NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA CONSERVATION PRACTICE STANDARD

RESIDUE MANAGEMENT, SEASONAL

(Ac.)

CODE 344

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface during a specified period of the year.

PURPOSES

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind.
- Harvest and utilize renewable bioenergy feedstocks

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland including cropland where biomass is removed for biofuel feedstocks.

Seasonal residue management includes managing residues of annual crops from harvest or termination of one crop until soil disturbance begins ahead of planting the next crop.

The intent of this practice is to (a) ensure adequate residue is present during the interval between crops to ensure protection of the soil and (b) to delay any full-width tillage until just before planting in order to keep the soil protected for as long as possible.

It also includes the management of residues from biennial or perennial seed crops from the time of seed harvest until regrowth begins the next season.

CRITERIA

General Criteria Applicable to All Purposes

1. The residue management period begins when one crop is harvested or terminated and ends when soil disturbance begins ahead of planting the next crop. In the case of biennial or perennial seed crops, the residue management period begins at harvest and ends when regrowth begins the next season.
2. Delay any full-width tillage and residue burial that ends the residue management period until no more than two weeks ahead of planting the next crop.
3. Tillage operations during the residue management period shall be limited to undercutting using blades or wide sweeps that minimize residue flattening or burial.
4. Residues shall not be burned.
5. Residues shall be uniformly distributed over the entire field during the residue management period. Combines or similar harvesting machines used prior to the residue management period shall be equipped with spreaders capable of redistributing residues over at least 80 percent of the working width of the header.
6. Throughout the residue management period, the soil surface must be protected by an overall average of at least 30% residue cover, as determined using the line transect method.

   In some cases, higher residue levels may be needed during one or more residue management periods to achieve the site-specific soil loss objective for the overall cropping system. In these cases, use applicable soil erosion prediction technology as the basis for planning more aggressive targets for residue cover.

   In other cases, it may be possible to achieve the site-specific soil loss objective for the overall cropping system with less than 30% residue cover for no-till/strip-till crops. In these cases, plan residue targets below 30% only if complete analysis of the cropping system using current approved erosion prediction technology indicates

that site-specific soil loss objectives can still be met.

CONSIDERATIONS

General

This practice is intended to apply primarily, but not exclusively, in situations where an interval of one or more months (typically the entire winter) will elapse between harvest or termination of one crop and planting of the next crop.

It is intended to apply primarily, but not exclusively, in situations where the crop following the residue management period will be clean-tilled (i.e., less than 30% residue cover after planting).

Seasonal residue management may be practiced continuously throughout the crop rotation, or may be used only occasionally in the cropping system.

Extending the residue management period beyond the minimum required by the Standard (i.e., delaying tillage and residue burial until less than two weeks before planting) should be encouraged whenever possible.

When planting into a clean-tilled seedbed, completing tillage and planting in a single operation, or performing primary tillage no more than three days before planting, can minimize exposure to erosion or loss of moisture for germination.

Whenever tillage is used, special emphasis should always be placed on delaying tillage operations until soil is sufficiently dry. Tilling wet soil causes compaction, cloddiness, and significant damage to soil structure.

Adopting complementary practices can significantly improve the conservation performance of seasonal residue management systems involving full-width tillage. Key complementary practices are crop rotation and cover cropping.

Soil compaction prevention should be recommended as a way to reduce the need for tillage. Key strategies for compaction prevention include:

- Staying off wet ground.
- Minimizing axle loads (e.g., keep haul trucks out of the field,) and minimizing tire-to-soil contact pressure (e.g., keep road tires out of the field).
- Minimizing the percentage of the field tracked over time (e.g., use controlled traffic to keep tires in the same tracks on every pass).

Adopting practices that result in reductions in tillage and/or increases in residue may trigger the need for adjustments to nutrient and pest management practices. Maintaining a diverse crop rotation will often facilitate such adjustments.

