ORCHARD CROPS
BEST MANAGEMENT PRACTICES GUIDANCE

OVERVIEW

BACKGROUND:

All burning by commercial agricultural operations requires a permit except when burning orchard pruning, natural vegetation along fence lines, irrigation and drainage ditches or natural vegetation blown by the wind. A grower must still comply with their fire protection authority's notification/approval process prior to igniting any outdoor fire even if an air quality permit is not required.

INTRODUCTION:

The purpose of this document is to identify the Best Management Practices (BMPs) for reducing emissions from orchard crops agricultural burning. The Agricultural Burning Practices and Research Task Force (Task Force) encourages the use of agronomically sound and economically feasible alternatives to burning that are consistent with resource conservation. The Task Force recognizes that any and all burning creates emissions having the potential of affecting public health and the environment. The Task Force also recognizes that after first considering all non-burning alternatives, there may be specific agronomic situations where burning is reasonably necessary to successfully carry out the enterprise.

DEFINITION of BMP:

A sequence of procedures that apply the best available science and technology in order to address the conservation of natural resources (Soil, Water, Air, Plants, Animals or SWAPA).

HOW TO USE BEST MANAGEMENT PRACTICE GUIDELINES:

The Best Management Practices (BMPs) are an important piece of the agricultural burning program. The clean air law requires growers to explain why burning is necessary. This is where BMPs come in. A grower can show burning is reasonably necessary to successfully carry out the enterprise when it meets the criteria of the BMPs and no practical alternative is reasonably available. While designed as guidance, these BMPs provide one way to explain why burning is reasonably necessary to carry out your enterprise.

Growers using these BMPs to demonstrate the need to burn should expect that applicable portions of this BMP guidance will be included in an approved agricultural burn permit.

Growers not using these BMPs to demonstrate the need to burn must, on an individual basis, establish that their proposed agricultural burn plan is reasonably necessary and, that no practical alternative is reasonably available. The responsibility and burden of proof is on the grower and the demonstration must satisfy the Department of Ecology, the local air pollution control authority, and the local delegated permitting authority. Growers should expect that appropriate parts of this demonstration will be included in an approved agricultural burning permit.

THESE BMPs ARE **NOT** FOR NON-CEREAL CROPS!
Please refer to non-cereal crop BMP guidance.

THESE BMPs ARE **NOT** FOR CEREAL GRAIN CROPS!
Please refer to cereal grain crop BMP guidance.

THESE BMPs ARE **NOT** FOR GRASS SEED!
Please refer to WAC 173-430.

Before getting started-Determine if you need an agricultural burning permit.

- Burning orchard tear-out that is in agricultural production requires a permit.
- Burning orchard tear-out that has been taken out of fruit production but that will remain in agricultural operations requires a permit.
- You do ***not*** need a permit to burn orchard pruning, natural vegetation along fence lines, irrigation and drainage ditches, or natural vegetation blown by the wind.

If you need an Agricultural Burn Permit, follow these 5 steps when using these BMPs:

- Review Part I – Pre-Qualification Requirements.
- Read all of Part II – General Requirements.
  Note: You must consider economically feasible alternatives to burning, timing for burning, and address the conservation of Natural Resources (SWAPA).
- Find the Best Management Practices in Part III, Sections 1- 4 that most closely matches your particular situation.
- Review Part IV – Specific Burning Practices.
- Fill in the REASON FOR BURNING section on the Agricultural Burning Application. Include the BMP section number and required details. Examples: REASON FOR BURNING

  Part III Section 1: Orchard Renewal; replanting orchard with new varieties;
  Part III Section 2; Insect Control; control of codling moth;
  Part III Section 3; Disease Control; control of fire blight;
  Part III Section 4; Orchard Removal; removing orchard to convert to another agricultural use;
  Part III Section 5: Research;
  Part III Section 6: Orchard Transition

Note: If you don't find your situation described in Part III, provide a detailed explanation of why you need to burn with your Agricultural Burning Application. When the extent or severity of the situation falls outside the BMPs or when not utilizing these BMPs, the permitting authority may require the grower to have the need for burning verified by a local horticultural pest and disease board formed under Chapter 15.09 RCW, an extension office agent with Washington State University that has horticultural experience, or an entomologist employed by the Washington State Department of Agriculture.

PART I – PRE-QUALIFICATION REQUIREMENTS

Section 1 – PRIOR NOTICE OF INTENT:

Growers must notify the permitting authorities of his/her potential need to burn and provide a preliminary explanation. Growers are expected to provide notice as early as possible after identifying the specific Best Management Practice needing to be addressed.

