting 3, 103, 109, 121 *See also notification*

U

uncertified crop advisor 78
unlicensed crop advisor 75, 79, 80

V

ventilation criteria 10, 37, 43, 44, 47, 48, 49, 50, 72, 75

W

warning signs 4, 20, 33, 34, 48, 81, 85, 87 119, 122
criteria for 34
worker 1, 4, 5, 7, 8, 10, 12, 14, 15, 19, 21, 22, 23, 24, 25, 27, 29, 33, 34, 35, 36, 41, 42, 43, 44, 45, 47, 52, 54, 63, 81, 91, 93, 99, 101, 103, 105, 107, 111, 113, 116, 117, 119, 122
worker employer 4, 14, 19, 21, 24, 27, 33, 36, 41, 43, 47, 52, 53, 54119, 122
Worker Protection Standard (WPS) 1, 3, 5, 7, 8, 9, 12, 15, 63, 93, 99, 101, 103, 105, 107, 111, 113, 117, 119

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www.epa.gov/agriculture

For up to date references go to:

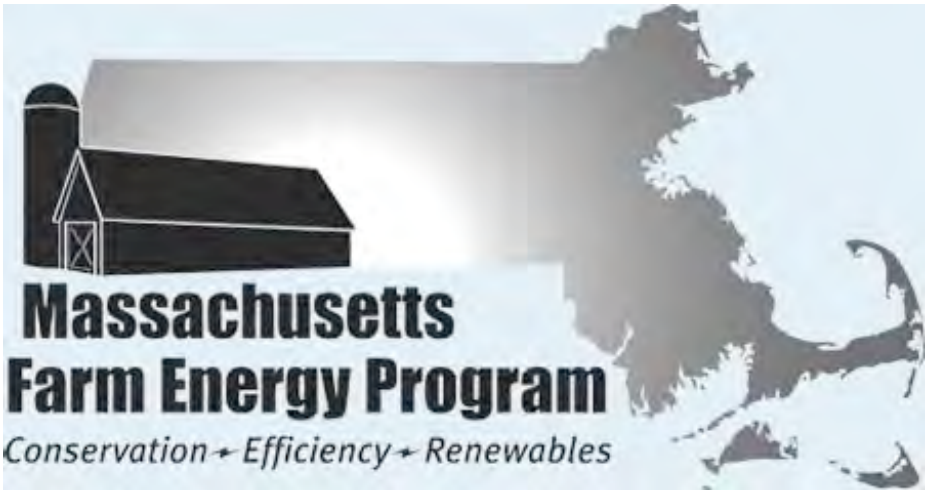
http://www.berkshirepioneerrcd.org/mfep/index.php

Massachusetts Farm Energy Program

Invitation to Bid

Energy consultants invited to bid for energy audit and renewable energy assessment services for Mass Farm Energy Program.

Download bidding materials (.zip)



A joint project of the Massachusetts Dept. of Agricultural Resources, the USDA-Natural Resources Conservation Service, Berkshire-Pioneer Resource Conservation & Development Area and Patriot Resource Conservation & Development Area.

The Massachusetts Farm Energy Program is a two year project that will provide assistance to farmers and agribusiness to:

- increase on-farm energy conservation and efficiency
- promote alternative and renewable energy strategies for on-farm energy generation
- reduce agricultural greenhouse gas emissions

Partners

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

Newsletters

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- USDA-NRCS
- MDAR
- Patriot RC&D

To receive email updates from Berkshire-Pioneer RC&D, including notification when we are accepting applications for services offered by this program join the email list to the right.

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Massachusetts Farm Energy Program

Why the Mass Farm Energy Program?

Electricity and fossil fuel costs have increased by 30% or more in the last few years. The impact on farms has meant a dramatic increase in costs related to power, refrigeration, heating, ventilation, lighting, transportation, fertilizer and feed. Rising energy costs reduce the profit margin for all farmers and directly threaten the viability of farms across the Commonwealth.

There is a tremendous loss of energy savings in the agricultural community because

- many Massachusetts farmers are unaware of current energy programs available to them;
- farmers do not have access to a simple, streamlined process of applying for technical and financial assistance; and
- because the current pool of financial incentives is not large enough to encourage widespread implementation.

What the Massachusetts Farm Energy Program will do

The Massachusetts Farm Energy Program is a two-year statewide collaborative effort, bringing together federal, state, industry, and private support to streamline technical and financial assistance available to Massachusetts farmers for reducing their energy demand and increasing their profits. The Massachusetts Dept. of Agricultural Resources (MDAR) and the USDA-Natural Resources Conservation Service (NRCS) are providing funding of $400,000 and significant in-kind assistance.

The program will

- provide technical assistance to increase use of existing energy programs;
- help to obtain, and in some cases provide, energy audits and/or renewable

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

Newsletters

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energy assessments;

- provide incentives for implementation of audit recommendations; and
- identify and promote best management practices for farm energy systems.

Federal, state, and industry investments in farm energy audits must be tied to energy savings and generation accomplished through *implementation*. This is the focus of the Massachusetts Farm Energy Program.

How the Program is structured

Berkshire-Pioneer Resource Conservation and Development (RC&D) Area, Inc. and Patriot Resource Conservation and Development Council, Inc. will develop and implement the program, under the guidelines adopted by the Steering Committee, currently made up of MDAR, NRCS, Berkshire-Pioneer RC&D, and Patriot RC&D. The program partners (listed separately) and the Technical Advisory Group (made up of all partners that provide energy conservation, efficiency, or renewable energy programs to their constituents) make recommendations to the Steering Committee.

The Technical Advisory Group is charged with:

- researching financial and technical assistance opportunities currently available to farmers;
- developing a streamlined approach for the Massachusetts Farm Energy Program to assist agribusiness; and
- identifying and recommending energy conservation and efficiency best management practices (BMPs) and renewable energy measures that will be encouraged by this program.

The Partnership Advisory Group will review the work of the Technical Advisory Group, insuring recommendations can be implemented within their own organization, if applicable. The Steering Committee will then customize and adopt the audit program and BMPs (including renewables), establish program participant criteria, and establish the technical assistance and rebate program. Energy audits and renewable energy assessments will be conducted by farm energy consultant(s) and/or utility companies. BPRC&D and PRC&D will provide technical assistance and administration for the program.

