



State of Idaho

DEPARTMENT OF WATER RESOURCES

322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098

Phone: (208) 287-4800 • Fax: (208) 287-6700 • Web Site: www.idwr.idaho.gov

November 30, 2009

C. L. "BUTCH" OTTER
Governor

Re: Order Requiring Measuring Devices in Water District No. 110

GARY SPACKMAN
Interim Director

Dear Water User,

The Idaho Department of Water Resources (Department or IDWR) has issued the enclosed preliminary order requiring installation of measuring devices for certain ground water diversions in Water District No. 110, Mud Lake Area. Pursuant to Section 67-5243, Idaho Code, the preliminary order will become a final order without further action of the Department unless a party petitions for reconsideration or files an exception and/or brief as explained in the enclosed information sheet.

This order requires users to install measuring devices on irrigation wells that do not meet IDWR minimum acceptable water measurement standards, including minimum criteria for using the Power Consumption Coefficient (PCC) method. Flow meters must be installed prior to diverting water in the 2010 irrigation season. Diversions subject to the attached order were identified by IDWR and the Water District No. 110 watermaster based on a review of reported field measurements and annual water use estimates.

Measuring devices for closed conduit systems must be magnetic flow meters meeting Department criteria unless a variance has been provided by the Water District 110 watermaster or IDWR. Devices must be installed prior to diversion of water in 2010. Please refer to the enclosed document "*Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices*" for information on types of measuring devices acceptable to IDWR and the requirements for using the PCC method for measurement. This document and other related information is available on the Department's web site as follows: http://www.idwr.idaho.gov/water/districts/water_measurement.htm

Please note that water users are required to provide measuring device plans to IDWR by January 31, 2010. Users are directed to submit plans by completing the form attached to this order and found on the Department's web site at:
http://www.idwr.idaho.gov/WaterManagement/WaterMeasurement/PDFs/MeasPlanForm_09.pdf

If you have questions concerning this order, please contact the watermaster for Water District 110, Ernie Carlsen, IDWR's eastern region office (208-525-7161), or either Corbin Knowles, or Tim Luke, IDWR Water Distribution Section, Boise (208-287-4800).

Respectfully,

Tim Luke
Water Distribution Section Manager

Enclosures: *Preliminary Order Requiring Measuring Devices in Water District 130, November 30, 2009*
Explanatory Information to Accompany a Preliminary Order (2 pages)
IDWR Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices
Measurement Plan Submittal Form for Irrigation Well

Cc: Ernie Carlsen, Watermaster, Water District 110
Jefferson Clark Ground Water District
Corbin Knowles, IDWR

BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE

STATE OF IDAHO

IN THE MATTER OF REQUIRING MEASURING)

DEVICES FOR GROUNDWATER DIVERSIONS)

IN WATER DISTRICT NO. 110, MUD LAKE)

AREA)

PRELIMINARY
ORDER

Staff from the Idaho Department of Water Resources (Department or IDWR), working in coordination with the Water District No. 110 watermaster, have determined that a number of ground water irrigation diversions or wells in Water District No. 110 are measured or estimated using methods or measuring devices that are not acceptable to the Department. Water use for most of the diversions in question is currently estimated using the Power Consumption Coefficient (PCC) method but do not meet the Department's minimum PCC method standards and requirements.

The current method used to determine annual ground water withdrawals from nearly all irrigation wells within Water District No. 110 that are currently required to be measured and reported is the PCC method. IDWR's *Water Measurement and Reporting Guidelines* (February, 1999) specify that "the PCC method will not be approved as a substitute for a meter for complex systems where flow rate or total dynamic head at the pump varies due to multiple valve adjustments; multiple discharge locations in a pipeline; the method of delivery varies between open discharge, low pressure or high pressure sprinkler systems during an irrigation season; multiple wells/pumps are tied together with common mainline(s); or the ground water level changes significantly during the year." Many ground water pumping systems are complex, operating at more than three (3) distinct flow and demand conditions. Any one or more of these circumstances causes use of the PCC method to be invalid. Measurements of diversions in Water District No. 110 based on invalid PCC methods do not meet the Department's minimum standards for measurement of ground water.

