PEST MANAGEMENT PLAN (PMP) CHECKLIST

For Following Wisconsin's NRCS 595 Pest Management Standard (6/2003) *Rev. 8/18/2004 UW-Madison, NPM Program*

County name: _____ Date Plan Submitted: _____

Growing season year PMP is written for _____

Townships (T. ____., S. ___) – (R.____.)

Initial Plan or Update (circle one)

Name of qualified pest management planner	Planner's business name, address, phone:	
Circle the planner's qualification: 1 – NAICC; 2 – CCA; 3 – ARCPACS – Agronomist, Crop Specialist, Crop Scientist, Soil Specialist, Soil Scientist, or Weed Scientist; 4 – NRCS – TSP	Cropland Acres	Name of farmer receiving pest management plan

Wisconsin PMP Requirements based on NRCS 595 Pest Management Standard (6/2003) and WI Planning Technical Note 2, Part 1.

	Responsible Party	Yes	No	Comments
1. **Farm Aerial Photographs or Maps** a. Photos or maps indicate field boundaries, field ID, acreage, for crop fields, pastures, woodlands, etc. with a pest management plan? b. Field ID consistent with conservation plan and nutrient management plan. If not, is a cross list provided? c. Have the locations of sensitive species, ground and surface water risk areas, and setbacks been identified? d. Are all permanent pesticide mixing, loading, storage and supply areas identified? e. Are all pesticide mixing, loading, storage and supply areas at least 100 feet from any well or surface water body (unless mixing and loading is conducted over a spill containment surface)?	Conservation staff	a. b. c. d. e.	a. b. c. d. e.	
2. Planned Pest Management Practices a. Are the crop and targeted pests documented? b. Are the fields scouted for pests and crop conditions? c. Have pest thresholds been identified? d. Have other pest management alternatives been considered? e. Do herbicide modes of action differ from the prior year?	Farmer Planner	a. b. c. d. e.	a. b. c. d. e.	
3. If the plan includes pesticide use, does it identify; a. Fields where the application will occur? b. Crop planted? c. Target pest? d. Pesticide formulation, rate and method of application? e. Date and time of application will be recorded? f. Are changes from planned treatments documented?	Farmer/Planner	a. b. c. d. e. f.	a. b. c. d. e. f.	
4. Pesticide Risk Assessment a. Has NRCS WIN-PST been used for the risk analysis? b. If not, was the WIN-PST Quick Guide used? c. If appropriate, are mitigation techniques identified on the plan?	Farmer/Planner	a. b. c.	a. b. c.	

I certify that the PMP *does / does not* meet the minimum requirements of Wisconsin's NRCS 595 pest management standard

Signature of certified pest management planner _____

Date: _____

PLAN WRITER'S NOTE: This is an example of a pest management plan written for a 595 contracted apple grower; details of the fruit varieties, farm site and situation, environmental concerns, etc. must be tailored to your grower's location, crop, equipment, pressures and state NRCS requirements.

Entries that are marked in **RED** were changed to protect the grower's privacy, and must be modified to fit the new farm in the contract. There may be additional modifications required, e.g., location of and total acres in plan, pests, soil types, chemical use, etc.

EQIP 595 2008 Orchard Pest Management Plan

For: Grower
Address
City, State, Zip Code

2008 Contract # [see EQIP Contract] **Farm # [see contract]** **Tract # [see contract]**

Introduction

Orchard blocks are located in [XXXXX] County, [YY]. The orchard is managed for retail (on farm sales, fresh eating and baked goods) and wholesale production. The orchard contains over 30 varieties of apples, including but not limited to Courtland, Dudley, Fuji, Golden Delicious, Golden Russet, Granny Smith, Greening, Heraldson's, Honey Crisp, Macintosh, Mutsu, Paula Red, Red Delicious, Snow and Wolf River. Apple pests are managed with minimal tolerance of fruit and leaf diseases (scab) and direct fruit feeding insects (plum curculio, codling moth and apple maggot). Indirect apple pests (European red mite, spotted tentiform leafminer, etc.) are kept below damage levels that would adversely affect fruit finish, size and other fruit quality parameters. Because many of the apples are raised for the fresh-eating market, there is very low tolerance for damage to apples.