Massachusetts Farm Energy Program

Immediate Assistance: Existing Energy Programs

- Farm Energy Discount Program
- Massachusetts Department of Agricultural Resources
- Non-Municipal, Investor-owned ("Public") Utility Conservation & Energy Efficiency Programs
- Municipal Utilities
- Renewable Energy Trust
- USDA-Rural Development's (RD) Value Added Producer Program (VAPG)
- USDA-Rural Development's (RD) Renewable Energy Systems and Energy Efficiency Improvements Program

Farm Energy Discount Program

The Massachusetts Department of Agricultural Resources (MDAR) is the state agency responsible for determining and certifying eligibility for the Farm Energy Discount Program included in the legislation enacted to restructure the utility industry. **As a result of the utility restructuring, all agricultural ratepayers will enjoy a mandated ten percent reduction on their energy bills for electricity and natural gas. Those persons or corporations that are principally and substantially engaged in the business of production agriculture or farming for an ultimate commercial purpose are eligible.** Upon determination that the applicant qualifies for the Farm Discount, MDAR will certify to the appropriate power supplier (electricity and/or natural gas) that the applicant meets the requirements for the Farm Discount and is eligible for a ten percent discount on rates. To maintain the Farm Discount, the applicant is required to submit a yearly renewal application to MDAR for confirmation of information and signature. The discount is not available for propane or fuel oil accounts. As of October 1, 2007, about 1500 farmers were in the program. Interestingly, the latest Agricultural Census reports there are about 6100 farms in Massachusetts.

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

Newsletters

Enter your email address to receive updates on the Massachusetts Farm Energy Program.

Join List

The Farm Energy Discount Program may be underutilized.

A two-page application is available at http://www.mass.gov/agr/admin/farmenergy.htm or contact Linda Demirjian, Office Manager, MDAR, at (6l7) 626-1733.

Back to top

Massachusetts Department of Agricultural Resources

The Massachusetts Department of Agricultural Resources (MDAR), through their newly created renewable energy coordinator position, now offers support for farms interested in energy efficiency, conservation, and renewables. The primary function of the coordinator is to promote energy knowledge and awareness and to facilitate the implementation of energy related projects for our agri-businesses through energy efficiency, energy conservation and renewable energy applications, as a means to reduce both energy costs and environmental pollution. A number of data bases of relevant resources are being developed and informative web-links are being identified to assist in your ability to obtain technical and financial assistance toward energy related matters for your agricultural business. **More information and technical resources are available at http://www.mass.gov/agr/programs/energy/index.htm.**

To discuss the technical aspects of your proposed energy project, please contact Gerry Palano, MDAR Renewable Energy Coordinator and partner in the MFEP at 617-626-1706 or Gerald.Palano@state.ma.us .

Back to top

Non-Municipal, Investor-owned ("Public") Utility Conservation & Energy Efficiency Programs

There are four investor-owned electric utility companies in Massachusetts: National Grid, NSTAR, UNITIL (Fitchburg Gas & Electric), and Western Massachusetts Electric Company. In addition, Cape Light Compact operates the regional energy efficiency program for the Cape and islands. Natural gas companies include Berkshire Gas, Bay State Gas, Keyspan Gas, and NSTAR. Keyspan will become National Grid in March 2008. **Customers of these investor-owned ("public") utility companies pay into conservation and renewable energy funds and therefore have access to energy conservation programs, as**

well as the renewable energy programs offered by the Massachusetts Technology Collaborative. These "public" conservation and energy efficiency programs are regulated by the MA Department of Public Utilities. Typically, energy audits and some types of energy assessment, performed by a contractor or employee of the utility company, are offered as well as financial incentives (cost-share) on energy efficiency measures that are cost effective relative to energy savings. In simple terms, the energy cost savings divided by the investment costs must be greater than one. **However, there may be some energy efficiency measures that would be of great benefit to agricultural operations but do not meet the cost effectiveness formula used by the public utility industry.**

Investor-owned Utility Contact Information:

Cape Light Compact

To request an energy audit for your farming operation, contact Maggie Downey, PO Box 427/SCH, Barnstable MA 02630, mdowney@barnstablecounty.org, 508-375-6636

Bay State Gas Co.

To request an energy audit for your farming operation, contact Partners in Energy Intake Center, 300 Friberg Parkway, Westborough MA 01581, www.baystategas.com, 800-232-0120

Berkshire Gas

To request an energy audit for your farming operation, contact Ken Sadlowski, 115 Cheshire Rd., Pittsfield, MA 01201, ksadlowski@berkshiregas.com, 413-445-0345

National Grid

To request an energy audit for your farming operation, contact Michael Pace, 52 2nd Ave., Waltham MA 02415, mpace@keyspanenergy.com, 781-907-1610

NSTAR Electric & Gas

To request an energy audit for your farming operation, contact W. Hugh Gaasch, One NSTAR Way, SW 360, Westwood MA 02090, w.hugh.gaasch@nstar.com, 781-441-8706

Fitchburg Gas & Electric/UNITIL

To request an energy audit for your farming operation, contact Ed Mailloux, 6

Liberty Lane W., Hampton NH 03842, mailloux@unitil.com, 603-773-6541

Western MA Electric Co (WMECO)

To request an energy audit for your farming operation, contact Robert Dvorchik, 333 West St., Pittsfield MA 01201, dvorcrs@nu.com, 413-499-9004

Back to top

Municipal Utilities

Many farmers fall through the cracks of the commercial energy conservation programs for various reasons. Customers that are serviced by the forty municipal electric, and in some cases gas, utility departments typically do not pay into conservation or renewable energy funds. **Municipal customers therefore do not have access to energy conservation programs offered by the utility industry or renewable energy programs offered by the Massachusetts Technology Collaborative (see below).** However, because some municipal utility companies have developed fee for service audit programs, **it is important to contact your individual municipal utility company to see if other options are available.**

Back to top

Renewable Energy Trust

Although there are numerous farmers investing in renewable and alternative energy projects, there are **many more who could be taking advantage of renewable energy programs administered by the Massachusetts Technology Collaborative (MTC).** A new initiative, Commonwealth Solar, provides rebates through a non-competitive application process for the installation of photovoltaic (PV) projects. Non-residential PV projects are eligible for rebates for up to 500 kilowatts (kW). Commonwealth Solar has $68 million available for funding over the next four years to support PV installations. MTC's Small Renewables Initiative (SRI) provides rebates for the installation of wind and small hydroelectric projects that are up to 10 kilowatts. The SRI distributes approximately $3.6 million of rebates each year through FY2010. Rebates will be provided on a "first come - first served" basis. MTC's Large Onsite Renewables Initiative (LORI) grants are awarded for feasibility studies and design & construction projects of systems greater than 10 kW. **MTC is now accepting applications for LORI. The deadline for submission is February 21, 2008 at 4pm.** Prior to submitting a LORI application, each applicant must secure a

consulting team. The applicant (and project site) must be a customer of a Massachusetts investor-owned electric distribution utility.

