

ADMINISTRATIVE PROTOCOL AND FUNCTIONAL STANDARDS

Surface Water Headgates and Measuring Devices

This document addresses the minimum standards the Division of Water Resources (Division) considers in determining whether new headgates and measuring devices are “suitable and proper”¹ as required under sections 37-84-112 and 37-84-113, C.R.S. Structures replacing or significantly modifying existing structures are also subject to this standard. When constructing new or replacement headgates and measuring devices, a water user’s failure to comply with these minimum standards for suitable and proper headgates and measuring devices may result in the curtailment of diversions as provided for by statute.

Background

An owner of a surface water right is required by Colorado Revised Statutes (C.R.S.) to “establish some reasonable means of effectuating his diversion,” but he “is not entitled to command the whole flow of the stream merely to facilitate his taking the fraction of the whole flow to which he is entitled.”² Water right owners are also entitled to right-of-ways under Title 37, Article 86, for the purpose of diverting the legal entitlement of their water right and transporting the water to its places of use.

Section 37-84-112(1), C.R.S., requires that the “owners of any irrigation ditch, canal, flume or reservoir in this state, taking water from any stream, shall erect where necessary and in good repair, at the point of intake of such ditch, canal, flume, or reservoir, a suitable and proper headgate of height and strength and with embankments sufficient to control the water at all ordinary stages and suitable and proper measuring flumes, weirs, and devices....” The State Engineer understands the phrase “sufficient to control the water at all ordinary stages” to mean a permanently installed structure that:

- has an adjustable, lockable opening in combination with the necessary embankments, diversion dam, spillway, waste gate or sluice system or other comparable system that prevents ANY diversion of water, intentional or otherwise, when the water right(s) associated with the structure is not in priority;
- allows the Water Commissioner or persons directed by the Water Commissioner to accurately adjust the flow of water when the water right(s) associated with the structure are in priority with reasonable effort and within a reasonable amount of time;
- can be locked or secured at the adjusted condition so as to prevent any unauthorized adjustment; and,
- accomplishes the foregoing requirements at all water levels below the normal high water mark of the stream.

¹ §37-84-112(1), C.R.S.

² §37-92-102(2)(b), C.R.S.



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The language of §37-84-113, C.R.S., acknowledges that a natural stream may be used as a conduit for owners of water rights to use the stream to deliver their water.³ In order to effect such delivery, water users seeking to use the natural stream to deliver water *“shall construct suitable and proper measuring flumes or weirs, equipped with self-registering devices if required by the state engineer, for the proper and accurate determination of the amount and flow of water turned into, carried through, and diverted out of said natural stream”⁴ (underline emphasis added).*

Noncompliance with the provisions of sections 37-84-112 or 37-84-113, C.R.S., *“shall, during such noncompliance, forfeit the right to divert water into any canal or to impound water in or deliver water from any reservoir.”⁵* Under section 37-92-502(5)(a), C.R.S., the State and Division Engineers are also authorized *“to order any owner or user of a water right to install and maintain at such owner’s or user’s expense necessary meters, gauges, or other measuring devices and to report at reasonable times to the appropriate division engineer the readings of such meters, gauges, or other measuring devices.”*

The construction of headgates and related structures for the diversion of water from a stream is also subject to Section 404 of the Clean Water Act, which is administered by the U.S. Army Corps of Engineers. When erecting headgates and measuring devices, water users are responsible for ensuring compliance with all state and federal laws and nothing in these guidelines affects that responsibility.

Past Practice

Many headgates and related diversion structures for senior water rights were built when there were few or no needs or requirements to deliver, or bypass, water past senior diversion structures that were historically entitled to divert or “sweep” the entire flow of the stream. Today, an increasing number of water users need to deliver water past senior diversion structures for augmentation and other purposes.

As delineated in statute⁶, the state engineer has required the owners of water rights who want to use the stream as a conduit to build the measurement flumes, weirs or devices required to administer their water deliveries, including the delivery of water past intervening water rights that are drying or “sweeping” the river. While the practice of compelling water users to provide the necessary bypass structures and measurement devices required to administer their water is considered an equitable way to address new deliveries of water past existing structures, the administrative need can also be effectively addressed when new or replacement headgates and measuring devices are constructed.

³ *Trail’s End Ranch, LLC v. CO DWR*, 91 P.3d 1058 (Colo. 2004).

⁴ §37-84-113, C.R.S.

⁵ §37-84-116, C.R.S.

⁶ §37-84-113, C.R.S.

Minimum Standards for New and Replacement Headgates and Measuring Devices

As new or replacement diversion or measurement structures are built, including such structures that may be entitled, at certain times of the year, to divert the entire natural flow of the stream, the Division will consider the following minimum standards in determining whether such headgates and measuring devices are “*suitable and proper*” as required under sections 37-84-112 and 37-84-113, C.R.S.:

1. The diversion structure must either include an integrated measurement structure or have a consistent, direct correlation to a separate measurement structure. The measurement structure must be capable of accurately measuring⁷ the volume of water being taken out of the stream in accordance with the associated water right(s).
2. The measurement structure, if it is an open channel device that correlates stage to discharge, must be equipped with a primary stage reference device that is:
 - a. properly located and calibrated as required by the structure’s design specifications and permanently affixed to the structure;
 - b. marked in feet, tenths of a foot and hundredths of a foot increments;
 - c. reasonably accessible; and,
 - d. maintained in good, readable condition.
3. The measurement structure, if required to have a self-registering device, must use a digital flow recorder that meets the following requirements:
 - a. be able to communicate via Pocket PC compatible handheld device (Windows CE Operating System) and Windows based Laptop;
 - b. be capable of recording data at a minimum of 15 minute intervals;
 - c. have a local display that shows current stage and battery voltage;
 - d. have a permanent, non-erasable log capable of holding a minimum of 180 days of 15 minute data before overwriting (log wrapping) or download;
 - e. have a real time, internal clock with battery backup;
 - f. use off-the-shelf batteries commonly available at the local hardware store.

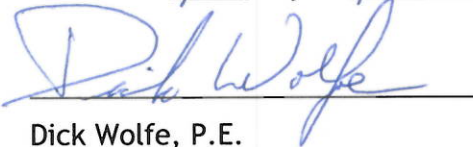
In addition, digital flow recorders with the following capabilities are preferred:

- g. allow interrogation from the front panel and NOT require a Laptop or handheld device to be set up;
- h. include a local display that shows instantaneous discharge rate and daily discharge volume; and,
- i. include an event log that shows changes to the set up.

⁷ For the purpose of surface water measurement through an open channel, the division considers a measurement structure is “accurately measuring” water if the recorded measurement is $\pm 5\%$ of the stage-discharge rating approved for use by the division engineer.

4. The digital flow recorder, if required, must be capable of being connected via telemetry or other media to the state engineer's surface water flow network whereby the 15 minute flow data can be immediately accessible via the internet.
5. The diversion structure must be able to safely pass the volume of flow in the river to which the associated water right(s) is either not entitled or chooses not to divert.
6. New or replacement headgate structures and measuring devices that fail to comply with these minimum standards may be subject to curtailment orders under §37-92-502, C.R.S. It is strongly recommended, therefore, that the Division Engineer and Water Commissioner be consulted prior to procurement and installation of any measurement structure or self-registering recording device.

Dated this 4th day of November, 2013.



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