Orchard Maps and Descriptions

Refer to the attached maps. Included on the maps are roads, surface waters and soil types. The following maps are included:

1. NRCS tract
2. NRSC soils
3. Topographic
4. Map Legend/Soils Map Unit Description

The arial map is marked with the locations of insect traps, wells and pesticide storage and mixing areas. The Soils Map Unit Description contains and abbreviated description of the predominant soil types.

Tract:
Township: 1N Range: 2E Sections: 3, 4

Field 1	Acreage: 10.0	Primary Soils: See map legend.
Field 2	Acreage: 2.0	Primary Soils: See map legend.
Field 3	Acreage: 3.0	Primary Soils: See map legend.
Field 4	Acreage: 12.0	Primary Soils: See map legend.
Field 5	Acreage: 15.0	Primary Soils: See map legend.
Field 6	Acreage: 8.0	Primary Soils: See map legend.

Total Acreage: 50.0

Environmental Assessment:

- The primary soils of this orchard are the XyZ1 Name silt loam, which is a well drained silty soil with moderate available water capacity. The site has already experienced a moderate level of erosion due to the slope range of 12 to 20 percent, and remains highly erodible. Surface transport is a concern. The perennial fruit trees and between-row vegetation both mitigate soil erosion and surface transport. Nitrogen applied to these fruit trees should be done during the growing season to increase the chances of uptake by growing plants. These soils are part of the "A" soil class and the "4E" subsoil group.

- The western section of the orchard is made up of AbC2 Name silt loam, a moderately eroded, well drained silty soil with high potential for erosion due to its location on a 12 to 20 percent slope. Surface transport is a concern. Perennial vegetation in and between rows will help mitigate this transport of pesticides. These soils are part of the "A" soil class and the "4E" subsoil group.

- The eastern portion of the orchard is partly comprised of LmN3 Name silt loam, which is well drained silty over clayey soil with low available water capacity. Soft bedrock is located 20 to 40 inches below the surface. Because of the proximity of the bedrock to the surface, shallow ground water, the well-drained nature of the soil and the site's location on a 12 to 20 percent slope, there is extreme concern for soil erosion, surface transport of pesticides and leaching of pesticides into the groundwater. Perennial vegetation in and between rows will help mitigate this transport of pesticides and provide a buffer between the soil and groundwater. These soils are part of the "A" soil class and the "4E" subsoil group.

- In 2008 the grower used the following chemicals: Superior oil (oil), Polyram (metiram), Flint (trifloxystrobin), Envidor (spirodiclofen), Captan (captan), Avaunt (indoxacarb),

Delegate (spinetoram), Rimon (novaluron), Imidan (phosmet), Indar (fenbuconazole), Assail (acetamiprid), Topsin-M (thiophanate-methyl). The Wisconsin WIN-PST Hazard Rating Quick Guide included in this plan rates the hazard of each of these compounds to surface and groundwater, excluding Superior oil, Envidor, Delegate and Rimon. These compounds were not listed in the Quick Guide, and hazard ratings could not be generated for them.

- The orchard is almost entirely surrounded by forested or farmed land. Roads border the southern edge of fields 1, 2 and 5. Field 3 is bordered to the east by a non-affiliated homestead and property containing wild apple trees which serve as alternate hosts for coddling moth and plum curculio each year, thereby increasing the chances of their migration into the orchard. There are also abandoned apple trees to the west of Field 4, raising the same issues.

- There are no bodies of surface water in the area. The topographic map indicates a potential concentration of flow toward the southeastern part of the orchard and beyond, which leads to the river approximately .75 miles to the southeast. There don't appear to be direct conduits to groundwater, with the exception of the soil profile discussed in the third bullet of this section.

- Orchard alleys are mowed. Approximately 70-75% of the trees are pruned on an annual basis in the dormant season.

Mitigation Practices to Reduce Environmental Risk

Product	Risk
Polyram	I – surface water
Flint	I – surface water
Avaunt	I – surface water
Imidan	I – surface water
Indar	I – surface water
Topsin-M	I – surface water

The following page (page five) lists mitigation practices currently employed by the grower to reduce the environmental impacts of the chemicals listed above. Pages eight and nine of this plan lists the recommended priority practices for the 2008 growing season.