Contact Information for Massachusetts Technology Collaborative:

Massachusetts Technology Collaborative

To inquire about renewable energy projects for your farming operation, contact Elizabeth Kennedy at 508-870-0312, ext. 1241 or kennedy@masstech.org.

Back to top

USDA-Rural Development's (RD) Value Added Producer Program (VAPG)

Rural Development's Value-Added Producer Grant Program (VAPG) may be used for planning activities and for working capital for marketing value-added agricultural products and for farm-based renewable energy. Eligible applicants are independent producers, farmer and rancher cooperatives, agricultural producer groups, and majority-controlled producer-based business ventures. For more information visit their VAPG web site which contains application guidance, FAQs, application guide and application templates (which is strongly recommend). $18.4 million is available nationally and applications are to be submitted to USDA-RD State Offices instead of the National Office by 3/31/08.

Back to top

USDA-Rural Development's (RD) Renewable Energy Systems and Energy Efficiency Improvements Program

The Section 9006 of the 2002 Farm Bill provides funding for renewable energy systems and energy efficiency improvements. Rural Development administers these funds and offers grants, guaranteed loans, or a combination to farmers and rural small businesses. **Applications must be received by RD by April 15 (Round 1) or by June 16 (Round 2). The Massachusetts Farm Energy Program through Berkshire-Pioneer RC&D, is currently offering grantwriting assistance to complete the application, for any project under $200,000 and for a limited number of projects over $200,000.**

Grant requests (to RD) must not exceed 25% of the eligible project costs. **RD renewable energy grants can range from $2,500 to $500,000, and can be combined with MTC grants. Energy efficiency grants can range from $1,500 to $250,000, and may be combined with non-municipal incentive programs.**

Projects under $200,000 qualify for a simplified application process. **You can learn more about the programs at this link.**

Please note that the energy generated or saved by the 9006 program cannot be for residential use. The cost of installing an electrical meter to separate farm use from residential use would be an eligible project expense. **Information to determine eligibility can be found here. If you still have questions about eligibility, level of energy assessment, or environmental review requirements, contact your local Rural Development Area Office.** This process may be lengthy so RD will advise you on how to get the environmental review started.

The 9006 Renewable Energy/Energy Efficiency application process is competitive so it is important that you do the best job possible to attain the highest possible score. The Berkshire-Pioneer RC&D is currently offering assistance to complete the application. The Energy Efficiency component of this program has been underutilized in Massachusetts so far. We are confident that farmers can benefit from the features of this program. The Energy Efficiency applications will require an energy assessment or an energy audit.

Completed applications must be received by Charles Dubuc, USDA Rural Development, 60 Quaker Lane, Suite 44, Warwick RI 02886 by close of business on April 15 (Round 1) or by June 16 (Round 2).

MFEP grant proposal writing assistance for applying to the USDA-Rural Development Energy Efficiency & Renewable Energy programs in early 2008.

Contact Information for USDA/Rural Development:

http://www.rurdev.usda.gov/rbs/farmbill/index.html

To inquire about energy efficiency & renewable energy projects for your farming operation, contact the following USDA-RD staff:

Serving Western Massachusetts
Berkshire, Franklin, Hampshire, and Hampden Counties

Peter Laurenza, Area Director

Phone: 413-585-1000 Ext. 4

Fax: 413-586-8648

Email: peter.laurenza@ma.usda.gov

Serving Central Massachusetts and North Shore

Worcester, Middlesex, Suffolk, and Essex Counties

Lyndon S. Nichols, Area Director

Phone: 508-829-4477 Ext. 4

Fax: 508-829-3721

Email: lyndon.nichols@ma.usda.gov

Serving South Eastern Massachusetts, Cape Cod and the Islands

Bristol, Norfolk, Plymouth, Dukes, Nantucket and Barnstable Counties Thomas S. McGarr, Area Director

Phone: 508-295-5151 Ext. 3

Fax: 508-291-2368

Email: tom.mcgarr@ma.usda.gov

Back to top

Mailing List

Enter your email address and select the lists to join to receive updates from Berkshire-Pioneer RC&D.

E-mail Address:

Select Lists:

- General
- MA Farm Energy Program
- MA Forest Stewardship Program
- Volunteering

Join Lists

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Massachusetts Farm Energy Program

Program Partners

This program, a collaboration between the utility industry, government, and private sector, enables us to make the most of resources and assure there is no duplication of effort. Therefore, collaboration with the electric and gas utility industry as well as other state and federal agencies is vital to the success of this program. Together, the partnership will contribute more than $100,000 in in-kind contributions of technical assistance.

- Massachusetts Dept. of Agricultural Resources (MDAR)
- USDA-Natural Resources Conservation Service (NRCS)
- Berkshire-Pioneer Resource Conservation & Development Area, Inc. (Berkshire-Pioneer RC&D)
- Patriot Resource Conservation & Development Council, Inc. (Patriot RC&D)
- Massachusetts Farm Bureau
- Massachusetts Technology Collaborative (MTC)
- EOEEA-MA Division of Energy Resources (MDER)
- USDA-Rural Development (RD)
- NSTAR
- National Grid
- Western Massachusetts Electric Company (WMECO)
- Cape Light Compact
- UNITIL (Fitchburg Gas & Electric)
- Massachusetts Municipal Wholesale Electric Company (MMWEC)
- Berkshire Gas
- Bay State Gas

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

Newsletters

Enter your email address to receive updates on the Massachusetts Farm Energy Program.

Join List

Massachusetts Farm Energy Program

Objectives

- Increase participation in the MA Farm Energy Discount Program
- Increase farmer participation in both electric and gas public utility energy conservation and efficiency programs
- Increase farmer participation in the MA Technology Collaborative's Renewable Energy Initiatives
- Increase farmer applications to the USDA-Rural Development's Energy Efficiency and Renewable Energy programs
- Provide assistance for obtaining energy audits, renewable energy assessments, and incentives to farmers
- Document best management practices for Farm Energy Systems for use in future federal and state cost-share programs

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

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Join List

Mailing List

Enter your email address and select the lists to join to receive updates from Berkshire-Pioneer RC&D.

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Massachusetts Farm Energy Program

Services

Both technical and financial assistance will be provided by the MFEP. As the program is still under development, please check back regularly or signup for receiving email notification when information is added.