Section 42-701, Idaho Code, provides in pertinent part:

42-701. INSTALLATION AND MAINTENANCE OF CONTROLLING WORKS AND MEASURING DEVICES BY WATER APPROPRIATORS – PROCEDURE UPON FAILURE TO INSTALL AND MAINTAIN – MEASURING AND REPORTING OF DIVERSIONS – PENALTY FOR FAILURE TO COMPLY – REPORT FILING FEE.

1. Each such appropriator shall construct and maintain, when required by the director of the department of water resources, a rating flume or other measuring device at such point as is most practical in such canal, ditch, wellhead or pipeline for the purpose of assisting the watermaster or department in determining the amount of water that may be diverted into said canal, ditch, wellhead or pipeline from the stream, well or other source of public water. Plans for such headgates, rating flumes or other measuring devices shall be approved by the department of water resources.

2. If an appropriator determines that installation and maintenance of a measuring device required by the director would be burdensome for his diversion, the appropriator may, upon approval of the director, execute an agreement with the director and submit to the director such information and technical data concerning the diversion and pumping facilities as the director determines necessary to establish the relationship of power usage to water withdrawal by any pump use to divert public water.

3. Any appropriator or user of the public waters of the state of Idaho that neglects or refuses to construct or maintain such headgates, controlling works, or measuring devices..., upon receiving ten (10) days' notice from the director of the department of water resources within which to begin and diligently pursue to completion the construction or installation of the required device or devices or to begin and diligently pursue to completion a remedy to such defects as exist in accordance with said notice, then the director of the department of water resources may order the duly qualified and acting watermaster of the water district to shut off and refuse to deliver at the point of diversion, the water owned by such appropriator or user until the user does construct and maintain such headgates, controlling works or measuring devices or remedy the defects which exist or the director may take action pursuant to section 42-1701B, Idaho Code, to enforce the requirement to construct, install or maintain such devices.

4. The appropriators or users of the public waters of the state of Idaho shall be given a reasonable time within which to complete construction of such headgates, controlling works or measuring devices, depending upon the size and extent thereof, when due diligence has been used in the prosecution of such work.

ORDER

IT IS HEREBY ORDERED AS FOLLOWS:

1. The water right holders or owners of each ground water well identified in Attachment A of this order shall install measuring devices of a type acceptable to the Department prior to diverting water during the 2010 irrigation season.

2. Measuring devices that are acceptable to the Department for wells that are required to be measured shall be magnetic flow meters meeting the specifications listed in the Department's *Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices (copy attached)*. These specifications apply to both irrigation and non-irrigation water uses.

3. Well owners must submit measuring device plans for each well listed in Attachment A of this order to the Department no later than January 31, 2010. Well owners are required to use the IDWR approved form attached to this order and available on the department's web page at: http://www.idwr.idaho.gov/WaterManagement/WaterMeasurement/water_measurement.htm. Plans will be reviewed to determine whether proposed measuring devices and installation are of a type acceptable to the Department.

4. A variance of the magnetic flow meter requirement may be considered upon completion and submittal of the IDWR form referenced above and attached to this order. Acceptable variances may include the following methods or devices:

- Development of a Power Consumption Coefficient (PCC), which is a ratio of power usage to water withdrawal *for qualifying diversions only*;
- Use of an hour meter (time clock) *for qualifying diversions only*;
- Use of an acceptable non-magnetic flow meter that was installed *prior to the date of this order*;
- Use of an acceptable non-magnetic flow meter where it can be shown that installation of the standard magnetic flow meter would be burdensome.