Section 2 – COMPLIANCE WITH THE REQUIREMENTS:

Growers are responsible for demonstrating compliance with the requirements described in these BMPs. Growers acknowledge their responsibility to show that the proposed burning is reasonably necessary to successfully carry out their enterprise. Permitting Authorities and Agencies will provide assistance, but the planning, preparation, and legwork is the responsibility of the grower.

Section 3 – ACKNOWLEDGMENTS:

The grower is responsible for acknowledging, in the appropriate permit form, that he/she is accountable for compliance with notification, application, permitting and burning requirements, payment of fees and adherence to any and all restrictions. It is understood that permitted burning is subject to on site inspection by the Department of Ecology, the local air pollution control authority, and the local delegated permitting authority.

Section 4 – TRANSITION:

In situations where a non-burning alternative is reasonably available but not yet being used by the grower, burning may be allowed as part of a limited term transition to non-burning orchard management plan. The grower in advance of burning approval, must bring forward a proposed transit plan including specific steps and time frames. Growers are expected to change to the non-burning alternative(s) as soon as practical. Transitioning plans are limited to no more than the time needed for the grower but may not exceed three years.

Section 5 – ORCHARD INSPECTION PRIOR TO ISSUING A PERMIT:

Growers are required to do careful and thorough orchard inspections, and document the need for the use of burning, before a permit may be issued. Growers must show that the setting of fires as requested is the most reasonable procedure to follow in safeguarding life or property under all circumstances or is otherwise reasonably necessary to successfully carry out the enterprise as part of their evaluation of alternatives. Growers will be held accountable for information they provide on which permit decisions will be based. The Task Force strongly recommends consultation with one or more agronomic professional(s) to assist with orchard inspections and documentation of agronomic conditions. However, it is the grower who is responsible for statements made in the application for permission to burn. Growers may seek assistance in this process from local horticultural pest and disease boards, extension agents with horticultural experience or an entomologist employed by the Washington State Department of Agriculture.

Section 6 – OTHER REQUIREMENTS:

Compliance with other, state and federal requirements is required. Growers must follow approved fire safety management plans of their local fire protection authorities.

PART II – GENERAL REQUIREMENTS

The Washington Clean Air Act (Chapter 70.94 of the Revised Code of Washington) establishes specific measures for the control of air pollution, which are appropriate for each category of air pollution sources. The legislature recognized that air pollution controls may affect other environmental media and supports those strategies that lessen the negative environmental impact on all environmental media, including air, water, and land. The law also recognizes that agricultural burning is acceptable when it is reasonably necessary to successfully carry out the enterprise.

The 1991 Clean Air Act recognizes air quality as a value no less important than SWAPA and economics and that every action or activity has environmental effects and consequences, including burning. The Task Force recognizes the potential long term adverse impact that excessive burning can have on the environment. Economically feasible alternatives must be considered prior to burning. The development of agronomic and cultural practices and the use of new technology are strongly encouraged.

Agricultural burning has a role in existing and developing orchard management plans when a balanced view of values (SWAPA and economics) is considered. RCW 70.94 identifies BMPs for agricultural burning as those practices that are essential agronomical and which eliminate unnecessary burning. Because of the diversity of farming in Washington, appropriate BMP guidance is needed. This has resulted in "General Agricultural Burning" and “Crop Specific” BMPs. The grower must accept responsibility for characterizing the conditions on their orchard which make it necessary to burn.

The nature of orchard management plans in Washington is very diverse. A specific agronomic or cultural practice (including burning practices) may not work the same on all orchards (i.e., one size does not fit all).

The *Agricultural Burning Best Management Practices* guidance is ***not*** intended to undo the requirements of fire protection authorities; of local air pollution control authorities; of other federal, state, or local governments; of other resource requirements (orchard renewal, insect control, disease control, etc.).

A grower can show burning is reasonably necessary to successfully carry out the enterprise when it meets the criteria of the BMPs, and no practical alternative is reasonably available. When the extent or severity of the situation falls outside the BMPs or when not utilizing these BMPs, the Department of Ecology, the local air pollution

control authority, and the local delegated permitting authority may require the grower to have the need for burning verified by an agronomic professional.

The cornerstones of the BMPs presented here are based upon sound agronomics, science, and public health. Economics should be but one factor to weigh in conjunction with the many agronomic decisions listed elsewhere in the guidance. As with all the BMP options listed here, economics should not be the sole determining factor in documenting the need to burn. Growers are required to use any reasonable non-burning alternative, consistent with SWAPA and economics, instead of burning. Non-burning alternatives are deemed to be reasonably available to a grower when they are successfully and customarily being used locally by others in circumstances similar to the grower's situation. In cases where a non-burning alternative is reasonably available but not yet being used by the grower, burning may be allowed only as part of a limited term transition to non-burning orchard management plan, as described in Part I, Section 4 of this document.