- Leveraged and coordinated support from government and industry - View or download "What you can do to start saving money and prepare for the MFEP at no cost to you!"
- Streamlined technical assistance to farmers - Click here for "MFEP grant proposal writing assistance for applying to the USDA-Rural Development Energy Efficiency & Renewable Energy programs in early 2008."
- Energy conservation and efficiency audits and/or renewable energy assessments with recommendations (NOT YET AVAILABLE)
- Cash incentives for implementation of recommendations (NOT YET AVAILABLE)
- Recommendations for reduced energy demand and greenhouse gas emissions from agriculture (part of energy audits and implementation of measures) (NOT YET AVAILABLE)
- Best Management Practices Manual for farm energy systems, for use in development of potential federal and cost share programs and standards (NOT YET AVAILABLE)

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

Newsletters

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Join List

Massachusetts Farm Energy Program

Forms & Applications

Tell us about your energy needs and help us develop the MFEP

BPRC&D has begun compiling a list of interested farmers and distributing a questionnaire to collect baseline information that will assist in developing the program and gauge progress.

Complete the on-line Farm Energy Information Questionnaire

Apply to the Program

The MFEP will take about six to nine months to develop, but portions of the program will be implemented in early 2008. We anticipate two signups in early 2008:

1. The MFEP will provide technical assistance for grant proposal writing services for the RD energy programs. To determine eligibility and to apply to the program begin the application process.
2. Energy Audits, Renewable Energy Assessments, and Cost-share for implementation (NOT YET AVAILABLE)

Massachusetts Farm Energy Program

Overview

Program Details

Immediate Assistance: Existing Energy Programs

Program Partners

Objectives

Services

Forms & Applications

Newsletters

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Food Safety Begins on the Farm

A Grower's Guide

Good Agricultural Practices for Fresh Fruits and Vegetables

Written and compiled by:
Anusuya Rangarajan, Elizabeth A. Bihn, Robert B. Gravani, Donna L. Scott, and Marvin P. Pritts

Food Safety Begins on the Farm

Click Here to download

A Grower Self Assessment of Food Safety Risks

Anusuya Rangarajan, Elizabeth A. Bihn, Marvin P. Pritts, and Robert B. Gravani

Cornell University
Department of Food Science

Department of Food Science • Department of Horticulture
Cornell University • Ithaca, NY 14853

Worker Training Log

Name of operation: **Date:**

Trainer: **Training Time:**

Location:

Training material (Please attach any written materials to this log with a staple):

Employee Name (please print)	**Employee Signature**
1._____	_____
2._____	_____
3._____	_____
4._____	_____
5._____	_____
6._____	_____
7._____	_____
8._____	_____
9._____	_____
10._____	_____
11._____	_____
12._____	_____
13._____	_____
14._____	_____
15._____	_____

Reviewed by: **Title:** **Date:**

Field Sanitation Unit Service Log

Name of operation:

Please see the food safety plan for overall information on field sanitation unit service procedures.

Sanitation Unit #*	Date of Cleaning	Cleaned By (name)	Date of Servicing	Serviced By (name)	Supplies Stocked**

* See field map for locations of each unit in fields.
** Sanitation supplies are single use towels, toilet paper, hand or anti-bacterial soap, potable water for hand washing.

If contracted with sanitation company, attach service/cleaning receipt.

Reviewed by: **Title:** **Date:**

Processing / Packing Line Water Log

Name of operation:

Please see the food safety plan for overall information on process/packing line water control procedures.

Date	Cleaning List (check each)					Date Cleaned	Treatment	Cleaned By (name)
	Contact Surface	Dump Tanks	Flumes	Wash Tanks	Hydro Cooler			

Reviewed by: **Title:** **Date:**

Water Treatment Log

Name of operation:

Please see the food safety plan for overall information on process/packing line water control procedures.

Date	Water pH Level	Type of Chemical Used	Amount Added	Type of Produce Being Run	Initials

Reviewed by: **Title:** **Date:**

Pest/Rodent Control Log

Name of operation:

Please see the food safety plan for overall Pest/Rodent control procedures.

Company Used* or self	Date of Service or action taken	Type of Pest	Type of Control**	Location of Traps	Traps Checked (date)	Checked by (name)	Disposal means

*If using a company for service, attach report or receipt of service for each of their visits.
**List type of control methods used such as exclusion, traps, poison, repellants, etc.

Reviewed by: **Title:** **Date:**

Cooler Temperature Log

Name of operation:

Cooler number: **Thermometer number:**
Please see the food safety plan for overall temperature control procedures and thermometer calibration instructions

Date	Thermometer calibrated date	Recorded temperature		Corrective actions if necessary:	Result of corrective actions and date accomplished	Initials
		AM	PM			

Reviewed by: **Title:** **Date:**

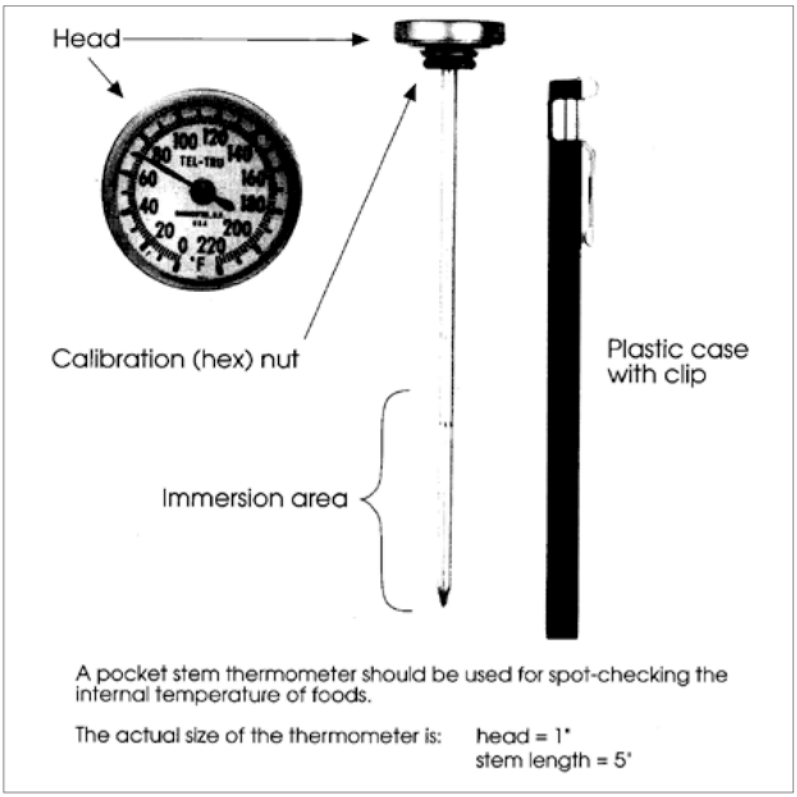
A note on calibration of your thermometer

This information on thermometer calibration is brought from "Food Store Sanitation", 1998, Sixth Edition, Gravani, Robert B., Rishoi, Don C., Cornell University Food Industry Management Distance Education Program, Lebhar-Friedman Books, Chain Store Publishing Corp.