PLAN WRITER'S NOTE: The table listed below is based on WISCONSIN soils and are not universally applicable to other states. You may need to run the WIN-PST program found on the NRCS' website to get data specific to your state.

EQIP 595 Pest Management Plan – NAME OF ORCHARD
Mitigation - 2008
With the exceptions of acetamiprid, all of the pesticides listed with Hazard Ratings pose at least an intermediate threat to either Groundwater or Surface Water in some part of the orchard, requiring the implementation of one or more mitigation techniques. The Hazard Rating Quick Reference Table results are reiterated below, followed by the mitigation measures employed to reduce the probability of environmental contamination. The Conservation Practices listed are historical practices employed to reduce runoff and soil loss. The management techniques listed have the special emphasis of the included EQIP Pest Management Plan.

Pesticide		**Pesticide Ratings per Subsoil**		**Mitigation Techniques Employed**							
Active Ingredient	**Trade Name**	**"A"**		**Management Technique**				**Conservation Practices**			
		Ground -water	Surface Water	Low Rate	Partial Treatment	Scouting, Use of Thresholds	Substi -tution	330	386	393	600
acetamiprid	Assail	V	V		Y	Y		Y	Y	Y	
indoxacarb	Avaunt	V	I	Y		Y		Y	Y	Y	
phosmet	Imidan	L	I	Y	Y	Y	Y	Y	Y	Y	
captan	Captan	V	L	Y		Y	Y	Y	Y	Y	
fenbucon-azole	Indar	V	L-I	Y		Y		Y	Y	Y	
metiram	Polyram	L	I	Y		Y	Y	Y	Y	Y	
thiophanate	Topsin M	V	I	Y		Y	Y	Y	Y	Y	
trifloxystrobin	Flint	V	I	Y		Y		Y	Y	Y	
oil	Superior Oil	*	*	Y		Y		Y	Y	Y	
spirodiclofen	Envidor	*	*		Y	Y		Y	Y	Y	
novaluron	Rimon	*	*	Y		Y		Y	Y	Y	
spinetoram	Delegate	*	*	Y		Y		Y	Y	Y	

*Not listed and/or rated in WI WIN-PST Hazard Rating Quick Reference Table.

V-Very Low
L-Low
I-Intermediate
H-High
X-Extra High

Y-Technique employed

Y - Eligible for Practice

Integrated Pest Management Strategy:

Insect & Diseases - The following table presents both disease and insect pests of apple that are to be monitored and managed.

Crop	Insect	Disease
Apple	Level I Plum Curculio Codling Moth Apple Maggot European Red Mite Spotted Tentiform Leafminer Level II Green Fruit Worm Red-Banded Leafroller Rosy Apple Aphids Obliquebanded Leafroller	Level I Apple Scab Level II Fire Blight Powdery Mildew Flyspeck-Sooty Blotch

Pest History - All of the primary diseases and insect pests in the table above have been present at damaging levels in the past. Monitoring will focus on the primary pests. Less rigorous monitoring and observation for the secondary pests will also be conducted. Variability in weather and crop development can lead to variability in pest occurrence with some needing regular yearly control.

A primary goal for 2008 and 2009 will be to decrease the number of sprays. For this reason it will be important to closely monitor pest and beneficial populations in response to the reduced spray program.

Pesticide Resistance Concerns/Management:

1. Orchard has a history of myclobutanil use against apple scab fungus (*Venturia inequalis*), which in several apple growing regions of the United States has become resistant to one or more classes of fungicide, including the sterol-inhibitors such as myclobutanil. It is important to reduce any s.i. fungicide use to a minimum to decrease the chances of pesticide resistance.

2. Orchard has a history of organophosphate (OP) use for control of codling moth (CM) and oblique-banded leafroller (OBLR). These two species have become resistant to this class of pesticides in many apple production regions of the United States.

   An endemic CM population will require more frequent applications of insecticide than would otherwise be necessary. One goal should be to minimize the area of the orchard

receiving these extra insecticide applications through the placement of additional CM traps throughout the orchard. Monitoring of all pest and beneficial species is to be continued throughout, to build the necessary database for eventual insecticide and fungicide reductions.