Requests for variance of the measurement method must be received no later than the applicable Plan Due Date of January 31, 2010 and will be considered by the Department and Water District No. 110 watermaster on a case-by-case basis. Variances proposing use of an existing flow meter must meet Department criteria and accuracy tests. Existing


meters which do not meet standards, or which fail, will be required to be replaced with a magnetic flow meter unless another variance is obtained. The suitability of any pumping plant for approval of an hour meter or the PCC method of measurement will be based on criteria found in the *IDWR Water Measurement and Reporting Guidelines* (available online using the same web address referenced in item 3 above).

5. The Department may waive the measuring device requirement for any well identified in Attachment A of this order if the well is not used provided the well owner submits power utility account information to the Department to verify non-use of the well. The Department will not provide a waiver for any unused well that may be connected to a diesel or other non-electrical powered pump, but may consider a request for variance as outlined in item 4 above.

6. The watermaster is authorized to shut off and refuse to deliver water to any water right holder or water user with a diversion in Water District No. 110 and identified in Attachment A of this order that does not have an adequate measuring device installed and maintained at any and all times, or an approved variance, during the 2010 or subsequent irrigation seasons.

7. Diversions not on Attachment A and found to have an inadequate or invalid method of measurement by the watermaster and/or department staff will be subject to a separate order and notice.

Dated this 30th day of November, 2009.



Jeff Peppersack
Water Allocations Bureau Chief

ATTACHMENT A

Owner Organization Name	Owner/Contact Last Name	Owner/Contact First Name	PLS Legal Description	Diversion Name	Metal Tag Number	Reporting District
Burton & Mary LLC	Allen	Burton & Mary	T07N R33E S16 SWNENW	300 HP	A0001860	WD 110
Burton & Mary LLC	Allen	Burton & Mary	T07N R33E S16 SWNENW	South Well	A0016326	WD 110
Monteview Trust Kendal F. Egbert Trustee			T07N R33E S7 SENENE	South Well	A0008603	WD 110
	Burtenshaw	Lanny	T05N R35E S10 SWSWSE	Big Well	A0008824	WD 110
C&N Family Land Investment LLC	Burtenshaw	Lanny	T05N T35E S8 NESE	480	A0001865	WD 110

**EXPLANATORY INFORMATION
TO ACCOMPANY A
PRELIMINARY ORDER**

(To be used in connection with actions when a hearing was not held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "**Preliminary Order**" issued by the department pursuant to section 67-5243, Idaho Code. It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:

PETITION FOR RECONSIDERATION

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

EXCEPTIONS AND BRIEFS

Within fourteen (14) days after (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

REQUEST FOR HEARING

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

ORAL ARGUMENT

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

CERTIFICATE OF SERVICE

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

FINAL ORDER

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

Unless a different date is stated in a final order, the order is effective fourteen (14) days after its issuance if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:

- (a) the petition for reconsideration is disposed of; or
- (b) the petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

APPEAL OF FINAL ORDER TO DISTRICT COURT

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

- i. A hearing was held,
- ii. The final agency action was taken,
- iii. The party seeking review of the order resides, or
- iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.

**STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES (IDWR)**

**MINIMUM ACCEPTABLE STANDARDS FOR
OPEN CHANNEL AND CLOSED CONDUIT
MEASURING DEVICES**

June, 2009

The source and means of diversion of water, whether surface or ground water, generally affects the selection of a measuring device. Surface water sources such as streams, springs and waste channels are normally diverted into open channels (ditches or canals), but closed conduits (pipes or culverts) are also used. Ground water is usually diverted into pipes (which may also discharge into open channels).

Measuring devices when required by IDWR are to be installed at or near the point of diversion from the public water source.

Open Channel

I. SURFACE WATER DIVERSIONS

The following discussion is applicable only to diversions from surface water sources. Measurement of a ground water diversion with an open channel measuring device must be pre-approved by the IDWR.