Melting point of ice method

1. Place ice in a container and let it melt.
2. Stir to make sure that the temperature in the ice/water mixture is uniform throughout the container.
3. When the ice is partially melted and the container is filled with a 50/50 ice and water solution, insert the thermometer and wait until the needle indicator stabilizes. The thermometer should be 32ºF (0ºC).
4. If the thermometer is not reading 32ºF (0ºC), it should be adjusted by holding the head of the thermometer firmly and using a small wrench to turn the calibration (hex) nut under the head until the indicator reads 32ºF (0ºC).

An important item to remember as you are calibrating your thermometer using the melting point of ice method is to never add tap water to ice because this will not be 32ºF (0ºC) but will be at a higher temperature. The calibration will be much more accurate if you use melting ice.



Source: Tel-Tru Manufacturing Company, Rochester, NY.

Truck Checklist log

Name of operation:

Please see the food safety plan for overall truck checking procedures.

Date	Trucking Company	Truck clean (Yes or No)	If no, state the problem (off odor, debris, etc.)	Corrective Action	Truck temp at Loading	Temp data logger in load (yes or no)	Initials

Reviewed By: **Title:** **Date:**

Illness/Injury Reporting log

Name of operation:

Please see the food safety plan for overall illness/injury reporting procedures.

Date	Name of Employee	Injury sustained/ Illness reported	Action taken (ice applied, bandaged, sent to hospital, etc.)	Did employee return to work? (Yes or No)	Initials

Reviewed By: **Title:** **Date:**

First Aid Kit Monitoring log

Name of operation:

Please see the food safety plan for overall first aid kit monitoring.

Date	Location of First Aid Kit or #	Checked & Stocked	If restocked, list added items here (band aids, ointment, etc)	Initials

Reviewed By: **Title:** **Date:**

Manure Applications log

Name of operation:

Please see the food safety plan for overall manure application procedures

Date	Field Applied	Rate	Incorporated (Yes or No)	Supplier	Crop Planted (Type and Date)	Crop Harvested (Date)	Initials

Reviewed By: **Title:** **Date:**

Surface Water Testing Log

Name of operation:

Please see the food safety plan for overall information on surface water testing.
Save any document providing information on test methods and test results from your laboratory.

Date	Surface water location/name	Laboratory	Results	Corrective actions if necessary	Initials

Reviewed by: **Title:** **Date:**

Mock Traceback Log

Name of operation: **Date:**

Conducted by: **Lot:**

Product traced:

Please see the food safety plan for overall traceback procedures.

Step backward					Step forward		
Harvest date	Harvester	Packing date	Packer	Shipping date	Customer(s) contacted	Amount of product remaining from original shipment at customer	Disposition of product which could not be recalled

Reviewed by: **Title:** **Date:**

Visitor Log

Name of operation:

Please see the food safety plan for information on food safety procedures for visitors.

Date	Enter time	Visitor	Badge number	Host	Exit time

Reviewed by: **Title:** **Date:**

EPA/735-B-05-002

EPA Office of Prevention, Pesticides, and Toxic Substances

How To Comply with the Worker Protection Standard for Agricultural Pesticides: What Employers Need to Know

Appendix B: Sample Forms, Fact Sheets, and Checklists

September 2005

Office of Prevention, Pesticides, and Toxic Substances
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW (MC 7506C)
Washington, D.C. 20460

http://www.epa.gov/agriculture/htc.html

APPENDIX B
SAMPLE FORMS, FACT SHEETS, AND CHECKLISTS

Appendix B includes a sample Pesticide Application Information form with space for the pesticide application information the WPS requires to be listed at a central location on each agricultural establishment. The WPS does not specify a format for presenting the information — you may copy this form or design another that meets your needs.

Appendix B also includes several fact sheets to help you comply with sections of the WPS that require you to provide information to others. Although the WPS does not require you to provide this information in written form, you may find that using photocopies of these fact sheets is a convenient way to make sure you convey the necessary information.

Finally, Appendix B includes some checklists and charts you can use as reminders of your WPS duties.

Pesticide Application Information 93

Fact Sheets:

- **Information About Cleaning PPE** 95
- **Working Safely With Pesticide Equipment** 97
- **Agricultural Owners and Operators: Information to Be Provided to Employers of Custom Applicators and Independent Crop Advisors** 99
- **Custom Applicators: Information to Be Provided to Agricultural Establishment Owners and Operators** 101

Checklists:

- **WPS Requirements for Agricultural Workers** 103
- **WPS Requirements for Pesticide Handlers** 105
- **WPS Requirements for Commercial Handlers** 107
- **WPS Exemptions for Agricultural Owners** 109
- **WPS Requirement To Provide Basic Pesticide Safety Information To Untrained Workers** 111

Charts:

- **EPA Chemical Resistance Category Chart** 113
- **Heat Stress: Preventable Measures, Illnesses, and First Aid Treatments** 115

PESTICIDE APPLICATION INFORMATION

AGRICULTURAL ESTABLISHMENT OWNERS AND OPERATORS:

The use of this form is optional, but if the information about an application is entered, it will help you comply with the federal Worker Protection Standard including all revisions through 2004 for information that must be displayed at a central place to inform workers and handlers about specific pesticide applications. For complete information, see p. 19 of the EPA manual "The Worker Protection Standard for Agricultural Pesticides: How To Comply."

	Application #1	Application #2
Area Treated: Location & Description		
Product Name		
EPA Registration Number		
Active Ingredient: Common or Chemical Name		
Application: Month/Day/Time		
Restricted-Entry Interval		
Do Not Enter Until: Month/Day/Time		

Similar data is required by the Federal Recordkeeping Requirements for Certified Applicators of Federally Restricted Use Pesticides (RUP). For more information on the RUP recordkeeping requirements, contact Agricultural Marketing Service, USDA, 8609 Sudley Road, Suite 203, Manassas, VA 20110, (703) 330-7826. Please consult the "USDA Recordkeeping Manual" at the following Web site for a complete list of all USDA record keeping requirements: http://www.ams.usda.gov/science/prb/Prbforms.htm

Some states, tribes, or local governments with jurisdiction over pesticide enforcement may have additional worker protection requirements beyond these requirements. Check with these agencies to obtain the information you need to comply with all applicable state, tribal, or local requirements.

Note to Employers:
This 2-page fact sheet will help you comply with the section of the WPS that requires you to provide information to people (other than your own handlers) who clean PPE for you. You are not required to give them this information in written form, but you may find that photocopying this fact sheet is an easy way to pass along the necessary information.

INFORMATION ABOUT CLEANING PPE

PROTECT YOURSELF FROM PESTICIDES

☐ 1. The clothing and protective equipment items you will be cleaning may have pesticides on them.