Anti-backsliding provision: A key principle of these BMPs is that they reduce emissions. For that reason, shifting to orchard management plans that are more reliant on burning is unacceptable when alternatives are reasonably available locally. These BMPs are meant to prevent widespread increases in agricultural burning.

PART III – SPECIFIC BEST MANAGEMENT PRACTICES

Agricultural burning of orchard tear-out (whole tree removal) is generally acceptable when the situation meets one of the following criteria:

Section 1 – ORCHARD RENEWAL

Burning identified for orchard renewal (in replacement block only) -- Burning is not generally recommended for orchard renewal except where its use is shown to be reasonably necessary and alternative practices are not available, feasible, timely or economically practical. The situation must satisfy all Pre-Qualification Requirements. Growers need to document their evaluation of the need to burn. Commercial orchards are generally renewed on a fifteen to thirty year rotation for a given block, depending upon market conditions and tree health. Typical practice is to replace three to five percent of the orchard's total acreage each year. Renewal involves removal of the entire tree, including trunks and root ball, most commonly in the fall after harvest or early in the spring, weather permitting. Once the trees have been removed the site must be prepared for replant using various soil preparation steps. The removed trees must be disposed of prior to the site preparation activities. Replacement trees are typically planted following completion of the site preparation activities. The Task Force strongly recommends that the grower verify that reasonable steps were taken to utilize alternative practices and to document why they were not available, feasible, timely or economically practical. Permit conditions must be met and the burden of proof falls upon the applicant for obtaining this documentation.

Section 2 – INSECT CONTROL

Burning identified for insect control (in affected acreage only) --Insects/pests for which burning is the control used by or appropriate to orchards of a similar nature in the local area. The situation must satisfy all Pre-Qualification Requirements. Growers need to describe their particular situation on the permit application including: insect/pest name, crop, local details and severity of problem, etc. The Task Force strongly recommends that the grower call upon their local horticultural pest and disease board, Washington State University extension agent or a Washington State Department of Agriculture entomologist to provide verification of the need to burn for insect control. Permit conditions must be met and the burden of proof falls upon the applicant for obtaining this documentation.

Section 3 – DISEASE CONTROL

Burning identified for disease control (in affected acreage only) --Diseases for which burning is the control used by or appropriate to the orchards of a similar nature in the local area. The situation must satisfy all Pre-Qualification Requirements. Growers need to describe their particular situation on the permit application including: disease name, crop, local details and severity of problem, etc. The Task Force strongly recommends that the grower call upon their local horticultural pest and disease board, Washington State University extension agent or a Washington State Department of Agriculture entomologist to provide verification of the need to burn for disease control. Permit conditions must be met and the burden of proof falls upon the applicant for obtaining this documentation.

Section 4 – ORCHARD REMOVAL

Burning identified for orchard removal (in affected acreage only) --Burning is not generally recommended for orchard removal. Burning for orchard removal usually requires a land-clearing burning permit and does not usually qualify for an Agricultural Burning Permit. Land-clearing burning is not allowed within any Urban Growth Areas (UGA) except as allowed under WAC 173-425-040(2). Orchard removal burning is allowed within UGA's under an Agricultural Burning Permit if: a local horticultural pest and disease board formed under Chapter 15.09 RCW; an extension office agent with Washington State University that has horticultural experience, or an entomologist employed by the Washington State Department of Agriculture has determined in writing that burning is an appropriate method to prevent or control the spread of horticultural pests or diseases. The applicant must submit a signed *Agronomic Professional Verification Document* with their Agricultural Burn Permit. Permit conditions must be met and the burden of proof falls upon the applicant for obtaining this documentation.

Section 5 – RESEARCH

Burning identified for research (in research acreage only) --Agricultural burning conducted as part of a research project or demonstration project provided the burning/research/demonstration is recognized by the agricultural community through College, University, Extension, Conservation District, or the Task Force as innovative or experimental and the results will be shared with the Task Force and the general public. Describe your situation on the permit application including: the research project, residue

amounts, crop, field treatment, local details, etc. Permit conditions must be met and the burden of proof falls upon the applicant for obtaining this documentation.

Section 6 – ORCHARD TRANSITION

Burning identified for orchard transition (in transition block only) –Orchard transition is the burning of orchard trees on land that will be changed from a commercial agricultural orchard to a non-orchard commercial agricultural crop. Burning is not generally recommended for orchard transition except where it use is shown to be reasonably necessary and alternative practices are not available, feasible, timely or economically practical. The situation must satisfy all Pre-Qualification Requirements. Growers need to document their evaluation of the need to burn. Once the trees have been removed the site must be prepared for replanting using various soil preparation steps. The removed trees must be disposed of prior to the site preparation activities. The Task Force strongly recommends that the grower verify that reasonable steps were taken to utilize alternative practices and to document why they were not available, feasible, timely or economically practical. Permit conditions must be met and the burden of proof falls upon the applicant for obtaining this documentation.