Pest Scouting, Monitoring and Control Strategies

- Specific strategies and protocol for monitoring and control are outlined in the "Integrated Pest Management in Apples-Emphasizing Direct Pests" document, which the grower has or will receive from their pest consultant. This document identifies IPM priorities (i.e., reducing unnecessary pesticide applications, focusing on pest control, alternatives to organophosphates, etc.), and gives the reader scouting and management tips for specific pests.
- The 2008 Planning Priorities List (found on pages eight and nine) will be distributed to the grower, which should be posted in the pesticide storage shed for the grower's reference.
- The primary goal for 2008 is to utilize monitoring data to guide pesticide applications.
- The goal for 2009-2011 is to transition from broad spectrum insecticides to reduced-risk and greener chemistries.
- An additional goal for 2009-2011 is to encourage, monitor and utilize beneficial insects for control of secondary pests such as mites, leafminers and aphids.
- Tissue analysis and proper fertilization to maintain the health of the apple and cherry trees and to help resist disease and insect pressure should be done in consultation with the pest consultant.
- Annual pruning is encouraged to open up the canopy, speed drying to suppress disease development and improve pesticide penetration and coverage.
- Once leaf drop has occurred, leaf litter should be mowed in the fall to reduce apple scab inoculums and leafminers the following spring.

Pesticide Storage, Mixing and Container Disposal

- Pesticide products are stored in a locked storage shed, which is used exclusively for pesticide storage. Product is purchased as needed; large volumes are not stored onsite. Currently the well is upgrade from the mixing area, though within 60 feet. Prior to the

2009 growing season, the grower will alter the location of the mixing area to ensure it meets standard distance.

- Pesticides (excluding herbicides) are applied with a 300 gallon PTO-driven air-blast sprayer, which was calibrated in April of 2008. Applications are not made when conditions are favorable for wind drift, and/or rain-induced wash-off. Concentrate applications ranging from 5X-8X are utilized to reduce pesticide movement from the leaves to the groundcover.

Emergency Action Plan and REI Tracking

- All pest management product labels and MSDS sheets are kept on file.
- Emergency contact and Poison Control Center numbers are posted where pesticides are stored.
- Portable pesticide exposure decontamination kit is located in the pesticide storage area and/or mixing areas. The kit must contain:

    1. 3 – 1-gal. potable water containers
    2. 2 – 16-oz. bottles of emergency eyewash solution
    3. 1 – 3-oz. container of antibacterial hand and body soap
    4. 4 – extra-larger disposable towels
    5. 1 – limited-use coverall for change of clothes

- Paper copies of application records are located in the pesticide storage shed.

Implementation Records

Pesticide application records are documented and included in the annual update. The grower is encouraged to compile and submit the pesticide application records to the program leader of the Wisconsin Eco-Apple Project in Madison. An Eco-Tox score will calculated for the orchard and sent to the grower in order to track progress toward implementation and adoption of integrated pest management principles.

2008 Planning Priorities

1. Scout for plum curculio, codling moth, apple maggot, spotted tentiform leafminer, and European red mites using the schedule included in the Insect and Disease Monitoring Schedule section of this plan, and the "Integrated Pest Management in Apples" handout.
2. Scout for obliquebanded leafroller, redbanded leafroller, rosy apple aphids and other secondary insect pests as necessary.

3. Continue pest trapping and recording of data from traps.
4. Provide a map indicating the locations of insect trapping and weather monitoring stations.
5. Record all pesticide applications and pest monitoring data.
6. Record temperature and wetting hours with a weather station (purchase is necessary) to determine when infection periods have occurred for apple scab and calculate degree days for arthropod pests.
7. Calibrate the sprayer.
8. Eliminate the use of Guthion (azinthos-methyl).
9. Eliminate one or two applications of Imidan (phosmet) and Rimon (novaluron) unless justified by pest monitoring data.
10. Reduce use of any s.i. fungicide to a minimum in 2009 to reduce chances of scab resistance.
    a. Alternatively, eliminate leaf litter in the fall to prevent scab (e.g. through mow/fine-leaf-chop the leaf litter in fall after leaf drop or in spring, broadcast lime under the tree rows after leaf drop in fall, or apply urea after leaf drop in fall or in spring).
11. If entire orchard is not pruned annually, keep pruning records to keep track which trees were pruned each year.
12. Implement one or both of these practices to increase habitat for beneficial insects:
    a. every other row mowing;
    b. plant an annual/perennial forbs mix wherever possible (within rows, in orchard alleys or as borders); the ultimate goal is to have a nectar source every 120 feet in every direction.
13. Grower must submit herbicide application records.