☐ 2. Although you may not be able to see or smell the pesticides, they can rub off on you when you touch the clothing and equipment.

☐ 3. If pesticides get on you, they can hurt you. They can:

- cause skin rashes or burns,
- go through your skin and into your body and make you ill,
- burn your eyes,
- make you ill if you breathe them or get them in your mouth.

☐ 4. To avoid harm from the pesticide, you should:

- Pour the clothes from their container into the washer without touching them.
- Handle only the inner surfaces, such as the inside of boots, aprons, or coveralls.
- Do not breathe the steam from the washer and dryer.

☐ 5. Pesticides should not be allowed to stay on your hands:

- When you wash clothing or equipment by hand, use plenty of water and rinse your hands often.
- Wash your hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Wash your hands as soon as you finish handling the clothing or equipment.

☐ 6. You should not allow clothing and equipment with pesticides on them to be washed with regular laundry. The pesticides can rub off on other items.

RECOMMENDED METHODS FOR CLEANING PPE

Cleaning Eyewear and Respirators

Hand-wash reusable respirator facepieces, goggles, face shields, and shielded safety glasses, following manufacturer's instructions. In general, use mild detergent and warm water to wash the items thoroughly. Rinse well. Wipe dry, or hang in a clean area to air dry.

Cleaning Other PPE

☐ 1. Follow the manufacturer's cleaning instructions. If the instructions say only to wash the item, or if there are no cleaning instructions, follow the procedure below.

☐ 2. Recommended procedure for washing most PPE:

a. **Rinse** in a washing machine or by hand.
b. **Wash in a washing machine**, using a heavy-duty detergent and hot water for the wash cycle.
c. **Wash only a few items at a time** to allow plenty of agitation and water for dilution. Use the highest water-level setting.
d. **Rinse twice** using two rinse cycles and warm water.
e. **Use two entire machine cycles** to wash items that are moderately to heavily contaminated.
f. **Run the washer through at least one more entire cycle** without clothing, using detergent and hot water, to clean the machine.

☐ 3. Some plastic or rubber items that are not flat, such as gloves, footwear, and coveralls, must be washed twice — once to clean the outside and a second time after turning the item inside out.

☐ 4. Some items, such as heavy-duty boots and rigid hats or helmets, should be washed by hand using hot water and heavy-duty detergent.

☐ 5. **Hang the items to dry**, if possible. Let them hang for at least 24 hours in an area with plenty of fresh air — preferably outdoors. Do not hang items in enclosed living areas.

☐ 6. You may **use a clothes dryer** for fabric items if it is not possible to hang them to dry. But after repeated use, the dryer may become contaminated with pesticides.

Note to Employers:
This fact sheet will help you comply with the section of the WPS that requires you to provide information to people (other than your own handlers) who clean or maintain you pesticide equipment. You are not required to give them this information in written form, but you may find that photocopying this fact sheet is an easy way to pass along the necessary information.

WORKING SAFELY WITH PESTICIDE EQUIPMENT

☐ 1. The equipment you will be cleaning, adjusting, or repairing may have pesticides on it. Although you may not be able to see or smell the pesticides, they can rub off on you when you touch the equipment.

☐ 2. If pesticides get on you, they can hurt you. They can:

- cause skin rashes or burns,
- go through your skin and into your body and make you ill,
- burn your eyes,
- make you ill if you get them in your mouth.

☐ 3. You should wear work clothing that protects your body from pesticide residues, such as long-sleeved shirts, long pants, shoes, and socks. If possible, avoid touching the parts of the equipment where the pesticide is most likely to be. Or, if practical for the job that you will be doing, consider wearing rubber or plastic gloves and an apron.

☐ 4. You should not let pesticides stay on your hands:

- Wash your hands as soon as you finish handling the equipment.
- Wash your hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Wash or shower with soap and water, shampoo your hair, and put on clean clothes after work.
- Wash work clothes that may have pesticides on them separately from other clothes before wearing them again.

AGRICULTURAL ESTABLISHMENT OWNERS & OPERATORS

Agricultural Establishment Owners and Operators:

The use of this form is optional, but ***if you hire custom applicators or independent crop advisors , you must provide this information to the employers of those persons.*** *This information is necessary to assure that custom applicators and independent crop advisors are protected according to the federal Worker Protection Standard including all revisions through 2004. For complete information, see p. 26 of the EPA manual "The Worker Protection Standard for Agricultural Pesticides: How To Comply."*

INFORMATION TO BE PROVIDED TO EMPLOYERS OF CUSTOM APPLICATORS AND INDEPENDENT CROP ADVISORS

The following information refers to areas that your employees may need to enter, or come with in 1/4 mile of on foot, while working on this agricultural establishment.

	Application #1	Application #2
Areas to be Treated or Under Restricted Entry Intervals: Location & Description		
Entry Restricted Until: Month/Day/Time		
PPE Required for Handlers*		
Early-Entry PPE Required for Workers*		

**The only early entry allowed is that which is permitted by the federal Worker Protection Standard including all revisions through 2004.*

CUSTOM APPLICATORS

Custom (for hire) Applicators:

The use of this form is optional, but ***you must provide this information to the agricultural owners and operators who hire you to apply pesticides.*** *This information is necessary to assure that the grower's employees are protected according to the federal Worker Protection Standard including all revisions through 2004. For complete information, see p. 26 of the EPA manual "The Worker Protection Standard for Agricultural Pesticides: How To Comply."*

INFORMATION TO BE PROVIDED TO AGRICULTURAL ESTABLISHMENT OWNERS AND OPERATORS

	Application #1	Application #2
Area to be Treated: Location & Description		
Product Name		
EPA Registration Number		
Active Ingredient: Common or Chemical Name		
Application: Month/Day/Time*		
Entry Restricted Until: Month/Day/Time		
Are Both Treated Area Posting and Oral Notifications Required?		
Other Label Requirements to Protect Workers, Handlers, and Others		
PPE Required for Handlers**		
Early-Entry PPE Required for Workers**		
Other		

**If the pesticide is not applied as scheduled, the customer must be notified of the corrected time and date before the application takes place. If you are unable to make the correction before the application takes place, make it as soon as possible thereafter.*

***The only early entry allowed is that permitted by the federal Worker Protection Standard including all revisions through 2004.*

CHECKLIST: WPS REQUIREMENTS FOR AGRICULTURAL WORKERS

Have you given your agricultural workers the protections required by the EPA Worker Protection Standard? Use this list as a reminder. Remember that you have duties to persons other than your worker employees. For complete explanations, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

