

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

ATMOSPHERIC RESOURCE QUALITY MANAGEMENT

(Ac)

CODE 370

DEFINITION

A combination of treatments to manage resources that maintain or improve atmospheric quality.

PURPOSE

Minimize or reduce emissions of:

- Particulate matter (PM-10 and PM-2.5)
- Smoke
- Odors
- Greenhouse gases
- Ozone
- Chemical drift

Maintain or increase visibility

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland, forest land, rangeland, roads, feedlots, dairies, poultry and swine operations and other CAFOs, equipment yards and staging areas, and other lands that contribute primary airborne particulates (dust, smoke, and chemicals), secondary airborne particulates (ammonia, nitrates (i.e. fertilizers, animal emissions, and animal waste emissions), organic products, odor, greenhouse gases [carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄)], (greenhouse gases, objectionable odors, and other gases that have a negative impact on air quality.

CRITERIA

General Criteria Applicable to All Purposes

The landowner is responsible for acquiring and following all necessary local, state, and federal permits.

The work shall be performed in compliance with all international, federal, state, and local laws, rules, and regulations affecting the control of

particulate matter, smoke, visibility/haze, ozone, odors, greenhouse gases, and chemical drift in the area of concern.

Criteria for Reducing Particulate Matter Emissions

Roads. Minimize PM-10 generation from unpaved roads, staging areas, and equipment storage areas by treating with water, chemicals, soil stabilizers, mulch, or other cover.

The amount of mud tracked onto paved roads shall be reduced by cleaning equipment before leaving the field or cleaning tracked mud off of paved roads.

Confined Animals. Manure management plans shall identify non-critical air periods when confined areas can be cleaned without contributing to high PM-10 concentrations in the air.

Management plans to decrease PM-10 and PM-2.5 production from activities in concentrated animal areas shall include, as appropriate, maintaining minimum manure depths, sprinkler watering, surfacing, and corral cleaning time tables.

Animal feed shall be mixed in an enclosed area or during low wind periods to minimize dust from animal feed processing.

Sprinkler watering to reduce PM-10 releases from feedlots shall be managed to minimize ammonia emissions from wet manure.

Feed and manure additives shall be utilized to minimize ammonia production and loss to the air (see conservation practice Feed Management code 592).

The amount, method, and timing of animal waste storage and disposal shall be managed in conjunction with other practices to minimize ammonia volatilization losses from the waste.

Cropland. Residue management (code 329A, 329B or 329C) shall be used to reduce the generation of particulate matter from agricultural operations on cropland.

Cover crops shall be established on fields susceptible to PM-10 generation during vulnerable periods (see conservation practice standard Cover Crop, code 340).

Cover crops shall be planted between the rows in orchards, groves and vineyards to minimize PM-10 generation during harvest operations.

Mowing operations shall be done in a manner which minimizes the generation of particulate matter.

Criteria for Reducing Smoke Emissions

When burning, follow all procedures specified in agency burn policy including identification of off-site impacts.

In air sheds that impact Class I regional haze areas, burn or smoke management plans shall be followed.

Criteria for Reducing Odor Emissions

Waste utilization (code 633) shall be used to reduce the amount of odor during manure spreading operations.

Windbreaks (practice code 380) shall be sited to minimize the movement of odor away from an odor-producing source to a sensitive area. Tree varieties and placement for the windbreak shall be managed to maximize odor interception and dilution of air, and reduce odor leaving the source.

Criteria for Reducing Greenhouse Gas Emissions

Management plans to increase carbon sequestration in organic matter and soil and offset CO₂ emissions to the atmosphere shall specify the frequency and intensity of tillage activities.

Plans to provide renewable energy sources and offset greenhouse gas emissions through biomass removal shall specify the amount and timing of the biomass removal. Sufficient biomass shall be left on the surface to maintain soil quality and to achieve the planned soil loss objective.

Reduction of methane emissions from animal waste storage shall be accomplished using an appropriate anaerobic digester or other approved methane reduction technology.

Nitrogen fertilizers shall be applied to croplands and rangelands in a manner which minimizes the loss of nitrous oxide (N₂O) to the air (see conservation practice standard Nutrient Management, code 590).