A. Standard Open Channel Measuring Devices

All open channel surface water diversions should be measured using one of the following standard open channel flow measuring devices commonly used in Idaho:

- contracted rectangular weir
- suppressed rectangular weir
- Cipolletti weir
- 90 degree V-notch weir
- Parshall flume
- trapezoidal flume
- submerged rectangular orifice
- constant head orifice
- ramped broad crested weir (or ramped flume)
- acoustic Doppler flow meter (ADFM)

Construction and installation of these devices should follow published guidelines. References are available upon request.

B. Non-standard open channel devices: Rated Structures or Rated Sections

IDWR may authorize the use of non-standard devices and rated sections provided the device or section is rated or calibrated against a set of flow measurements using an acceptable open channel current meter or a standard portable measuring device. Further restrictions and requirements are available from IDWR upon request.

II. CLOSED CONDUIT MEASURING DEVICES

New installations for closed conduit or pipe line diversions require installation of a magnetic type flow meter. There are many flow meters on the market, with costs ranging from several hundred dollars to several thousand dollars. In general, the higher priced meters are more accurate and require less maintenance. Most meters on the market have an acceptable accuracy rating for IDWR's guidelines. IDWR may provide a variance for diversions where an existing mechanical type flow meter is already installed and the meter is shown to meet the minimum requirements in section B of the Flow Meter Specifications in this document.

A. Flow Meter Specifications

Currently there are two types of magnetic flow meters available. Full profile magnetic type flow meters are flanged into the piping system and measures across the velocity profile. Insertion type magnetic meters are installed through a small diameter hole in the piping system and attempt to measure the average velocity (determined by pipe diameter and insertion depth of sensor) in the flow profile. Small diameter (< 12" in diameter) pipes should be fitted with a full profile magnetic type meter due to higher accuracy and less straight pipe requirements for installation. Larger pipe diameters may use insertion type meters but must meet the standards for accuracy listed below. Insertion type magnetic meters will require larger straight distances of pipe to minimize turbulence above and below the measurement point.

Listed below are the flow meter requirements and specifications for full-flowing closed conduits or pipes. These specifications apply to all irrigation and non-irrigation water uses except domestic systems as defined in Section 42-111, Idaho Code. Water users may apply to IDWR for a variance to these specifications in accordance with Criteria for Request for Variance of measuring Device Requirements of Section II C. of this document

Meters shall be magnetic flow meters meeting the following minimum specifications:

- 1) Flow range of 0.1 to 33 feet per second (fps).
- 2) Listed manufacturer accuracy of $\pm 2\%$ of flow rate from 0.1 to 33 feet per second (fps), with a repeatability of $\pm 0.5\%$ of reading.
- 3) The register or display unit shall:
 - a) Have a waterproof and tamperproof seal.
 - b) Have an LCD backlit display showing instantaneous flow rate and totalized volume.
 - c) Have a minimum of six (6) digits for flow rate.
 - d) Have a minimum of eight (8) digits for totalized volume display or a sufficient number of digits so that "rolling over" will not occur within two years operation, based on the maximum rate of flow and annual volume elements of the authorizing water rights. For totalizing data, IDWR recommends using the attached guidelines (see Table 1) for proper meter (totalizing units) selection for the intended use.
 - e) Have password or similar protection of all settings and data to protect against unauthorized change or accidental loss of data.
 - f) Contain a back up battery (according to manufacturers specifications) to prevent loss of data in the case of primary power failure.
 - g) The display unit must contain user programmable features that allow the selection of flow units. Available flow units must include, but are not limited to, gallons per minute (gpm) or cubic feet per second (cfs). The meter flow rate display must also allow

decimal display formatting of up to three (3) places when using cubic feet per second units.

- h) The volume totalizer display must contain user programmable features that allow the selection of volumetric units that must include but are not limited to, total gallons or acre feet. The meter must also allow decimal display formatting of up to four (4) places, and the application of unit multipliers ranging from .0001 to 10,000. See Table 1 below for examples of appropriate meter multipliers based on expected annual volume use.