- ☐ 1. Information at a central location (WPS safety poster, application information, location of emergency medical facility) ..... H-T-C pp. 19-20
- ☐ 2. Pesticide safety training for workers ..... H-T-C pp. 21-23
- ☐ 3. Decontamination supplies (water, soap, towels, etc.) ..... H-T-C pp. 24-25
- ☐ 4. Emergency assistance (transportation and information) ..... H-T-C p. 27
- ☐ 5. Restrictions during applications (do not allow workers in area) ..... H-T-C pp. 36-37
- ☐ 6. Special application restrictions in nurseries ..... H-T-C pp. 41-42
- ☐ 7. Special application restrictions in greenhouses ..... H-T-C pp. 43-44
- ☐ 8. Restrictions during restricted-entry intervals (and limitations on early entry) ..... H-T-C pp. 36-37 and 47-56
- ☐ 9. Notice about applications (oral warnings and treated area posting) ..... H-T-C pp. 33-35

CHECKLIST: WPS REQUIREMENTS FOR PESTICIDE HANDLERS

Have you given your pesticide handlers the protections required by the EPA Worker Protection Standard? Use this list as a reminder. Remember that you have duties to persons other than your handler employees. For complete explanations, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

- ☐ 1. Information at a central location (WPS safety poster, application information, location of emergency medical facility) ..... H-T-C pp. 19-20
- ☐ 2. Pesticide safety training for handlers ..... H-T-C pp. 21-23
- ☐ 3. Decontamination supplies (water, soap, towels, change of clothing, etc.) ..... H-T-C pp. 24-25
- ☐ 4. Emergency assistance (transportation and information) ..... H-T-C p. 27
- ☐ 5. Restrictions during applications (do not allow pesticide to contact anyone directly or through drift) ..... H-T-C p. 59
- ☐ 6. Monitoring handlers (if handling skull and crossbones pesticides anywhere or fumigants in greenhouses) ..... H-T-C p. 59
- ☐ 7. Specific instructions for handlers (pesticide label information and how to use application equipment) ..... H-T-C p. 60
- ☐ 8. Equipment safety (inspection and maintenance of application equipment) ..... H-T-C p. 61
- ☐ 9. Personal protective equipment (provide, clean, maintain PPE, and prevent heat illness) ..... H-T-C pp. 62-63
- ☐ 10. Exceptions to personal protective equipment (closed systems, enclosed cabs, and open and enclosed cockpits) ..... H-T-C pp. 66-67

CHECKLIST: WPS REQUIREMENTS FOR COMMERCIAL HANDLERS

Have you given the handler employees of your commercial pesticide handling establishment the protections required by the EPA Worker Protection Standard? Use this list as a reminder. Remember that you have duties to persons other than your handler employees. For complete explanations, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

- ☐ 1. Pesticide safety training for handlers ..... H-T-C pp. 21-23
- ☐ 2. Decontamination supplies (water, soap, towels, change of clothing, etc) ..... H-T-C pp. 24-25
- ☐ 3. Emergency assistance (transportation and information) ..... H-T-C pp. 27
- ☐ 4. Restrictions during applications (do not allow pesticide to contact anyone directly or through drift) ..... H-T-C p. 59
- ☐ 5. Monitoring handlers (if handling skull and crossbones pesticides anywhere or fumigants in greenhouses) ..... H-T-C p. 59
- ☐ 6. Specific instructions for handlers (pesticide label information and how to use application equipment) ..... H-T-C p. 60
- ☐ 7. Equipment safety (inspection and maintenance of application equipment) ..... H-T-C p. 61
- ☐ 8. Personal protective equipment (provide, clean, maintain PPE, and prevent heat illness) ..... H-T-C pp. 62-63
- ☐ 9. Exceptions to personal protective equipment (closed systems, enclosed cabs, and open and enclosed cockpits) ..... H-T-C pp. 66-67

CHECKLIST: WPS EXEMPTIONS FOR AGRICULTURAL OWNERS

Although agricultural owners are encouraged to give WPS protections to themselves and their families,* the WPS does not ***require*** them to provide themselves or members of their immediate family with the following:

- ☐ 1. Information at a central location (WPS safety poster, application information, and location of emergency medical facility) ..... H-T-C pp. 19-20
- ☐ 2. Pesticide safety training for workers or handlers ..... H-T-C pp. 21-23
- ☐ 3. Decontamination supplies (water, soap, towels, change of clothing, etc.) ..... H-T-C pp. 24-25
- ☐ 4. Emergency assistance (transportation and information) ..... H-T-C p. 27
- ☐ 5. Notice about applications (oral warnings and treated area posting) . H-T-C p. 33-35
- ☐ 6. Monitoring handlers (if handling skull and crossbones pesticides anywhere or fumigants in greenhouses) ..... H-T-C p. 59
- ☐ 7. Specific handling instructions (pesticide label information and how to use application equipment)..... H-T-C p. 60
- ☐ 8. Equipment safety (inspection and maintenance of application equipment)..... H-T-C p. 61
- ☐ 9. All the specific duties related to the care of PPE and management of its use (provide, clean, maintain PPE and prevent heat illness) .. H-T-C pp. 62-63
- ☐ 10. The following duties related to early entry: ..... H-T-C pp. 53-56
  - Training and instructions
  - Decontamination supplies
  - Specific duties related to the care of PPE and management of its use.

* *Remember that you must provide all protections required by the WPS to persons who are* ***not*** *members of your immediate family.*

CHECKLIST: WPS REQUIREMENT TO PROVIDE BASIC PESTICIDE SAFETY INFORMATION TO UNTRAINED WORKERS

You must provide basic pesticide safety information to **untrained** workers before they enter treated areas on your establishment where, within the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect. For a complete explanation, refer to "The Worker Protection Standard for Agricultural Pesticides — How To Comply."

The following is a list of things that you must provide:

☐ 1. Basic pesticide safety information in a manner that the untrained workers can understand, such as through written materials, oral communication, or other means.

☐ 2. Verification that you provided the workers with the required basic pesticide safety information.

☐ 3. At least the following information:

- Pesticides may be on or in plants, soil, irrigation water, or drifting from nearby applications.
- To prevent pesticides from entering your body:
  - Follow directions and/or signs about keeping out of treated or restricted areas,
  - Wash before eating, drinking, using chewing gum or tobacco, or using the toilet,
  - Wear work clothing that protects your body from pesticide residues,
  - Wash/shower with soap and water, shampoo hair, and put on clean clothes after work,
  - Wash work clothes separately from other clothes before wearing them again,
  - Wash immediately in the nearest clean water if pesticides are spilled or sprayed on your body and then — as soon as possible — shower, shampoo, and change into clean clothes.
- You will receive more training within 5 days (or at least before your sixth day of work in pesticide-treated areas on this establishment).

