United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

COMBUSTION SYSTEM IMPROVEMENT

CODE 372

(No.)

DEFINITION

Installing, replacing, or retrofitting agricultural combustion systems and/or related components or devices for air quality and energy efficiency improvement.

PURPOSE

This standard may be applied for one or more of the following purposes:

- To improve air quality by addressing the air quality resource concerns for particulate matter and ozone precursors by mitigating actual or potential emissions of oxides of nitrogen and/or fine particulate matter;
- To improve the energy efficiency of agricultural combustion systems.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to any agricultural operation that operates an agricultural combustion system, including stationary, portable, mobile, and self-propelled equipment. The combustion system must be used primarily for agricultural and/or forestry activities.

For a combustion system associated with a pumping plant (i.e., pumping plant power unit), use Conservation Practice Standard, Pumping Plant (533). This standard (372) may be applied in addition to the Pumping Plant standard for addressing air quality resource concerns associated with a pumping plant power unit, if applicable.

CRITERIA

General Criteria Applicable to All Purposes

Size the new or replacement combustion system and related components or devices appropriately to accomplish its intended task.

Where required, certify that the new, replacement, or retrofit combustion system and related components or devices meets or exceeds currently applicable Federal, State, and local standards and guidelines.

All replaced combustion systems shall be rendered inoperable or used to replace higher-emitting or lower-efficiency combustion systems. Certification of use as a replacement system can be accomplished by providing certification of inoperability of one or more higher-emitting or lower-efficiency combustion system(s).

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide.

Certification of inoperability can be accomplished by:

- Obtaining a receipt for the combustion system disposal from a scrap metal recycling operation and keeping this receipt available for inspection; or,
- Creating a permanent hole in the engine block or combustion chamber of the combustion system (minimum size to be determined by Federal, State, or local guidelines). The disabled engine must be kept on-farm for inspection, or a written and signed certification that a permanent hole has been created and the engine is disabled must be prepared and kept available on-farm for inspection.

Additional Criteria Applicable to Improving Air Quality

A new or replacement combustion system and related components or devices shall utilize a non-combustion power source or a combustion power source that utilizes cleaner-burning technologies, techniques, and/or fuels.

When installing a new combustion system that is not a replacement system, the new combustion system shall emit fewer oxides of nitrogen and/or less fine particulate matter than the most commonly-installed alternative system. When installing a new or replacement diesel-powered engine, use the newest available EPA engine TIER technology.

When installing a replacement combustion system and related components or devices, the replacement system shall emit less oxides of nitrogen and/or fine particulate matter than the replaced combustion system and related components or devices.

Retrofit can include actions or combinations of actions that reduce emissions of oxides of nitrogen and/or fine particulate matter. Examples of individual retrofit actions include:

- Adding one or more emissions control device(s);
- Altering air/fuel mixtures to achieve more complete combustion and less emissions;
- Adding a device that allows for reduced combustion of fuel to accomplish the same intended task;
- Accommodating the use of a cleaner-burning fuel; and/or,
- Other physical modifications or changes in combustion techniques that reduce emissions formation or release.

Additional Criteria Applicable to Improving Energy Efficiency

Only the replacement or retrofit of an existing combustion system is allowed under this practice standard for the energy efficiency purpose. Installation of new combustion systems where none existed prior are not allowed if energy efficiency is the sole purpose.

Replacement combustion systems shall be certified to be at least 20% more energy efficient than the systems they replace.

Retrofit to improve energy efficiency may involve adding a device that allows for reduced operation of an existing combustion system, such as a variable frequency drive or automated sensors and controls.

Note: Specific programs or other funding sources may dictate criteria in addition to, or more restrictive than, those specified in this standard.

CONSIDERATIONS

Installation of new or replacement combustion systems with non-combustion renewable energy sources, such as solar, wind, and water, are preferred means of reducing air emissions associated with agricultural combustion systems. Non-combustion renewable energy sources do not release air emissions directly and do not increase air emissions from off-site electricity generation. The impacts of

non-combustion renewable energy sources on other resources should also be considered to analyze their overall conservation benefit.

PLANS AND SPECIFICATIONS

Specifications for application of this practice shall be prepared for each site or planning unit according to the criteria. Specifications shall be recorded using State-developed specification sheets, job sheets, practice requirement sheets, narrative statements in conservation plans, or other acceptable documents.

As a minimum, the plans and specifications shall provide the following:

- Identification and description of the existing combustion system and related components or devices, if applicable, and the new or replacement combustion system and related components or devices. If the combustion system is being retrofitted, identification and description of the type of modifications being made to the existing system;
- Requirements on disposal of replaced combustion system and related components or devices, including assuring permanent disabling and rendering inoperable;
- Documentation requirements to determine combustion system usage and resulting air emissions from the new, replacement, or retrofit combustion system and related components or devices. Average annual air emissions for the existing combustion system (for replacements and retrofits) or alternative combustion system (for new installations) shall be calculated prior to the installation of the new combustion system or replacement or retrofit of the existing combustion system to determine the expected air emissions reductions from the application of this practice and to serve as a baseline for later air emissions calculations.

Supporting Data and Documentation Refer to the STATEMENT OF WORK for all the deliverables that apply to this practice.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of this practice, its intended life, safety requirements, and the criteria used for its design.

The new, replacement, or retrofit combustion system and related components or devices shall be operated and maintained in accordance with the manufacturer's recommendations.

NRCS recommends that records be retained and updated for a minimum of five years from the beginning of operation of a new, replacement, or retrofitted combustion system. The recommended records to be retained include:

- Total actual hours operated;
- Types and amounts of fuel used in the combustion system(s), or electricity used for electric motors that have replaced an existing combustion system;
- Documentation of maintenance conducted on the new, replacement, or retrofitted combustion system and related components or devices.

REFERENCES

California Environmental Protection Agency Air Resources Board (CARB). Diesel Programs and Activities website.

United States Environmental Protection Agency (U.S. EPA). National Clean Diesel Campaign for Agriculture (Clean Agriculture USA) website.