Attachments: Apple Pest Management-Scouting List; Apple-Insect and Disease Monitoring Schedule; "Integrated Pest Management in Apples-Emphasizing Direct Pests"; 2008 Midwest Tree Fruit Spray Guide-University of Wisconsin Pub. A3314 (cover page only); "Wisconsin WIN-PST Hazard Rating Quick Reference Table for Apple Production"; Pesticide Application Record Spreadsheet (Excel format).

Orchard Name

EQIP Pest Management 595
Integrated Pest Management

Specific IPM actions will be determined prior to each growing season through the duration of this EQIP contract. These specific actions must be implemented to maintain compliance with the contract, unless specific justifiable documentation is provided why the action was not implemented. **Please post this document in your pesticide storage shed as a reminder of this year's priorities.**

2008 Planning Priorities

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2. Scout for obliquebanded leafroller, redbanded leafroller, rosy apple aphids and other secondary insect pests as necessary.
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13. Grower must submit herbicide application records.

Orchard Name

Pest Management – Scouting List

The following is a listing of the diseases, and insect and mite pests to be monitored and managed. Level I pests and diseases have a higher probability of rapidly causing economic damage and consequently should be given greater emphasis in the management protocol, specifically scouting time and maintaining populations below their economic thresholds. This is not a comprehensive list of all the pests and pathogens occurring in Wisconsin apple orchards, but only those most commonly causing economic damage in commercial orchards. See the following page for the Insect and Disease Monitoring Schedule.

Monitored Arthropods:

Direct Fruit Feeders – Level I: Plum Curculio (PC), Codling Moth (CM), Apple Maggot (AM), Lesser Appleworm (LAW), Oriental Fruitmoth (OFM).

Direct Fruit Feeders – Level II: Green Fruitworm (GFW), Red-Banded Leafroller (RBLR), Oblique-Banded Leafroller (OBLR), San Jose Scale (SJS), Tufted Apple Budmoth (TABM), Tarnished Plantbug (TPB).

Secondary or Indirect Pests – Level I: Spotted Tentiform Leafminer (STLM), European Red Mite (ERM), Wooly Apple Aphid (WAA), Dogwood Borer (DWB), American Plum Borer (APB).

Secondary or Indirect Pests – Level II: Rosy Apple Aphid (RAA), Green Apple Aphid (GAA), White Apple Leafhopper (WALH), Potato Leafhopper (PLH), Two-Spotted Spider Mite (2SSM), Apple Rust Mite (ARM).

Monitored Diseases:

Level I: Apple Scab (AS), Fireblight (FB), Root and Crown Rots, Apple Replant Disease.

Level II: Powdery Mildew, Cedar Apple Rust, Black Rot, Sooty Blotch (SB) and Flyspeck (FS).

EQIP 595 Pest Management Plan

Insect and Disease Monitoring Schedule[1]

Tree Stage (Phenology)	Date	Begin Visual Scout for:[2]	Begin Trapping For:[2]
Green-tip		ERM eggs (Count pre-bud break)	STLM, RBLR
1/4" Green		ERM hatch, OBLR	
1/2" Green		ERM	
Tight Cluster		All LR's, GFW	
Pink		WAA, TPB adults	CM, OFM, LAW, TPB (if available)
Bloom		PC, AS	PC (if available)
Petal-Fall		STLM mines, GAA, WALH nymphs	OBLR, TABM, SJS crawlers
1st Cover		FB blossoms & shoots, Cm & OFM & LAW larvae, ARM, 2SSM	DWB, APB
2nd Cover		1st gen. OBLR larvae, TABM larvae, PLH adults	
3rd Cover		2nd gen. RBLR larvae	

[1]This chart denotes when visual scouting should begin. Scouting should continue weekly as justified by pressure. Pheromone trap liners and lures should be replaced every 30 days (CM every 21 days). CM and AM adults should be removed with each weekly count.

[2]See Pest Scouting List