4) Signal Output when Data Logger is Required

Data loggers are required only for magnetic flow meters installed as per conditions of approval for water right transfers in the Eastern Snake Plain Aquifer, or as may be required by specific water right conditions of approval in other locations.

Scaled pulse frequency output (or pulse counting) is required for continuous recording of totalized volume data on data loggers. Output signals must be compatible with data logger inputs. Analog output signal for flow rate (usually 4-20mA) is also optional (most magnetic flow meters provide both analog and pulse frequency as standard output signals).

B. Meter Installation and Diversion System Requirements

Meters required under Section II A. above shall meet the following installation requirements:

- 1) The minimum and maximum system operating flows and pressures must be fully within the range of measurable flows and pressures identified in the meter specifications.
- 2) Pipes must be full flowing.
- 3) The installed flow rate accuracy of the installed magnetic flow meter must be $\pm 5.0\%$ as compared to a second, standard flow meter. The installed flow rate accuracy for mechanical flow meters is $\pm 10\%$ of rate of as compared to a second, standard flow meter.
- 4) Meters must be installed according to manufacturer's specifications. Most manufacturers' recommend that meters be installed a certain distance from turbulence-causing bends and fittings such as discharge heads, single elbows, and valves. Industry standards for such distances are listed below, but larger distances may be required if the turbulence is severe.
 - a. Full profile magnetic flow meters require three (3) pipe diameters upstream of the meter and two (2) downstream.
 - b. Insertion magnetic flow meters require (10) pipe diameters upstream of the meter and five (5) pipe diameters downstream.
 - c.
- 5) Meter Certification: IDWR will certify the installed flow meter for accuracy using a second, standard flow meter. A location for measuring flow with a second standard meter must be provided as close to the installed meter as possible. A section of straight pipe with a minimum of 24 inches in length (for pipe diameters 16 inches and smaller) of unobstructed exposed pipe shall be provided for calibration purposes. The calibration section must be free of elbows, valves and other fittings, and must contain the same flows that are passing through the meter. The 24-inch certification section may be incorporated into the manufacturer's pipe requirements above or below the flow meter.

Table 1: Use for proper meter selection based on water right volume.

Volume Acre Feet (AF)	Multiplier X gallons (gal)	Multiplier X Acre Feet (AF)
0-150	1, 10, 100	.0001, .001
150-1000	10, 100, 1000	.001, .01
>1000	100, 1000	.001, .01

C. Requests for Variance of Closed Conduit Measuring Device Requirements

Owners of closed conduit diversions may request a variance of the standard magnetic flow meter requirements of section II A. above for the following reasons:

- a) An operable flow meter is already installed
- b) Installation and maintenance of the standard meter would be burdensome

If a meter is already installed, that meter may be used if the meter is field-tested by IDWR staff and/or the water district watermaster using a portable certified standard flow meter and upon a determination that the meter is installed properly and accurate to within $\pm 10\%$ of actual rate of flow and volume. *IDWR or the water district watermaster should apply a calibration factor to flow meters whenever the calibration measurement is greater than $\pm 1.0\%$.*

If a user demonstrates that installation and maintenance of the standard meter would be burdensome, then IDWR may consider alternate measurement options including:

- a) Development of Power Consumption Coefficient to estimate water use volumes (generally acceptable for simple ground water irrigation diversion systems only)
- b) Installation of one or more time clocks or hour meters (requires periodic flow measurements and recording of hours of water use from meter or clock).
- c) Installation of an alternative flow meter as shown in Table 2 below. Alternative flow meters may vary with respect to straight pipe length requirements. Mechanical flow meters require ten (10) pipe diameters upstream of the meter and five (5) pipe diameters downstream.

Users considering making a variance request may contact IDWR or the local water master for further information.

