Friday March 18, 2011

California Code of Regulations
Title 23. Waters
Division 2. Department of Water Resources
Chapter 5.1. Water Conservation Act of 2009
Article 2. Agricultural Water Measurement

§597. Agricultural Water Measurement

Under the authority included under California Water Code §10608.48(i)(1), the Department of Water Resources is required to adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirements in paragraph (1) of subdivision (b) of §10608.48.

For reference, §10608.48(b) of the California Water Code states that:

> *Agricultural water suppliers shall implement all of the following critical efficient management practices:*
>
> *(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).*
>
> *(2) Adopt a pricing structure for water customers based at least in part on quantity delivered*

For further reference, §531.10(a) of the California Water Code requires that:

> *(a) An agricultural water supplier shall submit an annual report to the department that summarizes aggregated farm-gate delivery data, on a monthly or bi-monthly basis, using best professional practices.*

Notes:

1. Paragraphs (1) and (2) of §10608.48(b) specify agricultural water suppliers reporting aggregated farm-gate water delivery and adopting a volumetric water pricing structure as the purposes of water measurement. However, this article only addresses developing a range of options for water measurement.
2. By reference, the agricultural water suppliers reporting agricultural water deliveries measured under this article shall use the reporting format and criteria developed for Water Code §531.

Note: Authority cited: §10608.48 (b), §531.10 Water Code. Reference:

§597.1. Applicability

a) An agricultural water supplier subject to this article shall measure surface water and groundwater that it delivers to its customers, excluding recycled water pursuant to the accuracy standards in this article.

b) Agricultural water suppliers providing water to less than 10,000 irrigated acres, excluding acres that receive only recycled water, are not subject to this article.

c) Agricultural water suppliers providing water to 10,000 or more irrigated acres but less than 25,000 irrigated acres, excluding acres that receive only recycled water, are not subject to this article unless sufficient funding is provided specifically for that purpose, as stated under Water Code §10853.

d) Agricultural water suppliers providing water to 25,000 irrigated acres or more, excluding acres that receive only recycled water, shall be subject to this article.

e) A wholesale agricultural water supplier providing water to another agricultural water supplier (the receiving water supplier) for ultimate resale to customers is subject to this article at the location at which control of the water is transferred to the receiving water supplier. The wholesale agricultural water supplier is not required to measure deliveries that the receiving agricultural water supplier makes to the customers of the receiving agricultural water supplier. Canal authorities or other entities that convey or deliver water through facilities owned by a federal agency are not subject to this article.

f) Pursuant to §10608.8 (d) this article does not apply to any agricultural water supplier "that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect."

g) Pursuant to §10608.12(a) this article does not apply to the Department of Water Resources.

~~h)Agricultural water suppliers that are subject to either the Central Valley Project Improvement Act (Public Law 102-575) or the Reclamation Reform Act of 1982, or both, shall be deemed in compliance with this article, if all irrigation water delivered by those suppliers is delivered through devices that meet the United States Bureau of Reclamation accuracy standards outlined in the 2008 Conservation and Efficiency Criteria Standards.~~

~~i)~~h) A water supplier providing water to wildlife refuges or habitat lands where (1) the refuges or habitat lands are under a contractual relationship with the water supplier, and (2) the water supplier meets the irrigated acreage criteria of §10608.12(a) is subject to this article.

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Note: Authority cited: §10828. Water Code.

§597.2. Definitions

(a) For purposes of this article, the terms used are defined in this section.

1) "Accuracy" means the measured flow rate, velocity, or volume relative to the actual flow rate, velocity, or volume, expressed as a percent. The percent shall be calculated as 100 x (measured value – actual value) / actual value, where "measured value" is the value indicated by the device and "actual value" is the value as determined through laboratory, design or field testing protocols that use best professional practices.
2) "Agricultural water supplier," as defined in Water Code §10608.12(a), means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding acres that receive only recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the Department of Water Resources.
3) "Best professional practices" means practices attaining and maintaining accuracy of measurement and reporting devices and methods as described in this ~~article~~article or as determined by a registered Professional Engineer. .
4) "Customer" means the purchaser of water from an agricultural water supplier who has a contractual arrangement with the agricultural water supplier for the service of conveying water to the customer delivery point.
5) "Delivery point" means the location at which the agricultural water supplier transfers control of delivered water to a customer or group of customers.
6) "Farm-gate," as defined in Water Code §531(f), means the point at which water is delivered from the agricultural water supplier's distribution system to each of its customers.
7) "In-house built device" means a measurement device that is manufactured by a water supplier or by others to specifications provided by a water supplier.
8) "Irrigated acres," for purposes of applicability of this article, is calculated as the average of previous five year acreage within the agricultural water supplier's service area that has received irrigation water from the agricultural water supplier.
9) "Lateral" means a branch of an agricultural water supplier's distribution system that directly provides water to multiple customer delivery points.
10) "Manufactured device" means a device that is manufactured by a commercial enterprise, often under exclusive legal rights of the manufacturer, for direct off-the-shelf purchase and installation. Such devices are capable of directly measuring flow rate, velocity, or totalizing the volume of water delivered, without the need for additional components built on-site or in-house.
11) "Measurement device" means a device by which an agricultural water supplier determines the numeric value of flow rate, velocity or volume of the water passing a designated delivery point. A measurement device may include manufactured devices, on-site built devices or in-house built devices.
12) "On-site built device" means a measurement device that is built in-situ on a water conveyance system and may include manufactured devices or in-house built devices as components.

