United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FIELD OPERATIONS EMISSIONS REDUCTION

CODE 376

(ac)

DEFINITION

Adjusting field operations and technologies to reduce emissions of particulate matter (PM) and oxides of nitrogen from field operations.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Reduce emissions of particulate matter (PM).
- Reduce emissions of oxides of nitrogen.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland.

CRITERIA

General Criteria Applicable to All Purposes

Document a demonstrated reduction in annual emissions from the benchmark (current system) to the planned system by using one or more of the techniques below.

Combined tillage operations
Utilize equipment that allows multiple operations in a single pass to reduce the number of field passes per acre in the crop rotation.

Precision guidance systems
To reduce total soil disturbance, use global positioning system and steering technologies that minimize overlap of field passes.

Alternative equipment technology
Use alternative equipment and/or equipment retrofits that reduce emissions. This can include dust-reducing technology (such as misters, deflectors, etc.), increasing equipment size to reduce net field passes, and changes to bed/row size or spacing.

Timing of field operations
Modify the timing of field operations so that PM emissions are reduced. This can include conducting operations when relative humidity and/or soil moisture levels are higher, winds are lighter, or by limiting operations during high wind events. This could also include a reduction in the amount of time between seedbed preparation and planting, and other such timing modifications that reduce PM emissions.

Modify crop cultural and harvest methodologies
Modify operations to use other means of crop production such as performing soil disturbance and/or harvest operations at slower speeds. Examples include—

- Harvesting a forage crop without allowing it to dry in the field.
- Hand harvesting.
- Applying water or other soil stabilizing material prior to soil disturbance or harvest.
- Using transplants instead of direct seeding.
- Applying chemicals and fertilizers through irrigation (using appropriate irrigation water management) to reduce field passes.
- Using chipping, shredding, composting, offsite disposal, or an air curtain burner for orchard and vineyard trimmings, prunings, and removals in lieu of open burning.
- Utilizing “low dust” technologies for surface harvesting of crops.

For applicable mechanical harvest operations, manage preharvest irrigation water to create a more consolidated and firm soil surface to reduce harvest-related PM emissions.

CONSIDERATIONS

Managing higher levels of crop residue can reduce the potential for PM emissions from wind erosion and increase the potential for carbon sequestration.

Maintaining cover between rows or on alternate crop rows will reduce the potential for wind erosion.

Using alternatives to tillage for weed control (e.g., mowers, sprayers, flamers, etc.) can significantly reduce the PM emissions.

Increasing the time interval between uncombined tillage passes (e.g., disking) may help reduce PM emissions by reducing the effects of thermal profile changes that cause additional entrainment of the soil particles.

PLANS AND SPECIFICATIONS

Develop plans and specifications for each field or treatment unit according to the Criteria section requirements above, and Operation and Maintenance section requirements below. Specifications must describe the requirements to apply this practice to achieve the intended purpose. Record the following specification components in an approved NRCS Conservation Practice Standard Field Operations Emissions Reduction (Code 376) implementation requirements document:

- field number and acres
- purpose of the emission reduction
- listing of the current benchmark field operations system
- listing of the planned field operations system
- listing of emission reduction activities including when, where, and how the activities will be applied
- special considerations

OPERATION AND MAINTENANCE

Record and review the emission reduction activities seasonally or annually as appropriate to ensure the activities are working properly and modify if needed.

REFERENCES

USDA NRCS, U.S. Environmental Protection Agency (EPA), and San Joaquin Valley Air Pollution Control District. 2004. Agricultural Air Quality Conservation Management Practices for San Joaquin Valley Farms. 14 pp.

USDA NRCS and EPA. 2012. Agricultural Air Quality Conservation Measures Reference Guide for Cropping Systems and General Land Management. 32pp.