WQT03 – Montana Supplement – REVISED 2/22/11

Irrigation Pumping Plant Evaluation - (Water Quantity Enhancement Activity)

Montana Clarification
No additional clarifications other than those described in the national enhancement.

Montana Specifications
Irrigation Pumping Plant Evaluation shall be conducted in accordance with the Technical Irrigation Pumping Plant Test Procedure Manual (1982, University of Nebraska Institute of Agriculture and Natural Resources).

Incompatible Enhancements
This enhancement may not be contracted with the following enhancements:
For cropland: ANM21, ANM22, ENR06, SOE02
For pasture: ENR06

Eligible Land
Cropland and pasture

Applicable Acres
Number of pumping plants

Example (Actual)
A producer owns 4 irrigated fields totaling 400 acres. On these irrigated fields, he/she maintains 3 older pumping plants and one newer more efficient pumping plant that had recently been replaced. The applicable amount would be 4 pumping plants. The producer proposes to replace 2 more pumping plants beginning in year 1. The Toolkit plan would appear as follows:

	Year 1	Year 2	Year 3	Year 4	Year 5
WQT02	1.0	1.0	0	0	0

Documentation Requirements (Complete the Table below)

To be completed by NRCS and Producer during planning			To be completed by Producer during certification process	
1	**2**	**3**	**4**	**5**
Tract	**Field(s)**	**Acres Planned**	**Number of Pumping Plants Evaluated**	**Date of Irrigation Pumping Plant Evaluation**
Ex. T100	**2b**	**7.3**	**1**	**August 25, 2010**

Ex. = example. NRCS completes Column 1, 2 and 3 (Tract, Field and Acres Planned). Operator completes remaining columns.

A full and complete report must be completed by the trained service provider. This should address:

1. Age and condition of the components of the irrigation system and pumping plant.
2. Water levels during pumping, a pressure/discharge curve.
3. Pump and engine speed (rpm)
4. Actual pumping plant performance versus the Nebraska Performance Criteria
5. Actual pump efficiency versus Manufacturers Published efficiency
6. Recommendations for improvements to the overall system efficiency
7. Estimate of energy savings if improvements are implemented

I certify that the Irrigation Pumping Plant Evaluation on the field(s) listed in the table above meets these specifications and that the following documentation has been provided to NRCS:

1. Documentation must include a completed Irrigation Pumping Plant Analysis Worksheet (Pgs. MT-WQT03-2 through 4 below) for each pumping plant evaluated.

I understand that it is my responsibility to obtain all necessary permits and to comply with all laws, regulations and ordinances pertaining to the application of these activities.

I acknowledge that I have read and understand all that is required for the implementation of this CSP Enhancement Activity.

_____ _____

Contract participant Date

IRRIGATION PUMPING PLANT ANALYSIS

Name_____ County_____ Tract No._____

DNRC Well Registration Number_____ Fuel Type_____

Static Water Level_____ Feet, Pumping Plant Evaluated_____

Age and condition of pumping plant_____

_____

Pump model number_____ Engine HP_____ Manufacturer_____

ALL DATA BELOW IS A SUMMATION FROM THE FIELD DATA SHEETS

Pumping Plant Condition	Before Adjustments		After Adjustments**	
Pumping Water Level	_____	feet	_____	feet
Operating Pressure	_____	psi	_____	psi
Operating Flow Rate	_____	gpm	_____	gpm
Power Requirements	_____	Whp	_____	Whp
Pump RPM	_____	RPM	_____	RPM
Engine RPM	_____	RPM	_____	RPM
% Performance Rating (NPPPC)*	_____	%	_____	%

Energy Analysis

Water Application Capacity	_____	Ac-in/hr	_____	Ac-in/hr
Fuel Use Rate	_____	unit/hr	_____	unit/hr
Fuel Unit Cost	_____	$	_____	$
Cost to Pump 1 Ac-in	_____	$/Ac-in	_____	$/Ac-in
Cost to Pump 1 Ac-ft	_____	$/Ac-ft	_____	$/Ac-ft

Summary of Fuel Cost for Pumping Plant

	% of NPPPC*	Acres	x	$/Ac-in	x	in/year	=	Annual Cost	Annual Savings
Before Adj.	_____	_____	x	_____	x	_____	=	_____	
After Adj.	_____	_____	x	_____	x	_____	=	_____	_____
At Criteria	100%	_____	x	_____	x	_____	=	_____	_____

