NATURAL RESOURCES CONSERVATION SERVICE

DOCUMENTATION REQUIREMENTS FOR

IRRIGATION SYSTEM, SPRINKLER

CODE 442

Use Form KS-ENG-201, Irrigation System Sprinkler - 442 (Center Pivot), to document the design and checkout of a center pivot (CP) sprinkler system. This form is to be completed by Natural Resources Conservation Service (NRCS) personnel or by the Technical Service Provider (TSP) using information obtained from the supplier of the CP sprinkler and/or nozzle package.

Design Criteria

The CP sprinkler shall be designed in accordance with the criteria listed in Conservation Practice Standard (CPS) 442, Irrigation System, Sprinkler, and the procedure outlined in Chapter 6 of National Engineering Handbook Part 652, *Irrigation Guide*, and Chapter 11 of National Engineering Handbook Section 15, *Irrigation*.

Surveys

Record the following survey data under "System Requirements and Information" on Form KS-ENG-201.

Ground Elevations:

Maximum - The highest field elevation the sprinkler must pass over (typically at the end of the lateral obtained from survey data)

The elevation should be obtained from a field survey whenever possible. If taking elevations from a U.S. Geological Survey (USGS) quadrangle map, increase the elevation by ½ of the contour interval as a safety factor.

Minimum - The lowest field elevation that any point of the sprinkler lateral must pass over (obtained from a field survey)

At the Pivot - The elevation of the pivot point (obtained from a field survey)

Location of Maximum Ground Elevation if Not at End of Pivot - If the high point occurs at any place other than the end of the pivot, list the location. The high point is needed for determining the minimum pressure available for nozzle design.

Design and Plan

CP sprinklers are usually designed by the manufacturer or dealer and checked and/or approved by an NRCS employee with proper engineering job approval authority as delegated on Form KS-CPA-1, Kansas Practice Approval Certification, or private Professional Engineer in accordance with Conservation Practice Standard 442.

On page 1 of Form KS-ENG-201, other items to be recorded under "System Requirements and Information" are as follows:

Water Right - This is the diversion rate as indicated on the state's water right for the land to be irrigated by the CP.

Irrigated Area - Record the number of acres to be irrigated by the CP sprinkler.

Pump Design Flow Rate - Use the reliable continuous water flow rate that will be available for the CP throughout the growing season. If the producer is unable to provide results from a pump test taken during the irrigation season within the past 3 years, then use a maximum of 80 percent of the pump flow rate provided.

Minimum Wetted Diameter of Outside Sprinkler Required - This can also be approximated from nozzle charts and through discussion with the system supplier.

System Length - The exact length must be obtained from the supplier.

System Capacity - This number (in gallons per minute) is obtained (assuming a full-circle pivot) from the results of Form KS-ENG-22, Irrigation System, Sprinkler - 442 (Center Pivot Sprinkler

Design), or it can be obtained from the system supplier. If an end gun or cornering system is incorporated, the supplier will need to increase the system capacity to account for this extra flow rate.

Sprinkler Placement - Check the option selected. See guidance provided in Conservation Practice Standard 442.

Typical Sprinkler Height Aboveground - This number (in feet) is selected according to the guidance provided in Conservation Practice Standard 442.

Height of the Pivot - Feet aboveground

Mark Attached Items:

Plan Map of System - Attach a map that shows locations of pivot, well and pumping plant, flow meter, pipelines, cleaning devices, and all other appurtenances needed for the system to function.

Form KS-ENG-22 - Print and attach this form which is in the Irrigation System, Sprinkler - 442 Center Pivot Sprinkler Design Spreadsheet. It is used to check if the design package is capable of meeting minimum water requirements.

Form KS-ENG-394, Irrigation Water Management- 449 (Planned Crop and Water Requirement) - Print and attach this form which is in the Irrigation Water Management - 449 Planned Crop and Water Requirement Spreadsheet. It is used to check if there is sufficient water to meet average water management requirements each month of the growing season for the crop/crops receiving water from the water source.

Remarks - Record any other pertinent information.

Items on page 2 of Form KS-ENG-201 should be recorded as follows**:**

Supplier/dealer is to provide a computer printout. Mark the listed items.

Is the sprinkler design printout attached? Obtain a copy of the supplier's nozzle design printout. Check the appropriate box.

Does the sprinkler design meet required design criteria? Compare with the criteria listed in the standard. Check the appropriate box.

Supplier/dealer is to provide the following information for the "Designed" column:

Coefficient of Uniformity (CU) (such as the Heermann-Hein CU) - The sprinkler package CU as supplied by the sprinkler vendor or as generated through the CPED program or versions thereof

Sprinkler Type and Manufacturer - Type of sprinklers (sprays, rotators, impacts, I-wobs, etc.) and brand of the nozzles

Number of Sprinklers - Number of nozzles designed

Number of Pressure Regulators

Pressure Regulator Rating - Pressure rating for the regulators in pounds per square inch (psi)

Sprinkler Height Aboveground - Typical sprinkler height aboveground (also recorded on page 1)

Wetted Diameter of Outer Nozzle - Wetted diameter of outer nozzle (in feet) from vendor's performance charts for actual nozzle type, size, and height (may have to interpolate)

Center Pivot Manufacturer - Brand of the pivot--not the nozzles

List the brand of the pivot controller (if different brand than the pivot).

Number of Towers

Length of System Lateral

Outside Diameters (O.D.) of System Lateral - Outside diameters (in inches) of the system lateral pipe

Layout

If this is a new CP sprinkler, the pivot point may be staked by NRCS or the CP sprinkler dealer. The CP sprinkler or nozzle package will be installed by the dealer.

Checkout

Use the "As Installed" column to document the installation of the pivot and/or its components after field inspection. The installed values will be as verified in the field by the person completing the checkout.