Form WM-05

WATER MEASUREMENT
WATT-HOUR METER REPORT FORM

PAGE ____ of

DATE: _____

WATER RIGHT OWNER=S NAME: _____

WATER RIGHTNO: _____

LOCATION: _____

USER INFORMATION: _____

MEASUREMENTS REQUIRED: _____

TYPE OF DEVICE USED: _____

A DATE	B TIME	C ENERGY METER (KWH)	D ENERGY USE (KWH)	E PERIOD OF OPERATION (HOURS)	F VOLUME USED (AF)
G. ≅**TOTAL VOLUME USED THIS YEAR**					

H. AVERAGE SYSTEM FLOW RATE _____ (*Circle one:* GPM or CFS)

I. PUMP MOTOR: AMPS _____, VOLTS _____, PHASE

J. CHANGES IN SYSTEM FROM LAST YEAR _____

WATER MEASUREMENT
WATT-HOUR METER REPORT FORM
INSTRUCTIONS

The *WATT-HOUR METER REPORT FORM* is used to record system information and energy consumption that will allow one to determine the volume of water diverted. The pump period of operation is determined by dividing the pump power rating into the total electricity consumed. Using the pump period of operation and the average flow rate, the volume can be calculated.

First, it is important to measure the average system flow rate of your system. See Line H information.

COLUMNS A & B: DATE & TIME
Record the date and time when the energy meter readings were observed.

COLUMN C: ENERGY METER (KWH)
Observe and record the accumulated number of kilowatt-hours on the meter. Often, this can be taken directly from the meter. However, some meters have to be multiplied by a constant before being recorded on the *WATT-HOUR METER REPORT FORM*. Consult your utility supplier to determine if a constant (multiplier) needs to be used.

COLUMN D: ENERGY USE (KWH)
Calculate the energy use by subtracting the previous energy meter observation (Column C) from the current energy meter observation.

COLUMN E: PERIOD of OPERATION (HOURS)
1) To determine the period of operation, first calculate the power of the pump motor in kilowatts[1]. Use the following formulas to determine the power rating of the pump motor:
   - Three Phase   Power = Amps X Volts) 577.4
   - Single Phase   Power = Amps X Volts) 1000.0

NOTE: If measured values of amperage and voltage are not available, report the motor nameplate specifications.

2) Divide the power into the energy consumed as shown below:
   - Period of Operation (Hours) = Energy Use (Kilowatt-Hours) ÷ Power (Kilowatt)

COLUMN F: VOLUME USED (AF)
To calculate the volume, you must know the average flow rate (Line H) at which the water is diverted and the period of time (Column E) that it is diverted. Use the formulas below to calculate the volume.

- System Flow Rate in GPM X Period of Operation in Hours X 0.00018 = Volume in AF
- System Flow Rate in CFS X Period of Operation in Hours X 0.0825 = Volume in AF

LINE G: TOTAL VOLUME USED THIS YEAR
To determine the total volume, add all the figures together in Column F and enter that figure on Line G.

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[1] The Department highly recommends that the measurement of the motor amperage draw and operating voltage be performed by qualified electrical technicians or the power supplier. **Exercise extreme caution if you take these measurements yourself!**

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LINE H. AVERAGE SYSTEM FLOW RATE
The flow rate of the system must be measured and calibrated with the energy consumption for a fixed set of system components. Changes in system configuration can affect the average flow rate. Therefore, if components of the system are altered, a new calibration of the flow rate with energy consumption may be required. Consult with the regional manager to determine whether a calibration must be performed after system components are altered.

LINE I: Observe and record the actual amperage drawn by the motor at a measured voltage. Report whether the motor is single or three phase.

LINE J: When reporting changes in the system, identify those changes that will affect the average flow rate of the system. Changes in your system can affect the average flow rate. Typical changes that should be noted include:

- Changing sprinkler nozzles, pumps, or motors;
- Replacing main lines or laterals with different pipe sizes or material;
- Reconfiguring the system;
- Adding or deleting the amount of irrigated acreage;
- Changing the type of end gun.

EXAMPLE CALCULATIONS

DATE	TIME	ENERGY METER (KWH)	ENERGY USE (KWH)	PERIOD OF OPERATION (HOURS)	VOLUME USED (AF)
5/3/95	8:00 a.m.	04120			
6/1/95	3:00 a.m.	05330	*1210*	*40.6*	*5.1*
7/5/95	8:00 a.m.	16790	*11460*	*384.6*	*48.5*
				@ TOTAL VOLUME USED THIS YEAR	*53.6*

AVERAGE SYSTEM FLOW RATE _____700_____ (*Circle one* GPM or CFS)

PUMP MOTOR: AMPS _____49_____ , VOLTS _____470_____ , PHASE ____3____

CHANGES IN SYSTEM FROM LAST YEAR __None_____

CALCULATIONS
POWER
Power = 37 Amps X 465 Volts) ÷ 577.4 KW/VoltAmps = 29.8 KW

29.8 KW ÷ .7457 KW/Horsepower = 40.0 Horsepower (For information only, may be greater than nameplate HP)
This value for power does not change unless there is a system modification

05/03/95 TO 06/01/95
Energy Consumed: 5330 KW Hours - 4120 KW Hours = 1210 KW Hours

Period of Operation.: 1210 KW Hours ÷ 29.8 KW = 40.6 Hours
Volume: 700 GPM X 40.6 Hours X 0.00018 = 5.1 Acre-Feet

06/01/95 TO 07/05/95
Energy Consumed: 16790 KW Hours - 5330 KW Hours = 11460 KW Hours

Period of Operation.: 11460 KW Hours ÷ 29.8 KW = 384.6 Hours
Volume: 700 GPM X 384.6 Hours X 0.00018 = 48.5 Acre-Feet