Consider leaving rows of unharvested crop standing at intervals across the field to enhance the value of residues for wildlife. When managing to benefit a particular wildlife species, consider that species' preference for mowed vs. standing residue.

Reducing Sheet & Rill and/or Wind Erosion

Living vegetation as well as dead plant material may be counted towards meeting the minimum cover targets in this standard.

Increasing residue cover beyond the minimum targets in this standard should be encouraged, even if soil loss objectives are met by a lower residue level.

Maintaining or Improving Soil Quality

Consider using the following as criteria for planning higher levels of performance in order to maintain or improve soil quality.

Throughout the residue management period, the soil surface must be protected by an overall average of at least 60% residue cover, as determined using the line transect method.

In some cases, higher residue levels may be needed during one or more residue management periods to achieve the site-specific soil quality / soil organic matter management objective for the overall cropping system. In these cases, use erosion prediction and Soil Conditioning Index (SCI) technology as the basis for planning more aggressive targets for residue cover.

In other cases, it may be possible to achieve the site-specific soil quality / soil organic matter management objective for the overall cropping system with less residue during one or more residue management periods. In these cases, plan residue targets below 60% only if complete analysis of the cropping system using erosion prediction and SCI technology indicates that overall soil organic matter management objectives can still be met.

Use the following to guide interpretation of Soil Conditioning Index (SCI) results for purposes of implementing these additional criteria:

- A cropping system expected to maintain soil organic matter content should have an SCI score of 0.00 or greater and predicted sheet & rill erosion at or below the soil loss tolerance level (T).
- A cropping system expected to improve soil organic matter content should have an SCI score of +0.25 or greater and predicted sheet & rill erosion at or below the soil loss tolerance level (T).
- Use the following as a guide for setting SCI targets above +0.25:

Soil Conditioning Index (SCI) Score	Performance Level – Soil Organic Matter Improvement
+0.25 to +0.49	Minimum
+0.50 to 0.74	Intermediate
+0.75 or greater	Optimum

Minimizing soil disturbance can enhance soil quality in ways that are not fully accounted for by SCI. Soil Tillage Intensity Rating (STIR) provides a useful measure of soil disturbance to complement SCI. Strive to minimize soil disturbance, with a STIR value of 10 or less representing an optimum to strive for.

PLANS AND SPECIFICATIONS

Specifications for implementation of this practice shall be prepared for each field or CMU (Conservation Management Unit).

Customize the language and level of detail in specifications as needed for each particular case. Focus above all on providing the client with the practical guidance needed to effectively put the practice on the ground.

Specifications shall be recorded and conveyed to the client using approved job sheets and/or narrative statements in the conservation plan.

Specifications shall at a minimum include all of the following elements:

1. A list of the field(s) and/or CMU(s) and their acreage where seasonal residue management will be implemented.
2. A list of the purpose(s) for which the standard is being implemented (sheet & rill erosion, wind erosion, etc.).
3. A description of the planned crop rotation that indicates when and how often in the cropping sequence seasonal residue management will occur.
4. A statement of the six general criteria that must be achieved in all cases where this practice is implemented
5. A description of targets for residue cover during the residue management period(s) based on criteria in the standard and plan objectives.
6. A description of additional limits, if any, on residue removal and/or timing and intensity of residue burial operations, based on criteria in the standard and plan objectives.
7. In those cases where analysis of the overall cropping system is used to adjust residue cover targets during seasonal residue management periods, a description of any complementary practices (crop rotation, cover crops, etc.) that must be carried out in order to achieve overall planned conservation objectives.
8. In those cases where site-specific analysis of the overall cropping system is used to adjust residue cover targets, document planned conservation objectives as well as inputs and outputs for the relevant decision-support tools (RUSLE2, SCI procedure, etc.). This is especially important when planned minimum residue cover targets are less protective than those listed in criteria.

OPERATION AND MAINTENANCE

Evaluate crop residue quantity, distribution, and duration during each residue management period to ensure planned residue targets are being achieved and adjust management as needed.

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