Comment [RL1]: Clearly defines who determines "best professional practices."

13) "Recycled water" is defined in subdivision (n) of §13050 of the Water Code as water, which as a result of treatment of waste is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource.

14) "Type of Device" means measurement devices that are manufactured or built to perform similar function. For example rectangular, v-notch, broad crested weirs are one type of device. Similarly all Parshall flumes are considered one type of device.

Note: Authority cited: §10608.48, Water Code. Reference: §10608.

§597.3 Range of Options for Agricultural Water Measurement

An agricultural water supplier subject to this article may choose any single option or combination of options listed in paragraph~~s~~ (a) ~~and (b)~~ of this section. Measurement devices shall be certified pursuant to §597.4 of this article.

a) Options Applicable to Measurement ~~at the Locations of Transfer to Delivery Point of a Customer~~:

Agricultural water suppliers shall measure water delivered to each customer delivery point or upstream of more than one customer delivery point using one of the following:

1) Measurement devices installed after the effective date of this article using a laboratory certification shall be certified to have an average accuracy~~be accurate~~ at least within ±5% by flow rate, velocity or volume in the laboratory.

Or,

2) Measurement devices installed after the effective date of this article using non-laboratory certification, shall be certified to have an average accuracy~~be accurate~~ at least within ±10% by flow rate, velocity, or volume when installed in field.

Or,

3) Measurement devices installed prior to the effective date of this article that are certified to have an average accuracy~~be accurate~~ at least within ±12% by flow rate, velocity, or volume. After replacement of an existing measurement device, the new or replacement device must meet the requirements of paragraphs (a)(1) or (a)(2) of this section.

~~**b) Options Applicable to Measurement Upstream of the Locations of the Delivery Points of Multiple Customers**~~

~~Agricultural water suppliers shall measure water delivered to each measurement location upstream of more than one customer delivery points using one of the following:~~

~~1) Measurement devices installed after the effective date of this article using a laboratory certification shall be certified to be accurate at least within ±3% by flow rate, velocity or volume in the laboratory.~~

~~Or,~~

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~~2) Measurement devices installed after the effective date of this article using non-laboratory certification, shall be certified to be accurate at least within ±6% by flow rate, velocity, or volume when installed in field.~~

~~Or,~~

~~3) Measurement devices installed prior to the effective date of this article that are certified to be accurate at least within ±10% by flow rate, velocity, or volume. After replacement of an existing measurement device, the new or replacement device must meet the requirements of paragraphs (b)(1) or (b)(2) of this section.~~

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An agricultural water supplier choosing to measure upstream of more than one customer delivery point~~an option under paragraph (b)~~ shall provide documentation in Agricultural Water Management Plans submitted pursuant to Water Code §10826 of (A) and (B) as follows:

A) Customer delivery points meet any of the following:

(i) The agricultural water supplier does not have legal access to the customer delivery point to install, measure, maintain, operate, and monitor the measurement device, or;

(ii) The agricultural water supplier determines that the flow rate or velocity through a customer delivery point varies during the calendar year, either due to crop agronomic requirements or the capabilities of the supplier's distribution system, such that no single measurement device is capable of meeting the accuracy standards under §597.3(a) for the year as a whole, or;

(iii) The agricultural water supplier determines that it is not technically feasible to measure and meet the accuracy standard of 597.3(a), where the finding of technical infeasibility has been reviewed and certified by a registered Professional Engineer.

