NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Residue and Tillage Management

No Till/Strip Till/Direct Seed

(Acres)

Code 329

DEFINITION

Managing the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots, or tilled or residue free strips in soil previously untilled by full-width inversion implements.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Improve soil organic matter content.
- Reduce CO2 losses from the soil.
- Increase plant -available moisture.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown.

This standard includes tillage and planting methods commonly referred to as no till, zero till, slot plant, row till, zone till, strip till, or direct seed.

CRITERIA

General Criteria Applicable to All Purposes Named Above

Loose residues to be retained on the field, shall be uniformly distributed on the soil surface. Where combines or similar machines are used for harvesting, they shall be equipped with spreaders capable of distributing residue over at least 80 percent of the working width of the header.

Planters or drills shall be equipped to plant directly through untilled residue or in a tilled seedbed prepared in a narrow strip along each row by planter attachments such as rotary tillers, sweeps, multiple coulters, or row cleaning devices.

Residues shall not be burned.

No full width tillage shall be performed regardless of the depth of the tillage operation.

The annual Soil Tillage Intensity Rating (STIR) value for all soil-disturbing activities shall be no greater than 30.

Planting and fertilizer placement shall disturb no more than one third of the row width. The row area formed by the planting operation shall be level with or slightly above the adjacent row middles unless the rows are planted on the contour.

Additional Criteria to Reduce Sheet and Rill Erosion

The amount of randomly distributed, flat residue needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective, shall be determined using current approved erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

Additional Criteria to Reduce Wind Erosion

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) or other planned soil loss objective shall be determined using current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

Additional Criteria to Improve Soil Organic Matter Content and soil condition

An evaluation of the cropping system using the current approved soil conditioning index procedure shall result in a positive trend. Calculations shall account for the effects of other practices in the conservation management system.

Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

Additional Criteria to Manage Snow Cover to Decrease Blowing and Drifting

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case. Stubble shall remain standing over winter to trap and retain snow.

Loose residue may be removed providing that the remaining residue is left standing.

When crops are planted in the fall, the width of the tilled strip or slot shall be no more than one third of the row width, in order to reduce the disturbance of standing stubble.

Additional Criteria to Provide Food and Escape Cover for Wildlife

Residue height, amount, and time period shall be determined using an approved habitat evaluation procedure.

Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal would not adversely affect habitat values.

CONSIDERATIONS

General - Removing of crop residue, such as by baling or grazing, can have a negative impact on resources. These activities should not be performed without full evaluation of impacts on soil, water, animal, plant and air resources.

Production of adequate amounts of crop residues necessary to achieve the purposes of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacing.

Using no till/strip till/direct seed for all crops in the rotation or cropping system can enhance the positive effects of this practice by:

- increasing the rate of soil organic matter accumulation.
- keeping soil in a consolidated condition, which provides additional resistance to sheet and rill erosion.
- sequestering more carbon in the soil.
- further reducing the amount of particulate matter generated by field operations.
- forming root channels and other near-surface voids that increase infiltration.

A field border planted to permanent vegetation can:

- allow unobstructed turning for equipment
- eliminate unproductive end rows
- provide food and escape cover for wildlife

provide travel lanes for farming operations

Earthworms are critical for the proper functioning of no till systems. Use cover crops, legume rotations, or seeding of earthworms to increase numbers if populations are low.

Adjust combine to spread crop residue evenly.

Killing sod in the fall may be more effective than doing so in the spring.

Consider using Integrated Pest Management to scout for weeds and other pests.

Consider using starter fertilizer, placing at least 20 to 30 pounds of actual nitrogen in the row.

Consider using seed treatment.

Inject at least half of the nitrogen below surface residues or other management to avoid immobilization or “tie up” in surface crop residue.

Proper maintenance and adjustments of the planter are critical.

Consider a wavy coulter on the planter (12 or 13 wave of ¾-inch to 2-inch), or a combination of row cleaners and closing wheels which crumble the side walls of the seed slot and provide good seed to soil contact.

Monitor pH levels in the top two inches of the soil, apply lime at “half as much, twice as often” schedule, as compared to a conventional system.

Plant according to soil conditions, including soil temperature and soil moisture, not necessarily the calendar.

Select high yielding, high seedling vigor, and disease resistant hybrids.

Plant slow, generally five miles per hour or less.

The use of row cleaning equipment may improve germination and row warm-up.

Seek advice and recommendations from those who are successful at no till.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications shall be recorded using approved work sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

This is an annual practice and does not require an operation and maintenance plan.