BIG WAVE
WATER TECHNOLOGIES

CASE STUDY
WALNUT, CA
MAY 2021

TIDAL WAVE MIXERS ASSIST WALNUT VALLEY WATER DISTRICT WITH MAINTAINING HIGHER CHLORINE RESIDUAL BY ELIMINATING NITRIFICATION AND THERMAL STRATIFICATION IN RESERVOIRS

OVERVIEW

The Walnut Valley Water District, located in Walnut, CA, encompasses an area of approximately 29 square miles, and serves customers in six communities with over 27,000 service connections. The District's present service areas include The City of Diamond Bar, portions of the cities of Industry, Pomona, Walnut, and West Covina, and the easterly section of the unincorporated area of Rowland Heights. The District is dependent on surface water that is transported through two major conveyance systems: the 242-mile-long Colorado River Aqueduct and the 444-mile-long State Water Project. Walnut stores approximately 50 million gallons of potable water daily within their 28 reservoirs.

Walnut strives to maintain total chlorine residual levels ranging from 3.30 – 3.70 PPM within their reservoirs; however, they found their reservoirs were being impacted by a combination of environmental factors that led to decreased chlorine residual. The surface water's naturally occurring ammonia, nitrites, and nitrates led to nitrification within the reservoirs. In addition to nitrification, the reservoirs became stratified due to higher temperatures during warmer months which average over 80˚ F throughout the year.

Walnut pursued reservoir mixing to address the chlorine residual loss and utilized mixers from several manufacturers with varying degrees of success. Chlorine residual improved but was not consistently maintained, and Walnut recorded fluctuating levels of chlorine within various reservoirs. Walnut speculated the fluctuating chlorine levels were partly due to premature failure of the mixers. Tom Hunt, Production and Storage Supervisor for The Walnut Valley Water District, recalls, "We had to make sure the mixers were still running because it was not apparent by visual inspection.

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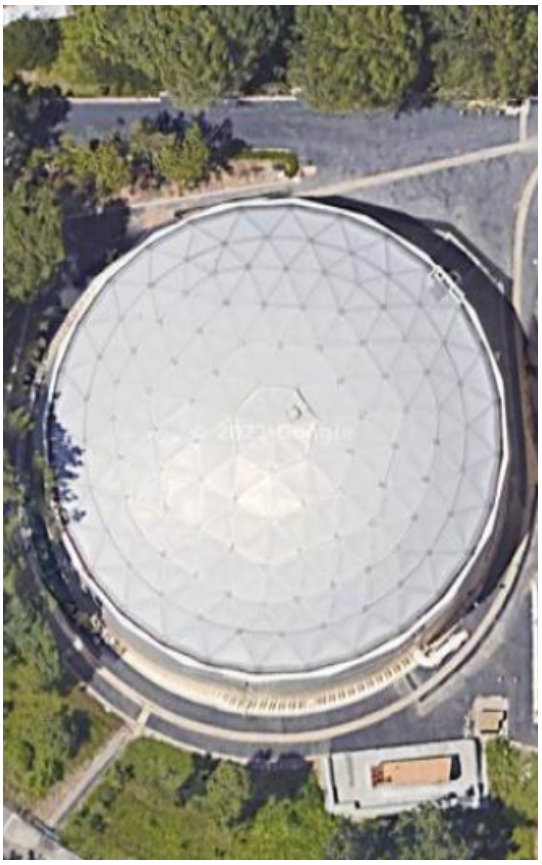
The lack of dependability with the various mixers created an additional challenge for Walnut. Walnut operators had to frequently remove mixers from their reservoirs for repair or replacement. Hunt states, “It’s a logistical nightmare getting those mixers on top of the reservoir.” Removing and installing mixers posed a safety risk to operators due to their heavy weight. This was dangerous for the operators because these mixers commonly weigh over 60 pounds, and all of Walnut’s reservoirs are over 30 feet tall.

APPROACH



Due to the inconsistency in performance of Walnut’s previous mixers, Walnut chose to demo The Tidal Wave Mixer manufactured by Big Wave Water Technologies, Inc. Walnut installed a demo Tidal Wave Mixer into Ambushers reservoir in July of 2020. Ambushers reservoir is a 1.5-million-gallon stand-alone steel reservoir that had decreased total chlorine residual levels ranging from 1.20 - 1.50 PPM. The District was immediately impressed with the turbulence in the water when The Tidal Wave Mixer was powered on. Hunt remembers, “My lead operator called me after he installed it and said, ‘You have to see this…it looks like a jacuzzi.’ The powerful mixing observed by Walnut was reflected in their chlorine residual samples, and Walnut discovered that within 24 hours of the Tidal Wave Mixer being installed the total chlorine residual for Ambushers reservoir had increased to 2.20 PPM.

Following the successful demo, Walnut purchased Tidal Wave Mixers in September of 2020 to address increased nitrite levels and decreased chlorine residual within two of their reservoirs. Mixers were installed directly under the hatch in both reservoirs, and nitrite and total chlorine samples were retrieved approximately 50 feet from the mixers prior to powering them on. The first mixer was installed in Pioneer, a 2.4-million-gallon stand-alone steel reservoir in October of 2020. Prior to powering on the mixer, Pioneer indicated increased nitrite levels of 0.022 PPM, and decreased total chlorine residual levels of 1.55 PPM. The second mixer was installed in Chestnut Hill, a 1-million-gallon stand-alone steel reservoir in October of 2020. Chestnut Hill had an increased nitrite level of 0.014 PPM and a decreased total chlorine residual level of 1.51 PPM prior to powering on the mixer.