Greenhouse Building Efficiency Improvement Practices

- **General** – Prior to the design of efficiency improvement practices, a greenhouse energy audit shall be performed to document the energy saving practices that are recommended for the greenhouse, and the feasibility of implementing specific practices covered in this section.
- **Greenhouse energy/shade screens** are a mechanical system consisting of a drive motor, shade/energy material, support cables and controls to provide energy savings and/or cooling or day length control in a greenhouse. (sometimes referred to as curtains, blankets or shades). This practice is installed to reduce energy usage, thereby reducing greenhouse gas emissions, and to promote better plant growth. Follow the requirements in the *Massachusetts NRCS Specification Guide for Greenhouse Energy/Shade Screens*.
- **Greenhouse horizontal air flow (HAF) system** is a system of energy efficient fans installed to create a horizontal air circulation pattern within a greenhouse. They provide energy efficient air movement and heat distribution for minimizing temperature, carbon dioxide and moisture gradients. The primary air quality benefit is gained by providing more uniform heating in greenhouses, leading to overall improved heating efficiency and less heating fuel used. Follow the requirements in the *Massachusetts NRCS Specification Guide for Greenhouse HAF System*.
- **Greenhouse root zone heating** is a hot water heating system designed to heat the root zone of the plants by circulating warm water through tubing or pipes located in the floor,

under the growing benches, or on top of the benches. Root zone heating allows the air temperature in the greenhouse to be maintained at a lower temperature to save fuel. Follow the requirements in the *Massachusetts NRCS Specification Guide, Root Zone Heating for Greenhouses*.

- **Greenhouse electronic environmental controls** are electronic devices that integrate the plant production environment control equipment in a greenhouse. Sensors and computer control equipment are used to monitor and automatically control the environment in a greenhouse to save energy. Follow the requirements in the *Massachusetts NRCS Specification Guide, Electronic Environmental Controls for Greenhouses*.

Criteria for Reducing Ozone

Minimize the emissions of NO_x, volatile organic compounds (VOCs), and other ozone precursors from farm equipment, irrigation engines, livestock, and agricultural burning.

Criteria for Reducing Chemical Drift

Reduce volatile organic compounds from pesticide application by changing formulations and adapting methods of application.

Minimize chemical drift during pesticide applications.

CONSIDERATIONS

Secondary particulate matter is derived from emissions of ammonia, nitrates (i.e. fertilizers, animal emissions, and animal waste emissions), organic products, odor, greenhouse gases [carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄)], ozone, and chemical drift and increasing or maintaining visibility.

Particulate matter. Where appropriate, conservation plans which identify wind erosion controls should evaluate those controls for their PM-10 reductions.

Moving towards a less intensive tillage system (Residue Management, No-till/strip-till, code 329A) will reduce particulate matter generation and enhance soil carbon sequestration.

Use tillage methods and/or equipment that have been proven to reduce particulate matter generation.

Instead of burning tree-trimming wastes, they can be chipped/shredded and used for composting or as mulch on unpaved roads or other areas that produce particulate emissions.

Irrigation water can be applied to soil surfaces to reduce particulate matter generation.

Mulches, oils, and tree saps can be used on critical areas to help reduce particulate matter generation.

Reduce or limit turning of equipment and vehicles on paved roads to reduce the amount of soil tracked onto roads.

Controlling speed and access on unpaved roads will reduce the generation of particulate matter.

Using cleaner burning fuels, such as natural gas, will reduce the emission of ozone precursors {nitrogen oxides (NO_x) and volatile organic compound (VOCs) from farm engines.

Smoke. Use alternative disposal methods for other combustible materials such as bags, sacks and domestic waste that will be more environmentally beneficial.

Odor. Anaerobic digesters can be constructed for odor control and methane capture.

Consider feed management to reduce odor generation.

Greenhouse gases. Reduce nitrogen losses as N₂O through the use of fertilizer type, amount and application timing and method, as described in conservation practice Nutrient Management, code 590).

PLANS AND SPECIFICATIONS

Plans for atmospheric resource quality management that are elements of a more comprehensive conservation plan shall recognize other requirements of the conservation plan and be compatible with them.

Plans and specifications for Atmospheric Resource Quality Management shall be in keeping with this standard and shall describe the requirements for

applying the practice to achieve its intended purpose.

Plans and specifications will be listed separately to address particulate matter, smoke, odor and, greenhouse gas management. Plan narratives or job sheets will address identified atmospheric resource concerns to meet quality and condition criteria.

The location of all supporting practices used will be shown on the drawings or conservation plan map.

OPERATION AND MAINTENANCE

The conservation plan should include operation and maintenance items needed to continue treatment of atmospheric resource related concerns.

Records shall be kept in accordance with associated practices and Federal, state and local laws.

REFERENCES

Energy Conservation for Commercial Greenhouses, Northeast Regional Agricultural Engineering Service, NRAES-3, 2001.

Standards and Guidelines - Curtain Systems. National Greenhouse Manufacturer's Association.

Heating, Ventilating and Cooling Greenhouses, American Society of Agricultural and Biological Engineers, ANSI/ASAE EP406.4, Jan 2003.

Computerized Environment Control in Greenhouses. IPC Plant Dier, Horticultural Department, Zandlaan 25-29. P.O. Box 32, 6710 BA Ede, the Netherlands.

Standards and Guidelines - Environment Controls. National Greenhouse Manufacturer's Association.