Table 2: Types of Alternative Measuring Devices for Closed Conduits

Types	Pipe Sizes	Maintenance Required	Relative Purchase Price
Differential Head <ul style="list-style-type: none">• Orifice• Venturi• Annubar	small to large	Low to high. Sand wears on sharp edges, and particles can plug small orifices and tubes.	low to medium
Force Velocity <ul style="list-style-type: none">• Turbine• Propeller• Impeller	small to large	Typically moderate to high. Often problematic when exposed to sand or moss. Some cannot measure low velocities	low to medium
Ultrasonic or Acoustic Doppler	small to large	Low. Typically non-invasive with no moving parts to wear	high
Vortex	small to medium (about 12 to 14 inch maximum pipe diameter)	Low. Few or no moving parts to wear.	High

1. Use of Power Records as an Alternative Measurement Method

An alternative to installing flow meters is the use of power records and other information to estimate the annual diversion from a pump. Estimating total water diversion from power records requires the derivation of a relationship between power demand and flow under normal operating conditions. This relationship, called a power consumption coefficient (PCC), is a ratio of the number of kilowatt hours needed to pump an acre-foot of water. This number is unique to each well or pumping plant due to the physical attributes of the system and can be applied to the year end power records to determine the total acre-feet pumped.

Total power consumption at individual irrigation pumping plants is supplied to the Department by electric utilities. To determine the rate of flow, a portable measuring device, such as a non-invasive ultrasonic flow meter can be used. Simultaneous with the flow measurement, power is measured using the utility's kilowatt-hour meter. A qualified individual with the necessary equipment will be required to perform these measurements.

Some complex systems cannot use this method due to the potential for large errors. See the discussion in the following section to see if this method can be used.

Because systems wear and water levels change, it is necessary to occasionally verify the flow to power ratio. Therefore, the power consumption coefficient must be re-calibrated at least once every three years.

2. Can Power Records be used to Estimate My Diversion?

Only irrigation water users may use power records to estimate their diversion because the utilities will only provide consumption information for irrigation uses. If you are not an irrigation user, but want to use power records, you must propose a method of reporting your power consumption data.

Owners of **surface water diversions** must have a flow measuring device in most cases. The alternate method of estimating water withdrawals with power records cannot be used unless you pump from a public water source and can show the Department that it will yield reliable results (case by case determination).

Owners of **ground water diversions** can either install a totalizing flow meter or ask the Department to use power records to estimate withdrawals. If the pump discharges to an open channel, an open channel measuring device can be employed to measure the water diverted if the device and a method of tracking hours of operation are pre-approved by the Department. Flow meters which register only instantaneous flow rate are not acceptable unless the water user can demonstrate a reliable method of tracking the number of hours the pump operates through the season (the flow measuring device must then be read and flow rate recorded at least once per week).

The total water diverted can be accurately estimated from the PCC method if the system configuration or operation is not complex. Unfortunately, the PCC or power records will not always yield acceptable results, and it will be necessary to install a flow meter. **Flow meters must be installed if any of the following conditions exist:**

- The well flows (artesian) so that water can be diverted when the pump is off.
- The energy consumption meter that records power used by the pump also records power used by other devices not integral to the irrigation system. For example, if the meter also records power used by a home, shop, cellar, re-lift pumps from surface water sources etc., a flow meter must be installed because power used by the pump cannot be isolated from the other devices. However, if the meter also records power used by center pivots, booster pumps, or other devices which operate as part of the well pumping system, the alternate method may be acceptable.
- The electrical meter records the power used by more than one well pump. If a deep well pump which discharges to an open pond or ditch and a re-lift pump are both connected to the same electrical meter, the discharge from the well pump can be measured, and a time clock can be installed to record the total number of hours of pump operation which can be multiplied by the flow rate to determine the total volume of water diverted.
- Variable frequency drives (VFD) operate the pumping plant. This includes both drives for the well motor and the booster system. Variable frequency drives generally indicate that multiple operating conditions exist in the system where large kilowatt and pressure changes are present.

