



State of Idaho

DEPARTMENT OF WATER RESOURCES

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C. L. "BUTCH" OTTER
Governor

DAVID R. TUTHILL, JR.
Director

September 29, 2008

Groveland Water and Sewer District
Attn: Clem Yancey
PO Box 833
Blackfoot, ID 83221

RE: Water Use Reporting; Your Correspondence Dated September 20, 2008

Dear Mr. Yancey:

Thank you for your letter on behalf of the Groveland Water and Sewer District (GWSD) dated September 20, 2008. I appreciate the efforts GWSD is taking to acquire additional water or water rights. I wish to remind you that it is critical that you submit the annual measurement reports for GWSD's water use. If you haven't received these reports, please contact Gene Hansen at our Eastern Region office (525-7161).

The Idaho Department of Water Resources (Department) asks that you complete the steps to bring your water use into compliance prior to next year's irrigation season to insure that GWSD does not exceed its' water rights. I anticipate that GWSD will have reduced water use in 2008 given the policy adopted by the district on September 28, 2007 (your letter says it was adopted September 28, 2008 but I assume that is a typo and meant to be 2007 instead.) Any use of water for irrigation purposes by GWSD next year without a valid water right may result in the Department issuing a Notice of Violation to GWSD. Additionally, the Department may issue a Notice of Violation if GWSD fails to submit annual water measurement reports. If you decide to replace your flow meter, I would like to inform you that the Department's current minimum standards for measurement of closed conduits requires installation of magnetic flow meters (see copy attached).

If you have any questions or concerns please contact me at the above address.

Respectfully,

Tim Luke
Manager, Water Distribution

Enclosure

Cc: Ernie Carlsen and Gene Hansen, Water District 120

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

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

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

Closed conduit or pipe line diversions require installation of a flowmeter.

There are many flowmeters 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. However, some types and designs are much more prone to maintenance problems. Moving parts tend to wear when sand or silt is present, and moss often plugs small orifices and slows moving parts. No single flowmeter is best for every situation. We recommend that you visit with qualified dealers and discuss your needs with them.

A. Flow Meter Specifications

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 $\pm 0.5\%$ of flow rate from 1.6 to 33 feet per second (fps), and $\pm 2\%$ of flow rate from 0.1 to 1.5 feet per second (fps).
- 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.

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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. Magnetic flow meters require three (3) pipe diameters upstream of the meter and two (2) downstream.
 - b. Mechanical flow meters require ten (10) pipe diameters upstream of the meter and five (5) pipe diameters downstream.
- 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.

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.

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

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

Table 2; Types of Measuring Devices for Closed Conduits

Types	Pipe Sizes	Maintenance Required	Relative Purchase Price
Differential Head • 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 • 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