And,

B) The methodology the agricultural water supplier uses to apportion the quantities of water delivered to individual customers must meet all of the following criteria:

(i) Account for differences in water use among individual customers, using information that shall include recording the time at which each individual customer's delivery starts and ends, and that may also include, but is not limited to, irrigated acreage, crop, and on-farm irrigation system, and account for variances in a customer's use throughout the year, and;

(ii) Be sufficient~~adequate~~ for establishing a pricing structure ~~for water customers~~ based at least in part on quantity delivered, and;

(iii) Be formally approved by the agricultural water supplier's governing body (e.g., Board of Directors).

Note: Authority cited: §10608.48, Water Code. Reference: §10608, Water Code.

§597.4 Certification and Performance Requirements of Measurement Devices

a) Certification Requirements- Certification of an individual device or type of device as required in §597.3 shall be conducted and documented by any of the following:

i) Laboratory Certification – testing will be performed by an entity, institution, or individual that has obtained certification from appropriate organizations or accrediting institutions, or follow industry established protocols such as the National Institute for Standards and Testing (NIST) traceability standards. The results of laboratory testing shall be provided to the agricultural supplier in (1) manufacture's literature referencing the laboratory testing, or (2) laboratory reports documenting the testing results for the specific device or installation.

ii) Non-Laboratory Certification – certification may occur through either:
(1) a registered Professional Engineer shall approve either (a) the design and installation of an individual device at a specified location, or (b) a standardized design and installation for a group of measurement devices constructed at various locations. The results shall be in the form of a notice of the accuracy stamped and signed by the Professional Engineer,

Comment [JD2]: The assumption here is that there are no PE's on staff. I don't want to be obligated to contract this work out.

Or,

(2) an in-field test performed on a measurement device once installed by individuals trained in the use of field testing equipment~~, where results are reviewed and certified by a registered Professional Engineer~~.

~~The results shall be in the form ofprovided to the agricultural water supplier as (1) a notice of the accuracy stamped and signed by the Professional Engineer, or (2) results of the field test as stamped and signed by the Professional Engineer.~~

iii) Existing devices – field testing shall be done on a random basis for a~~f~~ statistically representative~~a~~ sample of existing devices~~, or some other methodology which sufficiently verifies the accuracy of the devices used.~~ All field testing~~, selected randomly to be statistically representative,~~ shall be performed by individuals trained in the use of field testing equipment. ~~It is recommended~~ If using a statistically representative~~the~~ sampling technique, it is~~e~~ recommended that the sample be no less than 10% of existing devices, with a minimum of 5, but not to exceed 100, individual devices for any particular device type. Alternatively, the agricultural water supplier may develop its own sampling plan using accepted statistical theory, or other methodology which provides verification of accuracies.~~calculations for determining a sample size required to achieve a 95 percent confidence interval such that the upper~~

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95% confidence limit on the mean of the sample meetsof +/- 0.1 on the proportion of devices meeting the accuracy standard. For example, field testing wherein the aggregate accuracy of multiple devices can be verified via comparison with a set of upstream or downstream devices may be used to identify compliance, provided that all farm gates within the reach are equipped with measurement devices.

Comment [RL3]: Justification: Where a district utilizes measurement devices, that when installed met the requirements of §597.3(a) and (b), can verify accuracy by comparing the District's aggregate metering records to upstream metering. For example, where a district can measure volumetric flow into and out of a reach section and verify the difference in flow (farm gate diversions) by aggregating all farm gate measurements for the same period.

iii)

If, during the testing of sampled devices, more than one quarter of the devices tested for any particular device type do not meet the criteria pursuant to §597.3(a), the agricultural water supplier shall provide in its Agricultural Water Management Plan a plan to test an additional 10%, with a minimum of 5, but not to exceed an additional 100 individual devices for that particular device type. Devices that do not meet the criteria pursuant to §597.3(a) shall be subject to corrective action as stated in §597.4 (b). This second round of testing and corrective actions shall be completed within three years of the initial sample. A schedule, financing plan and budget shall be prepared by the agricultural water supplier and reported in the agricultural water supplier's subsequent Agricultural Water Management Plan to be submitted by December 31, 2012.

For compliance under §597.3(b) above (measurement upstream of multiple points of delivery), all existing devices must be field tested.

The results of field tests must be reviewed and certified by a registered Professional Engineer. Water measurement device testing protocols and frequency of testing shall be according to best professional practices.

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b) Performance Requirements - All measurement devices, shall be correctly installed, maintained, operated, inspected, and monitored as described by the manufacturer, laboratories or individuals certifying the device and pursuant to best professional practices. Water measurement device testing protocols shall protocols and frequency of testing shall be according to manufacturers or design specifications and following best professional practices.