- The energy supplied to the pump cannot be accurately and reliably measured. For example, most diesel and propane driven pumps do not have provisions to measure the fuel used by the engine.
- The flow rate from the pump varies significantly due to changes in demand or operation. For example, pumps that discharge into a pressurized system some times and then open discharge at other times, or pumps that supply multiple pivots and/or other discharge points, would likely have flow rates that change considerably. These changes generally alter the flow to power ratio, causing inaccurate estimates of diversions. The alternate method of estimating water withdrawals with power records may only be used if the water user can propose an acceptable method of tracking these changes in operation.
- Changing water levels that cause the flow to vary more than 25% (or pressures to vary more than 15%) over the irrigation season.

IDWR
MEASUREMENT PLAN SUBMITTAL FORM FOR IRRIGATION WELLS
Please fill out a form for each well

Well Name: _____
IDWR site tag: _____
Legal description: _____
Owner/Operator: _____
Water District: _____

Check one of the following measurement options for this well:

Please note: this plan must be approved before you may install a flow meter or use any alternate measurement method.

A. I plan to install a magnetic flow meter on my well pursuant to IDWR's Order and criteria: _____

Manufacturer and Model of flow meter you have selected

I have not selected a meter _____

Please complete section #10, then sign and submit this form to the address provided.

B. I am requesting a variance of the magnetic meter requirement: _____

Please indicate the method of measurement you wish to use and have approved:

- _____ Existing operating flow meter
_____ Non-magnetic flow meter
_____ Hour Meter / Time Clock
_____ Power Consumption Coefficient (PCC)

If you are requesting a variance, you must answer the following questions:

1. Please describe the irrigation equipment used with this well (*example: center pivot with hand lines, 1/4 mile wheel lines, solid set hand lines, etc*).

Do your pivot systems operate with corner machines? _____yes _____no _____N/A

Approximate number of acres irrigated by this well: _____ acres

2. Does the well open discharge into a pond or ditch? _____yes _____no

3. Is there a flow meter presently installed on your well? _____yes _____no

Type:

Manufacture:

Installation date:

Is the meter operable?

4. Are there multiple pumps wired to the same electrical demand meter? _____yes _____no

If yes, how many pumps are surface water boosters that would increase the power use when the deep well is not in operation? _____

How many are in-line pressure boosters? _____

- Do in-line boosters always run with the well? ____yes ____no
5. Pressure Changes:
- Do you throttle the main well pump? ____yes ____no
- Do you throttle the in-line booster pumps? ____yes ____no
- Additional explanation/information regarding pump throttling or pressure changes:
6. Does the system operate with a variable frequency drive? ____yes ____no
- On Well motor: ____
- On Booster motor: ____
- On Both: ____
7. Is the well interconnected to other wells? ____yes ____no
- Does the well supply water for use other than irrigation? (*Example: stock water, commercial*)
____yes ____no If yes, please list:
8. Do your cropping patterns differ under pivot systems within the same year (*example: one pivot in potatoes, one pivot in wheat and both systems irrigated by the same well*)?
____yes ____no If yes, please describe:
9. Does the well production decrease over the irrigation season? ____yes ____no
- Does pumping water level decrease over the irrigation season? ____yes ____no
- If yes, approximately how much does the level decrease (in feet)? ____
- If you answered YES to any of the questions #4 through #9, your system is not likely a candidate for the Power Consumption Coefficient (PCC) method of measurement. You will be required to install a flow meter.
- If the system is an OPEN DISCHARGE system (answer to #2 is YES) and well production does not decrease during the irrigation season (answer to #9 is NO), then the system may use an hour meter for measurement.
10. **Required for all systems.** Please attach a diagram or photo of the wellhead and pumping plant. Include or show locations of all proposed or existing flow meters, and the locations of boosters, valves, elbows, chemigation ports, etc., and the spacing between each.
What is the pump discharge line size? ____

PLEASE PROVIDE YOUR SIGNATURE AND A CONTACT PHONE NUMBER, AND RETURN ALL FORMS TO:

IDWR
322 E FRONT ST
PO BOX 83720
BOISE ID 83720

Name/Title

Phone #

Date