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RESULTS

Nitrite and total chlorine residual levels measured 24 hours after installing The Tidal Wave Mixer indicated improvement in both Pioneer and Chestnut Hill reservoirs. Pioneer's nitrite level decreased from 0.022 PPM to 0.004 PPM, and total chlorine residual increased from 1.55 PPM to 2.52 PPM. Chestnut Hill's nitrite levels decreased from 0.014 PPM to 0.003 PPM, and total chlorine residual increased from 1.51 PPM to 2.64 PPM (Figure 1). The improved conditions were achieved by mixing exclusively without additional sodium hypochlorite. Hunt states, "We didn't add any chemical directly into either Chestnut Hill or Pioneer. - we didn't do anything differently…the mixing is absolutely valid, and we think so highly of it that every one of our reservoirs will have Mixers in them."

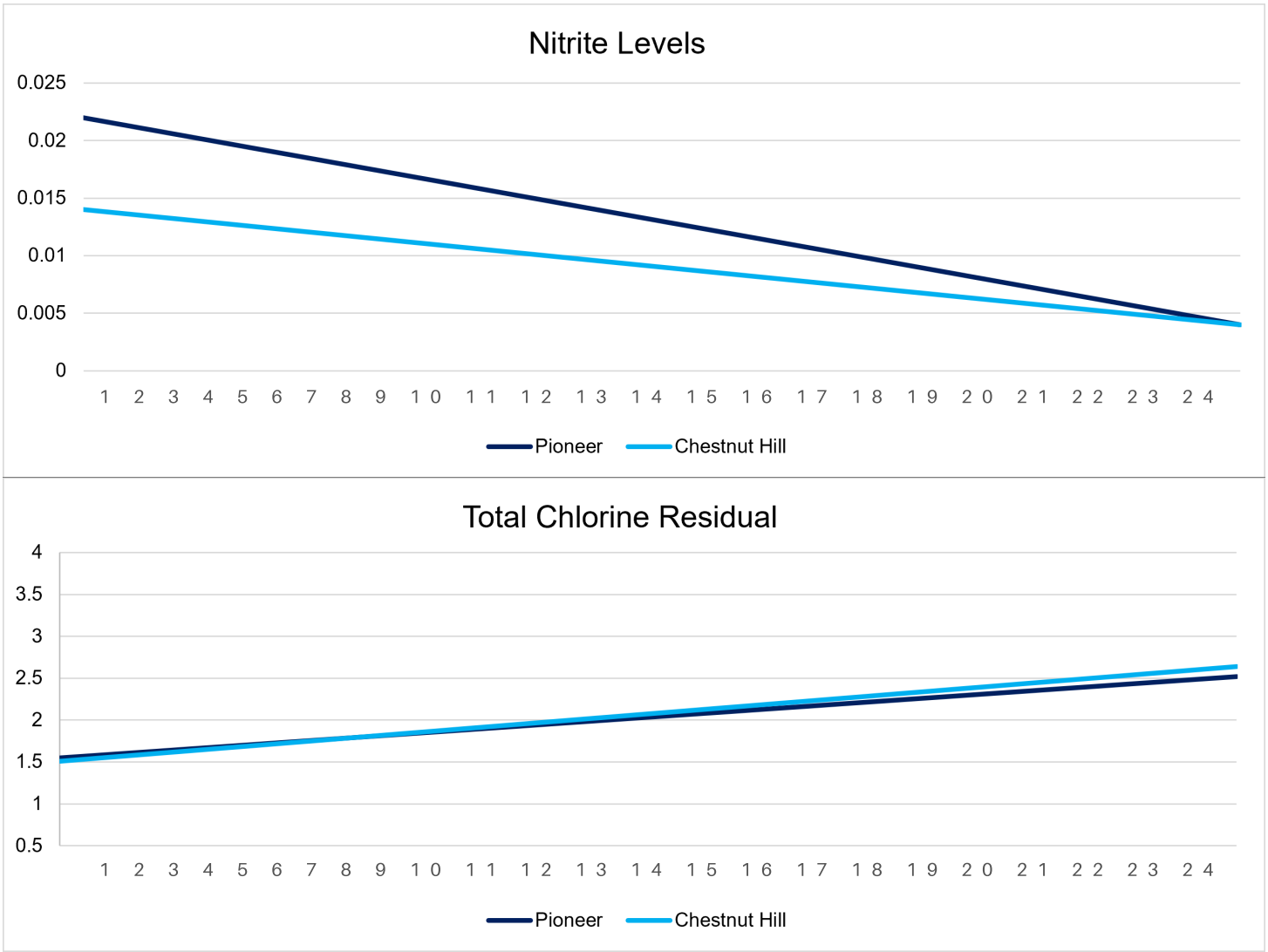

Figure 1: Nitrite and total chlorine residual levels taken 50 feet from The Tidal Wave Mixer.

CONCLUSION

Correcting nitrification and stratification issues can be difficult and costly without an effective mixer. The Tidal Wave Mixer has provided The Walnut Valley Water District with an economical and reliable alternative to mixing that addresses these issues. Walnut has continued to maintain increased total chlorine residual levels and decreased nitrite levels in Pioneer, Chestnut Hill, and Ambushers reservoirs since installing The Tidal Wave Mixer. They have also been able to purchase additional mixers because of the mixers competitive price. “The cost is the greatest thing. We are getting a better performance for a cheaper cost and we can’t go wrong there.” claims Hunt.

“We didn’t directly add any chemical - we didn’t do anything differently…the mixing is absolutely valid, and we think so highly of it that every one of our reservoirs will have Mixers in them.”

-Tom Hunt
Production and Storage Supervisor for The Walnut Valley Water District