NATURAL RESOURCES CONSERVATION SERVICE

NEW JERSEY

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
  - 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 (CO_2), nitrous oxide (N_2O), and methane (CH_4)], (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.

Precision farming methods including variable rate application utilizing global positioning technology shall be applicable to reducing emissions, greenhouse gases, chemical drift, and ozone.

Specific Criteria Applicable to 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.

Specific Criteria Applicable to 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.

Specific Criteria Applicable to Reducing Odor Emissions

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

- Lowering crude protein will reduce odor intensity.
- Feed to meet the animals' needs as nearly as possible to reduce precursors of odorous intermediate compounds.
- Feeds that may exacerbate manure odor include bloodmeal, fishmeal, and feathermeal due to their own strong odor combined with a high protein content.
- Inert fats may have enough effect on pH to reduce ammonia emissions and possibly emissions of more odorous volatiles. Nitrogen excretion has been reduced in diets including calcium salts of long chain fatty acids.
- Dietary addition of strong odorants such as peppermint oil, may influence manure odor and possibly continue to influence the odor of stored manure.
- Steps taken to minimize nutrient excretions, particularly nitrogen, in an effort to protect water quality, are likely measures that will help reduce malodor as well.

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.

Specific Criteria Applicable to Reducing Greenhouses Gas Emissions

Management plans to increase carbon sequestration in organic matter and soil and offset CO_2 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.

Plans to provide renewable energy sources to help reduce greenhouse gas emissions must comply with New Jersey's Clean Energy Program-Renewable Energy, be E85 compliant, or qualify

as biodiesel. Qualifying renewable energy sources include wind, solar, sustainable biomass and geothermal.

Engines qualifying for replacement under this standard shall be for agricultural production including irrigation and aquaculture. E85 compliant flexfuel engines shall replace conventionally fueled engines where feasible. Off road diesel engines shall meet the current EPA requirements as applicable. Marine 2 stroke marine gasoline engines shall be replaced by 2 stroke fuel injected or 4 stroke engines. Horsepower of the new engine shall not be more than 25% greater than the replaced unit. Engines replaced through this initiative shall be decommissioned and recycled.

Biodiesel or biodiesel blends with a minimum designation of B20 (20% biodiesel, 80% conventional petroleum diesel) shall be used in diesel engines. Renewable energy sources shall be used to supply power to farm buildings and equipment, including vehicles, tractors, electric fencing, lights, heating and cooling systems.

Diesel engines may require some preparation to best run B20 or higher blends. Engine cleaning, fuel filter, gasket and fuel line hose replacement may be needed due to solvent properties of biodiesel. Special storage facilities for E85 and biodiesel may need to be installed. Biodiesel handling and use guidelines shall follow those found at: http://www.biodiesel.org; E85 guidelines can be found at http://www.e85fuel.com .

Reduction of methane emissions from animal waste storage shall be accomplished using an appropriate anaerobic digester or other approved methane reduction technology. Capture and utilization of the methane as an energy source shall be achieved.

Nitrogen fertilizers shall be applied to croplands in a manner which minimizes the loss of nitrous oxide (N_2O) to the air (see conservation practice standard Nutrient Management, code 590). Agricultural practices that increase nutrient use efficiency and diminish nitrogen leaching such as cover crop and residue management are appropriate for minimizing N2O emissions. Reduction in the use of nitrogen fixing leguminous crops may also help reduce N2O emissions.

Specific Criteria Applicable to Reducing Ozone

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

Specific Criteria Applicable to Reducing Chemical Drift

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

Minimize chemical drift during pesticide applications by doing the following:

- Use as coarse a spray as possible and still obtain good coverage and control. For sprays, use formulations which give large diameter (150-200 microns or larger) spray droplets. Droplet size is one of the most important factors affecting drift.
- Don't apply pesticides under windy or gusty conditions: don't apply at windspeeds over 15 mph, ideally not over 5 mph. Read the label for specific instructions.
- Maintain adequate buffer zones to insure that drift does not occur off the target area.
- Be careful with all pesticides. Insecticides and fungicides usually require smaller droplet sizes for good coverage and control than herbicides.
- Use drift control/drift reduction agents. These materials are basically thickeners and are designed to minimize the formulation of droplets smaller than 150 microns.
- Choose the formulations carefully. Water-based sprays will volatilize more quickly than oil-based sprays. Oil-based sprays can drift farther because they are lighter, especially above 95 degrees F.
- Apply pesticides early in the morning or late evening; the air is often more still than during the day.

- Don't spray during thermal inversions, when air closest to the ground is warmer than the air above it. Avoid spraying at temperatures above 85 degrees.
- Know your surroundings! Determine the location of sensitive areas such as susceptible crops, surface waters, population centers, honey bee colonies, etc. within one mile of applications.
- When chemigating, turn off the end gun and use drop booms instead of upwardly directed nozzles.
- Use a solid cone or fan spray nozzle. These produce larger droplet sizes than hollow cone nozzles.
- Service and calibrate your equipment regularly. Small leaks under pressure can produce very fine droplets.
- Determine wind direction before spraying.

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 (CO_2), nitrous oxide (N_2O), and methane (CH_4)], late 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 (NOx) 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.

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 particu

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

Consider feed management to reduce odor generation.

Greenhouse gases. Reduce nitrogen losses as N_2O 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

"Reduce Pesticide Drift", PIP-35, Clemson University. R.G. Bellinger, P.M. Horton, & C.S. Gorsuch. January 1996.

Powers, Wendy. 1998. The Potential to Reduce Manure Odors Through Dietary Manipulation. Proceedings of the Michigan Agricultural MEGA Conf. and Trade Show.