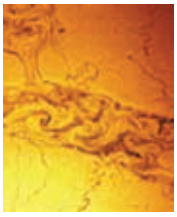
SDA
Special District Association of Colorado
March 2007
newsletter

Clifton's Clean Water Leading-Edge Technology Incorporated to Ensure Superior Water Quality

Guest Article by Colorado Public Works Journal



Colorado's many high-mountain lakes and streams are magnificently pristine and captivating. Whether just fallen rain, melting snow pack or groundwater from a spring, the water is pure and only beginning its life on earth. Colorado's myriad sub-basins drain into one of four major watersheds, the largest of which is Rio Colorado. Flowing from 9000 feet elevation in Rocky Mountain National Park, the Colorado River and its many tributaries manage the fourth largest runoff volume of all rivers in North America.

Upper Colorado water is as fresh as river water gets, yet as its Spanish name implies, the mighty river is often red in color. It's a river's job to move sediment, and as its flow sporadically increases in velocity from storm events, so does the amount of sediment moved. Erosion also plays a major role, beginning within the confines of Glenwood Canyon and continuing through the Grand Valley and the extraordinary geographic formations of Book Cliffs in the Colorado Plateau. Rainfall along the river's corridor erodes the differently-colored soils, muddying the river with sediment. Measure of the cloudiness of the water is known as "turbidity."

"Our staff can pretty much tell where the latest thunderstorm was centered just by looking at the color of our influent," says Dale Tooker, manager of Clifton Water District, located on the eastern edge of Grand Junction. "Our raw water supply, which comes entirely from the Colorado River, routinely has high levels of turbidity."

That's the truth! Samples have measured as high as 60,000 turbidity units. The allowable standard for drinking water, as set by the EPA, is 0.30 units. Clifton Water District is celebrating the coming on-line of its new pre-treatment facility at the Charles A. Strain Water Treatment Plant that is making cleaning the water to potable standards a much more efficient process. The District's continuing high level of service is attributed to a capable and dedicated staff supported by a progressive and proactive Board of Directors.

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inside march

Application for Exemption from Audit

Guest article by Kevin Collins, Clifton Gunderson, LLP

The deadline for Colorado local governments, including special districts, to file an Application for Exemption from Audit ("Application for Exemption") is fast approaching. The Application for Exemption must be filed with the Office of the State Auditor on or before March 31, 2007,[1] and there is no provision in state statute for an extension of time. If an eligible special district does not file an Application for Exemption by March 31, 2007, then it is presumed that the special district will file audited financial statements for the year ended December 31, 2006 no later than July 31, 2007.[2]

Applications for Exemption are not automatically approved. The Office of the State Auditor reviews each Application for Exemption and makes an individual determination whether to grant an exemption from audit or to require the special district to undergo

[1] The Application for Exemption is due within three months after the close of the local government's fiscal year. The March 31deadline assumes a fiscal year ending December 31.

[2] Extensions to September 30 for filing the completed audit may be approved in certain circumstances.

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Clifton's Water

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Clifton Water District was formed in 1951 to serve a portion of the Grand Valley population not being serviced by the cities of Grand Junction or Palisade. While there is no town, Clifton is a distinct area with a population of around 35,000 and an estimated 12,000 plus equivalent residential units served by several special districts, including sanitation and fire as well as water. There are few businesses and no multi-family residences of more than four within the Clifton community, making providing civil services a little bit easier. In January of this year, the Water District celebrated activation of its 10,000th active tap.

"When the Water District first began operation," Tooker says, "it served 351 active taps and produced around 95,000 gallons of potable water each day. Today's 10,000 active taps require us to treat as much as 8 million gallons per day or around 1.2 billion gallons annually."

Treatment first and foremost means removing suspended and dissolved solids to lower the water's turbidity. The influent enters Clifton's facilities primarily through the Grand Valley Canal but can also be pumped directly from the river. Raw water first enters the 3.7-million-gallon primary settling pond, where it remains as long as it can until demand calls for its processing. If demand is 3.7 MGD, then the water settles in the pond for 24 hours. If the demand is less, then detention time is proportionately longer and vice-versa.