EPA CHEMICAL RESISTANCE CATEGORY CHART

This chart is to be used when PPE section on the pesticide label lists a chemical resistance category. The Worker Protection Standard requires that labels of pesticides used on farms, and in forests, nurseries and greenhouses list the type of personal protective equipment (PPE) that must be worn with each product. Labels will refer to chemical resistance categories (A-H) for PPE. Items in these categories are made of materials that the pesticide cannot pass through during the times indicated below the chart. Choose the category of resistance which best matches the handling task duration. The categories are based on the solvents used in the pesticides, ***not*** the pesticides themselves. Therefore, there will be instances where the same pesticide with two different formulations (wettable powder-WP and emulsifiable concentrate-EC, for example) will require PPE from two different chemical resistance categories.

Selection Category Listed on Pesticide Label	**Types of Personal Protective Material**							
	Barrier Laminate	**Butyl Rubber ≥ 14 mils**	**Nitrile Rubber ≥ mils**	**Neoprene Rubber ≥ 14 mils**	**Natural Rubber ≥14 mils**	**Poly-ethelene**	**Polyvinyl Chloride (PVC) ≥14 mils**	**Viton ≥14 mils**
A (a dry and water-based formulation)	high	high	high	high	high	high	high	high
B	high	high	slight	slight	none	slight	slight	slight
C	high	high	high	high	moderate	moderate	high	high
D	high	high	moderate	moderate	none	none	none	slight
E	high	slight	high	high	slight	none	moderate	high
F	high	high	high	moderate	slight	none	slight	high
G	high	slight	slight	slight	none	none	none	high
H	high	slight	slight	slight	none	none	none	high

HIGH: Highly chemical-resistant. Clean or replace PPE at end of each day's work period. Rinse off pesticides at rest breaks.

MODERATE: Moderately chemical-resistant. Clean or replace PPE within an hour or two of contact.

SLIGHT: Slightly chemical-resistant. Clean or replace PPE within ten minutes of contact.

NONE: No chemical-resistance. Do not wear this type of material as PPE when contact is possible.

HEAT STRESS: PREVENTABLE MEASURES, ILLNESSES, AND FIRST AID TREATMENTS

WAYS TO CONTROL HEAT STRESS IN AGRICULTURAL ENVIRONMENTS

Taken from EPA's "Controlling Heat Stress in Agriculture" (EPA 750-F-95-001)

Key Elements

- Drinking enough water to replace body fluid lost through sweating.
- Gradually adjusting to working in the heat.
- Taking periodic breaks in a shaded or air conditioned area whenever possible.
- Monitoring by supervisors of environmental conditions and workers.

Basic Steps

- Training in how to control heat stress and to recognize, prevent, and treat heat illnesses.
- Accounting for the weather, workload, protective gear to be worn, and condition of the workers.
- Determining minimum amounts of water workers should drink.
- Adjusting work practices for the conditions of each day.
- Giving first aid when workers become ill.

HEAT ILLNESSES AND FIRST AID MEASURES

Chart taken from EPA's "A Guide to Heat Stress in Agriculture" (EPA 750-B-92-001)

Illness	Signs and Symptoms	Cause and Problem	Treatment
Early heat illness	■ Mild dizziness, fatigue, or irritability; decreased concentration; impaired judgement	■ Reduced flow of blood to the brain ■ May lead to heat exhaustion or heat stroke	■ Loosen or remove clothing ■ Rest in shade 30 minutes or more ■ Drink water
Heat rash "prickly heat"	■ Tiny, blister-like red spots on the skin; pricking sensations ■ Commonly found on clothed areas of the body	■ Sweat glands become plugged and inflamed from unrelieved exposure of skin to heat, humidity, and sweat	■ Clean skin, apply mild drying lotion or cornstarch ■ Wear loose clothing ■ Preventable by regular bathing and drying the skin and by periodic relief from humid conditions of work ■ See physician if rash persists
Heat cramps	■ Painful spasms of leg, arm, or abdominal muscles ■ Heavy sweating, thirst ■ Occurs during or after hard work	■ Loss of body salt in sweat ■ May be totally disabling	■ Loosen clothing ■ Drink *lightly* salted beverages ■ Massage ■ Rest

HEAT ILLNESS AND FIRST AID MEASURES (cont.)

Illness	Signs and Symptoms	Cause and Problem	Treatment
Heat exhaustion	■ Fatigue, headache, dizziness, muscle weakness, loss of coordination, fainting, collapse ■ Profuse sweating; pale, moist, cool skin; excessive thirst, dry mouth; dark yellow urine ■ Fast pulse, if conscious ■ Low or normal oral temperature, rectal temperature usually 99.5–101.3 degrees F ■ May also have heat cramps, nausea, urge to defecate, rapid breathing, chills, tingling of the hands or feet, confusion, giddiness, slurred speech, irritability	■ Dehydration, lack of acclimatization; reduction of blood in circulation; strain on circulatory system, reduced flow of blood to the brain ■ Worker may resist treatment ■ May lead to heat stroke	■ Removal to cooler, shaded area as quickly as possible ■ Rest lying down ■ If conscious, have worker drink as much water as possible ■ ***Do not give salt*** ■ If unconscious or if heat stroke is also suspected, treat for heat stroke until proven otherwise ■ Loosen or remove clothing ■ Splash cold water on body ■ Massage legs and arms ■ If worker collapsed, get evaluation by physician, nurse, or EMT before worker leaves for the day; shower in cold water; rest for balance of day and overnight
Heat stroke ***Immediate Treatment Required***	***Life-threatening medical emergency*** ■ Often occurs suddenly ■ Headache, dizziness, confusion, irrational behavior, coma ■ Sweating may slow down or stop ■ Fast pulse, if conscious ■ Rapid breathing ■ Rectal temperature 104 degrees F and over ■ May also have convulsions, nausea, incoherent speech, very aggressive behavior	■ Sustained exertion in heat, lack of acclimatization, dehydration, individual risk factors; reduced flow of blood to the brain and other vital organs, body's temperature-regulating system fails, body can not cool itself ■ Risk of damage to vital organs, including the heart, brain, central nervous system, liver, and kidney ■ Worker may resist treatment ■ ***Brain damage and death can result even with prompt treatment***	■ Move to a shaded area ■ Remove outer clothing/shoes ■ Immediately wrap in wet sheet, pour water on and fan vigorously, avoid over-cooling ■ Treat shock if present, once temperature is lowered ■ If worker vomits, make sure all vomit is cleared from mouth and nose to prevent choking on vomit ■ Transport to nearest medical treatment facility at once ■ While awaiting or during transport, elevate legs, continue pouring on water and fanning ■ If conscious, have worker drink as much water as possible ■ ***Do not give salt***