



Collection System Aeration and the Microbial Benefits

By
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In late 2015 Reliant Water Technologies introduced the Wet Well Wizard, an aeration tool for the wet wells in collection systems. During 14 months of field testing the patent pending Wizard System, the primary objectives were to eliminate FOG (fat, oil and grease) caps and to reduce H₂S, eliminating it if possible. All trials were proven excellent with very few changes to the product that eventually was introduced to the collection system market.

Now, after a number of months with customer owned Wizards in collection systems around the US and several countries, more is being learned about the opportunities of the Wet Well Wizard system. We are receiving increasing reports about –

1. Common FOG caps up to 5' thick being emulsified in under 3 days (most thinner caps within 24 hours) – never to return again.
 - Complete return on investment in this application, if vacuum trucks had been previously rented, in under 8 weeks.
2. H₂S being completely eliminated, as long as the well using the Wizard system was the primary source of the H₂S generation. For wells that had carryover H₂S from upstream wells, once a Wizard system was installed in the upstream well, H₂S was totally eliminated.
3. A number of small towns, with small collection systems where several Wizard systems are being used just prior to the wastewater plant, customers quickly noticed that the head-works, or bar screen areas of their wastewater plants were suddenly experiencing reduced odor.

The first two bullets above were expected results, as these were our goals during the months of field testing that began in 2014. But now, with the reports of bar screen odor reduction/elimination, we are beginning to understand the true value of turning the microbial population in a collection system to a totally aerobic population.

During the trials, it was determined that the elimination of FOG caps required a very aggressive aeration technology, thus the development of the unique, patent pending, Wizard. At the same time, we knew that we would increase the dissolved oxygen (DO) in the well and the water leaving that well. We expected this increased DO to have the effect of transitioning the anaerobic microbial population into an aerobic population – eventually making the well a place that H₂S could not survive. Again, this was achieved and we continually experienced lift stations and sewer lines losing their odor downstream – never to return, as long as the Wizard were continually operational.

Part of our testing, besides photos of the FOG cap destruction and metered testing of H₂S reduction, was the measurement of the ORP of the wet wells throughout the trials. The ORP measurements provided a view of the various time lines required for the microbial populations to transition from anaerobic to aerobic populations. ORP and H₂S work hand-in-hand in providing information on whether the wet well microbes are providing the necessary BOD removal. Differences varied with wet well sizes, lift station locations within a community, and various pumping intervals used in each lift station. But, as long as the Wizard was kept operational – the population always made the transition to a stable aerobic population. And, an interesting side note was that the water in each lift station became more “clear” over time. Certainly, floating non-dissolvable debris would stay on top of the water, but the water clarity itself was quite noticeable. See **Figures 1 & 2**.

Town 7 (2700 Population) Wiz Trials - DO

NOTES

- (1) 1.4 Mi between LS 4 to LS 3; .9 Mi between LS 3 to LS 2
- (2) LS 4 had a 9" grease cap on 5/12 - No grease cap on 5/13
- (3) LS 3 had a 15" grease cap on 5/12 - No grease cap on 5/13

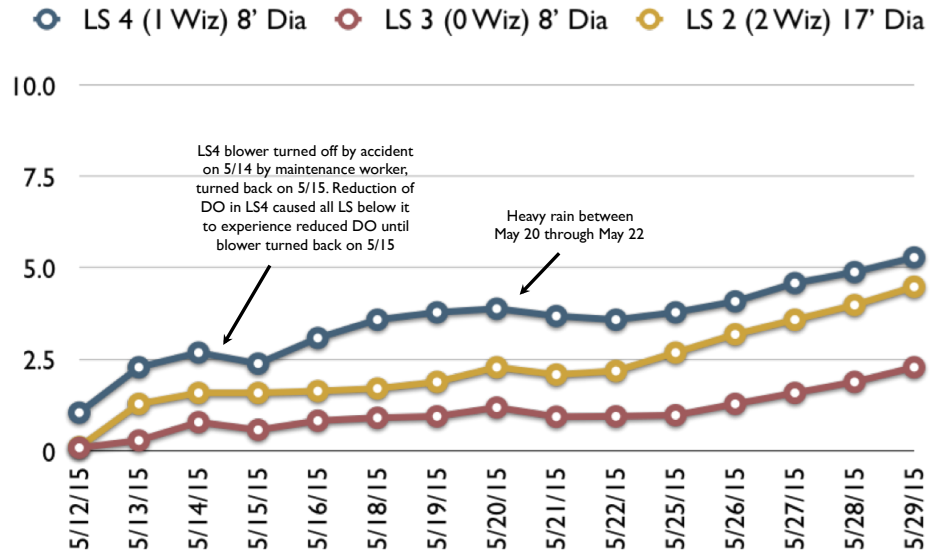


Figure 1

Town 7 (2700 Population) Wizard Trials - ORP

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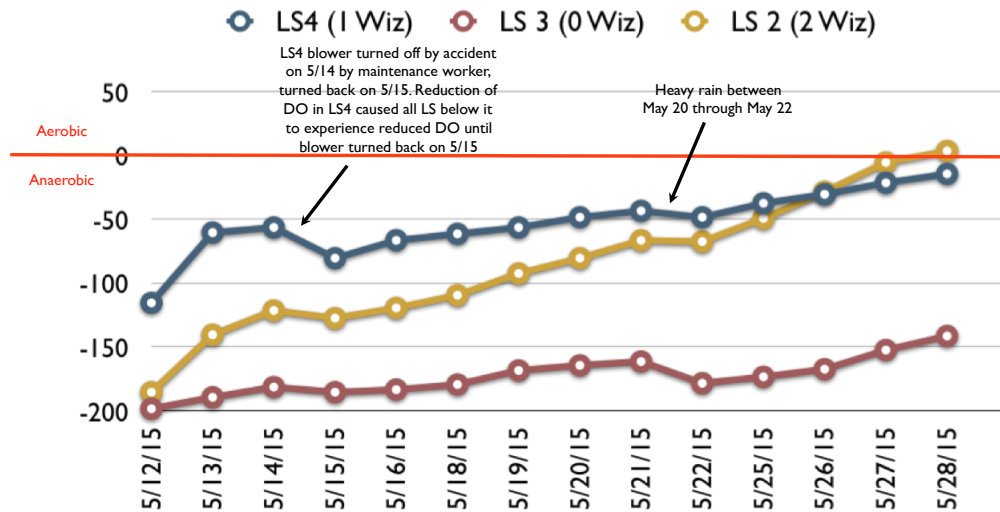


Figure 2

Now, in hindsight, and with customers returning for more Wizard systems for other lift stations and sewer wells, we are hearing stories like the ones noted above – bar screen and headwork facilities not only losing odor characteristics, but when tested, a relatively high dissolved oxygen in the water moving through the head-works.

While it is still too early to determine, the indications are that using the Reliant Wet Well Wizard in various troubled lift station and sewer wet wells through out a towns collection system, could reliably – and inexpensively – provide pre-treated wastewater to the wastewater plant. A very quick Return on Investment has already been demonstrated in many installation, but if it can be proven that the water leaving the collection system can be, even partially, pre-treated, with a responsible level of dissolved oxygen, the savings to the operation of wastewater plants could be quite respectable.