"We are in the design phase of developing two more cellular-type ponds that will increase our pre-sedimentation capacity by about 11 million gallons," says Water Treatment Plant and Laboratory Superintendent, Dave Payne. "Our current pond design has proven to be very effective under extreme turbidity events, usually removing over 95 percent of the turbidity load when raw water turbidities are in excess of 5,000 NTU, and going as high as 60,000 NTU in the past."

Before the new pre-treatment facility project was completed this summer, Clifton Water District utilized its conventional treatment plant, capable of producing 12 MGD when it was constructed in 1979. The facility had recently been derated to 8 MGD due to both more stringent regulations requiring increasingly cleaner water and the existing limitations of the late 1970s era pre-treatment process. The District's goal with this most recent capital project was to restore plant capacity to 12 MGD, improve water quality and provide additional capacity for future demands.

In 1997, the District completed the addition of a reverse osmosis and nanofiltration plant. Manufactured by GE Osmonics, the technically-advanced system uses spiral-wound membrane elements to remove minerals, effectively softening the water. The RO and NF process serves as a final "polishing" step for the already-treated water to meet current drinking water standards and also yields significant benefits for the District by fostering compliance to the Disinfection By-products Rule and the Enhanced Surface Water Regulations.

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In 2003, the District embarked on an $8.5 million plant optimization strategy to increase potable water storage and improve the existing treatment process by adding a post-treatment chemical facility and a new pre-treatment facility in an effort to bring total plant capacity up to 16 MGD. A new 3.9-million gallon steel tank was completed in 2004. Phase I of the treatment process upgrades followed, involving construction of the chemical handling facility, which was completed in the spring 2005. Phase II constituted construction of the new pretreatment plant, which has been in full operation and testing mode since August.

"The new pre-treatment plant is a vital tool in effectively treating water from the Colorado River," Payne says. "The turbidity of the water makes treatment with conventional processes difficult. RO and NF offer an additional treatment process that is not often found in most conventional facilities. As a result, our water treatment process results in the highest water quality available."

Clifton Water District hired Burns & McDonnell to engineer and design the chemical and pre-treatment facilities and oversee construction. Garney Construction served as the general contractor, completing the project $200,000 under budget.

"The facility consists of two chemical coagulant storage and feed systems," explains Mark Lichtwardt, P.E., Burns & McDonnell's project manager for the Clifton project. "The primary means of controlling chemical coagulant feed rates is through the

use of streaming current technology, which monitors changes in influent water quality and continuously and automatically adjusts the amount of coagulant added. The technology is critical for treating a raw water source that has such variable water quality."

Rapid mixing of the coagulant destabilizes the raw water instantaneously, and the particulate matter, known as "floc," agglomerates in the flocculation basin. As the floc particles become larger, mixing intensity is lowered to keep the particles intact. Moving into the sedimentation basin, the water and floc separate via gravity, where the settled solids are removed by a cable-driven collection system. Gravity sand filters complete the pre-treatment process.

"The new pre-treatment facility system is working so well, the water being produced from the sedimentation basin prior to filtration meets the turbidity standards, and that is something that we have never experienced before," says a proud Tooker, who is in his 10th year as manager and his 26th overall with the District. "We rely on nanofiltration and reverse osmosis to provide us with that last significant treatment step that sets us apart from all the other conventional water treatment plants.

"Technologically, we're ahead of the curve," he continues, "but I'm not sure we planned it that way. We have prepared ourselves for more stringent water quality regulations, and that's because of the support and leadership our Board of Directors has always provided. Clifton Water District has operated for the past 22 years without property tax revenues for water service, receiving all funding through water sales and tap fees. We build reserves for capital improvement projects from the revenues from new tap sales while our water sales revenues are allocated to operational day-to-day expenses. Our Board remains committed to utilizing effective rates and fees to successfully operate the District."

On the not-too-distant horizon for Tooker and his team is conversion of the now retired flocculation and sedimentation area of the older plant into a submerged membrane treatment facility, which will bring the entire facility up to a capacity of 16 MGD and potentially provide up to 30 MGD filtration capacity. The District is committed to and fully intends to continue the pursuit of applying leading-edge treatment technologies to provide superior drinking water to its growing number of customers.