NOTE: ORCHARD PRUNINGS

Per RCW 70.94.745(7)(d)(i) burning of orchard prunings does not require an agricultural burning permit, however the Task Force strongly recommends that whenever practical the grower mulch up the prunings rather than burning them.

PART IV – SPECIFIC BURNING PRACTICES

The Task Force has established the following specific practice or practices in order to reduce emissions from burning orchard tear-out piles.

Section 1 – MOISTURE CONTENT

Fuel moisture content is one of the most influential factors in the combustion, consumption and emission processes. Fuel moisture content affects the flame temperature that in turn influences the ease of ignition, the amount and rate of consumption and the combustion efficiency. Generally, fuels with low fuel moisture content burn more efficiently and produce fewer emissions per unit of fuel consumed.

Section 2 – CURING

Orchard trees contain very high internal fuel moisture, which may take up to eight months to dry after cutting. Therefore, whenever possible piles or windrows should be cured for at least eight months prior to being burned. However, due to the time limitation caused by soil preparation, tree availability, insect or disease control and weather conditions all fuels should be aged for as long as possible before ignition. Once the fuel has been ignited it should be allowed to burn itself out completely.

Section 3 – LARGE PILES/WINDROWS

Fuels concentrated into clean and dry piles or windrows generate greater heat and burn more efficiently. A greater amount of the consumption occurs in the flaming phase and the emissions factor is lower. Concentrating fuels into piles or windrows generally require the use of non-traditional orchard equipment. Large piles and windrows also cause temperature extremes in the soils directly underneath and can result in areas of soil sterilization.

Section 4 – CLEAN PILES/WINDROWS

Fuels that are mixed with dirt, rocks or other non-flammable debris will affect the amount and rate of consumption and the combustion efficiency of the pile or windrow. Clean piles/windrows burn more efficiently and generate greater heat, resulting in less emissions. Piles/windrows that are mixed with dirt, rocks or other non-flammable debris will smolder for extended periods of time and produce more emissions.

Section 5 – PILES/WINDROW DENSITY

The structure of fuels and air space within a pile or windrow can either enhance or retard fuel consumption and affect combustion efficiency. A loosely packed pile or windrow will allow plenty of oxygen to be available for combustion, but may result in inefficient heat transfer between burning and adjacent non-burned fuel. On the other hand, a tightly packed pile or windrow allows efficient heat transfer between fuels, but may restrict oxygen availability and reduce consumption and combustion efficiency. An efficiently burning pile or windrow will have fuels close enough for adequate heat transfer while at the same time large enough spaces between fuels for oxygen availability.

Section 6 – SEASON

The season of burn influences many burn parameters. Typically, acceptable burning conditions are more predictable during certain seasons, making it easier to plan and prepare for burn days in advance. Regional effects are important in decision-making for this factor. Selecting the correct season to execute a burn will help maximize the probability of achieving low emissions.

Section 7 – PRECIPITATION

Fuels that are wet generally burn less efficiently and produce more emissions per unit of fuel consumed. Therefore, burning prior to a precipitation event will enhance the combustion, consumption and emission process. Successful application of this practice depends on the accurate meteorological forecasts for the area.

Section 8 – TIME OF DAY

The timing of ignition determines whether the burn can be completed in an efficient and effective manner. Timing is also important when considering factors such as: when solar radiation will break a nighttime inversion or dissipate any dew which formed during the night, when atmospheric conditions will support adequate transport and dissipation

of smoke, when surface winds may develop or change speed or direction, or when a sea breeze front may reach the area.

Section 9 – TIMELINESS

Due to the critical threat posed by orchard insects or diseases all piles or windrows should be disposed of as quickly as possible to prevent the establishment or spread of orchard insects or diseases. Also, certain orchard insects and diseases are best controlled by burning due to the complete destruction of the insect or disease.

Growers should contact their local horticultural pest and disease board, Washington State University extension agent or a Washington State Department of Agriculture entomologist to assist them in determining the level of threat and timeliness of a burn if it is deemed necessary.

The Task Force strongly recommends that the grower allow adequate time for the submitting, processing, approval and issuing of their Agricultural Burn Permit when planning an orchard crop agricultural burn. Also to be taken into consideration by the grower is the availability of alternatives, weather conditions, smoke dispersal patterns and other conditions that may delay or postpone a permitted agricultural burn thus adversely affecting the timeliness of the planned burn.