



CONSERVATION ENHANCEMENT ACTIVITY

E449A

CONSERVATION STEWARDSHIP PROGRAM

Complete pumping plant evaluation for water savings

CONSERVATION PRACTICE: 449 - Irrigation Water Management

APPLICABLE LAND USE: Crop (Annual & Mixed); Crop (Perennial); Pasture; Associated Ag Land; Farmstead

RESOURCE CONCERN: Water

ENHANCEMENT LIFE SPAN: 1 years

Enhancement Description

Evaluation of all pumping plants to determine the potential to rehabilitate/replace/reconfigure pump performance to improve water delivery efficiency 10% or more.

Criteria

- Pump test evaluation will include all irrigation pumps on fields where the activity is implemented. There could be multiple pumps that are used on single or multiple fields.
- Minimum data necessary to complete the pumping evaluation:
 - Flow rate, instantaneous and for the season.
 - Pressure at different flow rates based on partial or complete irrigation.
 - Power usage to compute efficiency of the drive unit.
 - Area and fields irrigated.
 - Estimate of friction loss in pipelines based on pressure drop in lines during test.
- The irrigation water management plan is followed and includes, as per NRCS Conservation Standard Practice, Irrigation Water Management (Code 449):
 - An irrigation system layout map showing the main pipeline(s), irrigated area, soil moisture locations and depths (if used), and soils. If water level sensors are used, show locations and number of sensors used.
 - Methods used to measure or determine the flow rate or volume of the irrigation applications.



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- Measurement records showing the amount of water used to irrigate as it comes onto the farm and goes to each field.
- Documentation of the scientific method used for scheduling the timing and amount of irrigation applications.
- The Irrigation water management plan explains:
 - How irrigation system meets crop needs, while maximizing irrigation water efficiency.
 - Seasonal or annual planned water application volumes by crop.
 - Management allowable depletion (MAD) and depth of the managed crop root zone or water level for each crop and stage of growth.
 - Evaluation of irrigation system distribution uniformity and necessary changes to insure uniform irrigation.
 - Information on how to recognize irrigation induced erosion and how to mitigate it.
 - Indicate how data from the sensor locations and depths will be considered to make field-wide irrigation decisions.
 - Water application scheduling based on soil moisture or water level monitoring and or evapotranspiration monitoring from the weather station
- Recordkeeping documents for the irrigator to use during operation and management.

Documentation and Implementation Requirements

Participant will:

Prior to implementation

- Provide NRCS with a map showing the location of all fields and pumps connected to the irrigation system.
- Arrange for pump test evaluations of all irrigation pumps on fields where activity is implemented.
- Acquire an irrigation water management plan meeting NRCS Conservation Practice Standard Irrigation Water Management (Code 449) requirements.



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During implementation

- Follow the irrigation water management plan and keep records as required by the plan.
- Have a pump test evaluation performed on all irrigation pumps on fields where activity is implemented.

After implementation

- Make the following items available for review by NRCS to verify implementation of the enhancement:
 - Irrigation water management plan and records kept.
 - Pump test evaluation report(s).
 - Provide a list of any adjustments to improve system efficiency made as a result of the evaluation. Calculate the reduction of water use based on before and after conditions.

NRCS will:

Prior to implementation

- Provide and explain NRCS Conservation Practice Standard Irrigation Water Management (Code 449) to participant as it relates to implementing this enhancement.
- As needed, provide additional technical assistance to the participant as requested.

After implementation

- Verify implementation of the irrigation water management plan, by reviewing records kept during enhancement implementation.

NRCS Documentation Review:

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and met all criteria and requirements.

Participant Name _____

Contract Number _____

Total Amount Applied _____

Fiscal Year Completed _____

NRCS Technical Adequacy Signature

Date

North Dakota Sideboards:

1. Use of this enhancement is restricted to systems where the installation of a Variable Frequency Drive (VFD) has a reasonable potential for water savings. Either of two situations are considered to have potential: 1) the system consists of multiple irrigation delivery sites operating from a single pump or 2) the system has Variable Rate Irrigation (VRI) currently installed.
2. The NRCS Irrigation Water Requirements software, with ND datafiles, will be utilized to develop peak consumptive use requirements for crops in the rotation. Based on the flow rate determined necessary for PCU, adjusted if needed by water permit allocation, system hydraulics will be run in order for accurate pumping plant evaluation. NRCS engineers will assist the service provider in these steps, if requested.
3. The producer is required to hire a qualified service provider, with appropriate testing equipment, to complete an evaluation of the pumping plant performance and efficiency using the Nebraska Irrigation Pumping Plant Performance Criteria and as described in NEH Part 623, Chapter 8, Appendix A. As of 2018, NDSU Extension is no longer staffed to provide this service. A full and complete report must be completed by the service provider, including the ND-ENG-533E Pumping Plant Evaluation Form and should include:
 - Age and condition of the components of the irrigation system and pumping plant
 - Water levels during pumping
 - A field developed pump curve
 - Pump and engine speed (rpm)
 - Actual Pump Plant Performance versus the Nebraska Performance Criteria
 - Actual pump efficiency versus the Manufacturer Published efficiency
 - Recommendation for improvements to the overall system efficiency
 - Estimate of energy savings if improvements are implemented
4. An Irrigation Water Management Plan will be prepared, utilizing either the Basic or Intermediate versions of the ND NRCS IWM Plan templates. NRCS engineers will assist the service provider, if requested.

Note that this enhancement does not cover implementation of Advanced IWM. Utilize enhancement E449B in that case.