Adjustments, remarks and recommendations

_____

_____

_____

_____

_____

_____

*Nebraska Pumping Plant Performance Criteria (see Water Quality Enhancement Activity WQT03)

**Adjustments shall be evaluated but are not required to be installed to meet the requirements of the Conservation Security Program Enhancement Water Quality Enhancement Activity WQT03, Irrigation Pumping Plant Evaluation

Form modified from Cooperative Extension Service Agricultural Engineering Department, University of Nebraska – Lincoln
Form modified from USDA, NRCS, Lincoln, Nebraska
Form modified from USDA, NRCS, Bozeman, Montana

FIELD DATA

Name_____ County_____ Test No._____

Pump Brand_____ Stages_____ Serial No._____

Pump Setting_____ Pump Shaft Dia._____ Threads/in_____

Pump RPM_____ Driver RPM_____ State Water Level_____ Cascading Water_____

Pumping Head

Pressure_____psi x 2.31 = _____ft Discharge Head
+ _____ft Pumping Water Level **=** _____ **Total Pumping Head**

Flow Test (Check that Apply)

☐ Propeller Flow Meter:

Time:_____ min_____ sec = _____ min

Gallons STOP _____ Gallons START _____

= _____ Total Gallons ÷ Time in min _____ **=** _____ **GPM**

☐ Collins Flow Gauge:

10 Pt. Setting	Setting Position	Right		Left	
.158D					
.275D					
.354D					
.420D					
.475D					

Pipe I.D. _____ Average Velocity _____ x 2.45 x D^2 = _____ GPM

Energy Use Test (Check that Apply)

☐ Diesel Time:_____ min._____ sec. = _____ Hours
7.1 lb/gal Weight START_____ lbs. Weight STOP_____ lbs. **=** _____ **lbs/hr**

☐ Propane = _____ Net Weight Used ÷ _____ lbs/gallon
4.25 lb/gal ÷ _____ Time in Hours **=** _____ **gal/hr**

☐ Electric Time:_____ min._____ sec. = _____ Seconds
3.6 x _____ Disc. Revolutions x _____ Kh ÷ _____ Seconds **=** _____ **kW**
Volts _____ _____ _____ Amps _____ _____ _____

☐ Natural Gas Time:_____ min._____ sec. = _____ Seconds
3.6 x _____ Dial Capacity x _____ Dial Revolutions
÷ _____ Seconds = _____ x Correction Factor_____ **=** _____ **mcf/hr**
Gas Pressure_____ psi Elevation_____

Performance Rating

_____ Head x _____ GPM ÷ 3960 = _____ Whp ÷ _____ Fuel Use
= _____ Pumping plant Performance ÷ _____ Criteria **=** _____ **% Performance Rating**

Pump Adjustment**

_____ Pumping Head x _____ Downthrust = _____ Total Downthrust
_____ Shaft Stretch x _____ Shaft Length/100 = _____ Total Stretch x _____ Threads/in
= _____ Turns of Nut

** It is recommended that the pump adjustment be made only by trained professionals. Adjustments shall be evaluated but are not required to meet the requirements of the Conservation Security Program Enhancement Water Quality Enhancement Activity WQT03, Irrigation Pumping Plant Evaluation.

Copies of this Field Data form should be completed for each test performed and submitted to NRCS.

Form modified from Cooperative Extension Service Agricultural Engineering Department, University of Nebraska – Lincoln
Form modified form USDA, NRCS, Lincoln, Nebraska
Form modified from USDA, NRCS, Bozeman, Montana

Field Pump Test Data

Observation No.	Flow (gpm)	Well Pressure (psi)	Drawdown Pumping Level (ft)	Constant RPM (Check that Apply) ☐ Motor RPM ☐ Pump RPM
1				
2				
3				
4				
5				
6				
7				
8				

Note: Field pump test data must show data for all columns above. An observation shall be documented at any change of flow with a constant RPM. Points shall be obtained on both sides of the normal pump operating flow rate.

Date of Test:_____

Test completed by:_____

Contact Number of Tester:_____