Comment [RL4]: The frequency of test should be included in the manufactures instructions. Therefore, restating frequency is redundant. Also there is concern that DWR could make an interpretation of frequency that would cause additional burden to the water suppliers.

If, as part of an agricultural water suppliers maintenance and operations protocols, an installed device is determined by the agricultural water supplier to no longer meet the performance requirements in §597.3(a) or §597.3(b), then the agricultural water supplier shall take appropriate corrective action, including but not limited to repair or replacement to achieve the requirements of this article.

Records to document compliance with the requirements in §597.3 shall be maintained by

the agricultural water supplier for at least 5~~10~~ years. The records shall include at a minimum: documentation of certification for ~~an individual~~ devices or types of devices as necessary to indicate compliance with §597.3, and additional device-specific data where warranted including date of inspection, maintenance, repairs, calibrations, and adjustments to measurement device.

Comment [JD5]: 10 seems overly cumbersome and 5 seems to align nicely with our AWMP requirements.

§597.5 Demonstration of Certification and Performance

Agricultural water suppliers subject to this article shall demonstrate the certification and performance of measurement devices by summarizing the program and submitting documents in its Agricultural Water Management Plan, pursuant to §597.4, as follows:

a) Describe the agricultural water supplier's water measurement, certification, and performance evaluation program, including but not limited to:

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~~a) i~~~~Submit documents demonstrating certification for each device or type of device for all devices or device types not previously reported in a prior Agricultural Water Management Plan.~~

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~~b)~~

) A summary of devices used and how they comply with §597.3. For devices identified as out of compliance with the accuracy criteria pursuant to §597.3, which an agricultural water supplier is unable to bring into compliance before the Plan is finalized, a schedule, financing plan and budget for future corrective actions shall be provided.

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ii) For in-field testing, include a description of~~submit~~ the methodology for sampling and testing, and a~~the~~ summary of ~~testing~~ results.

iii) ~~, and a schedule, financing plan and budget~~~~documentation of protocols to addressing actions plannedtaken to resolve devices identified as not meeting the accuracy criteria pursuant to §597.3.~~

~~c)~~A description of best professional practices associated with the (1) collection of measured data and method of determining irrigated acres, (2) data quality control, and (3) for devices measuring flow rate or velocity, methods for determining volumetric quantities.

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~~i)~~1)For devices that measure flow-rate, the documentation will demonstrate protocols associated with the measurement of the duration of delivery, where volume is derived by the following formula: Volume = flow rate x duration of delivery.

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~~ii)~~2) For devices that measure velocity only, the documentation will demonstrate protocols associated with the measurement of the cross-section of flow and duration of delivery, where volume is derived by the following formula: Volume = velocity x cross-section flow area x duration of flow.

~~iii)~~3) For devices that measure water elevation at the device (e.g. flow over a weir or differential elevation on either side of a device), the documentation will demonstrate protocols associated with the measurement of elevation

where elevation is used to derive flow rate at the device. The documentation will further demonstrate protocols used to derive volume from the elevation values.

§597.6 Implementation

a) Existing Agricultural water suppliers shall implement the regulation as follows:

i) Agricultural water suppliers shall evaluate existing measurement facilities and practices; develop a schedule, financing plan and budget related to corrective actions needed to comply with this regulation (§597) by July 31, 2012, and report the findings in the Agricultural water supplier's Agricultural Water Management Plan (pursuant to §597.5) to be completed by December 31, 2012.

ii) Significant progress toward compliance with this regulation shall be completed and reported in the updated Agricultural Water Management Plan due December 31, 2015, along with an updated schedule, financing plan, and budget needed for completion of the modifications by December 31, 2020.

iii) Agricultural water suppliers which are completing the scheduled modifications established within their Agricultural Water Management Plans, and have measurement facilities, programs and practices in place which comply with this regulation by December 31, 2020, shall be deemed in compliance with this regulation.

b) Any Agricultural water supplier subject to this regulation (§597), which forms after its enactment, shall implement this regulation as follows:

i) Agricultural water suppliers shall evaluate existing measurement facilities and practices; develop a schedule, financing plan and budget related to corrective actions needed to comply with this regulation (§597), and report the findings in the Agricultural water supplier's Agricultural Water Management Plan (pursuant to §597.5).

ii) The schedule, financing plan and budget shall be developed to enable the Agricultural water supplier to comply with this regulation within 8 years. Significant progress shall be made toward compliance within the first 3 years, and documented in subsequent Agricultural Water Management Plans.

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