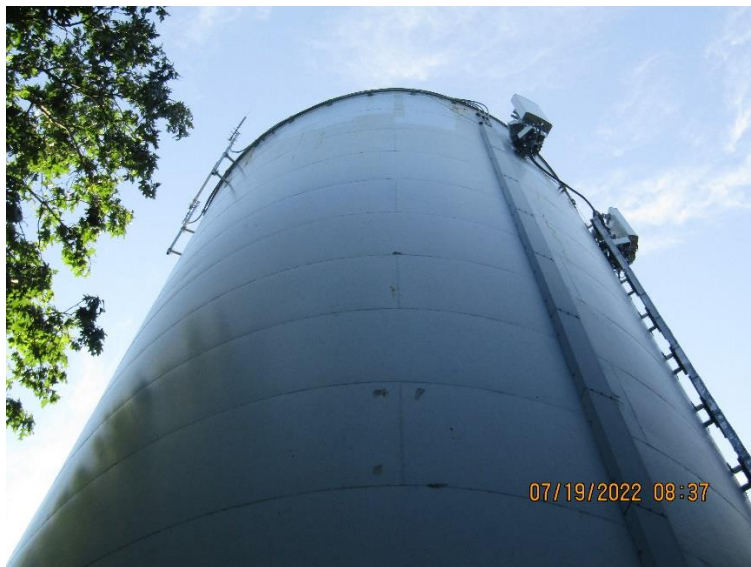




The following is an actual case study of a water standpipe stratification and mixing study utilizing the Big Wave Water Tidal Wave Mixer.

Subject Tank:

Welded steel standpipe 102-ft tall and 35-ft diameter. Single combined inlet/outlet pipe in tank floor.



On July 25th, 2022, CorrTech representatives installed Hobo underwater temperature data loggers in the tank through the roof hatch. A total of 8 loggers were suspended 10 feet apart starting at the floor of the tank going all the way up to the just below surface water level. The loggers began recording temperature readings (°F) at the 10-foot intervals throughout the tank at 12:00pm on July 25th and continued to take readings every 10 minutes. The loggers were left in the tank for 48 hours to collect the data for with the tank operating normally.

Data Executive Summary

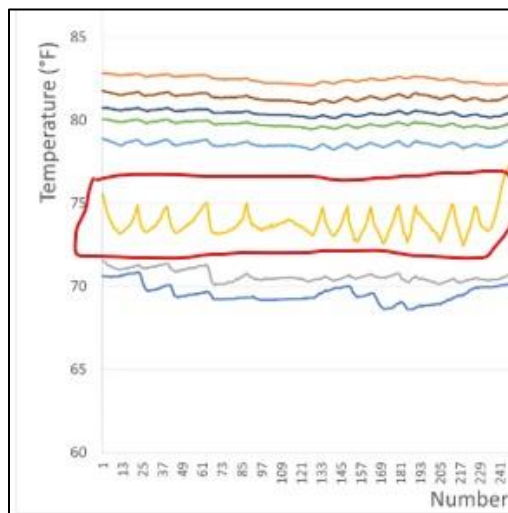
Each colored line 1-8 represents a temperature recorder at a different depth of the tank. Blue line 1 represents the floor of the tank. The grey line 2 is 10 feet above the floor of the tank. The yellow line 3 is 10 feet above the grey line 2. This pattern continues to the orange line 8 which is just below the surface level. Temperature data clearly shows the tanks is stratified with a temperature range from 68-83 degrees F. The only zone in the tank showing any mixing under normal tank operation is approximately 20-22 feet above the floor represented by the yellow trace.

At the 289-minute mark the mixer was energized. It is clear that once the mixer is energized it only took about 6-8 hours for all of the water in the tank to become the same temperature at about 77 °F. The water temperature was uniform for the following 48 hours while the mixer was operating. Therefore, we know that even when new cold fresh water was introduced to the tank it was immediately mixed completely with all of the old water before being sent back out of the tank.

The fully mixed tank as indicated by uniform temperatures ensures that chlorine residuals in the water are uniform and that even during heavy draw on the tank the system is always getting consistent water quality.

Data Details:

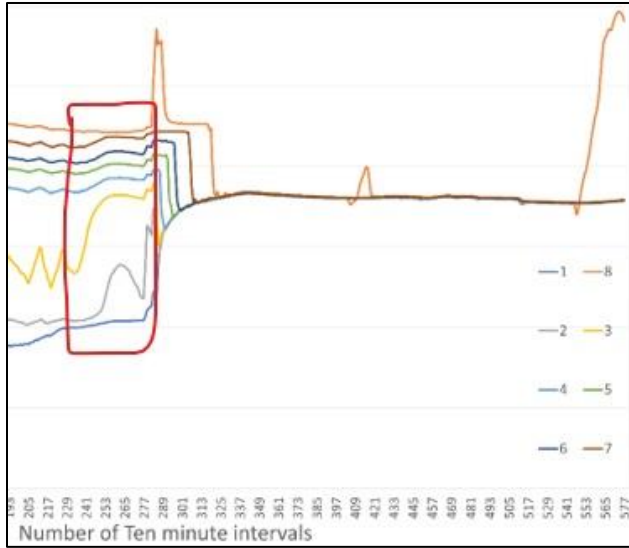
Fig. 1.1



Highlighted to the left shows that the depth at logger 3 is about as far as the fresh cold water gets into the tank. The water entering the tank will get up to that depth of around 20 feet from the floor, mix and fluctuate slightly then be taken out as needed. This further confirms that the hot water at the top of tank is becoming stagnant and not being sent out of the tank for extended periods of time.

The increase in temperature of nearly all the loggers at the 253-interval mark (circled below) is due to the fact that we had to raise all of the loggers about 5 feet before energizing the mixer so that they did not hit the mixer.

Fig. 1.2



The abnormalities on the top orange line stem from the top data logger coming out of the water when tank levels dropped. Because the temperature of the air was greater than that of the water it caused the spikes you see on the orange line.