

Reducing H₂S and FOG at the Discharge of a Force Main

by Frank Haltom, PE

Beginning early in 2019 our office began receiving complaints of sewer odor in the neighborhood of Fountain Ridge Section III (FR III), located in Prince George County VA. The County Operations staff investigated the wastewater collection system that serves the neighborhood, and found that odor was proliferating throughout the neighborhood. Corrosion of the sewer manholes was clearly evident.

There are 526 total homes from four neighborhoods that gravity flow to three terminal pump stations and one lift station. The three terminal stations discharge to a common interceptor force main. This interceptor is four miles of 10" and 12" PVC pipe that discharges to the gravity system at FR III. Additional direct connections to the interceptor include 2 commercial/retail parcels: a gas service station with a car wash, and a restaurant.

A hydrogen sulfide (H₂S) gas monitor was installed on 10/30/2019 inside the manhole where the force main discharges and transitions to a gravity system within FR III. Data was collected continuously for one week. The initial reading indicated a weekly average H₂S level of 250 ppm and a peak level of 1167 ppm.

The County purchased a Reliant Water Technologies Wet Well Wizard air ejection system that was subsequently installed on 11/18/2019. The unit was installed in the lift station, which was experiencing anaerobic conditions, evidenced by the 4-6" layer of fats, oils & grease (FOG). The three terminal stations did not have FOG buildup so only one Wizard device was used to begin the effort to reduce the H₂S at FR III. Within 14 days of installation, the Wet Well Wizard system was able to eliminate nearly all of the FOG by keeping the wet well in a constant aerobic state.

The H₂S monitor continued to collect data for four weeks after the installation of the Wizard Sy producing the following data:

10/30 – 11/8: Avg H₂S level= 250 ppm, peak of 1167 ppm

11/8 – 11/21: Avg H₂S level= 185 ppm, peak of 870 ppm

Aeration unit installed on 11/18

11/21 – 12/5: Avg H₂S level= 60 ppm, peak of 772 ppm

12/5 – 12/10: Avg H₂S level= 48 ppm, peak of 496 ppm

12/10 – 12/17: Avg H₂S level= 27 ppm, peak of 235 ppm

See Figure 1

The use of the Reliant Wet Well Wizard has caused the wet well to remain in a constant aerobic state. As a result, the entire wastewater collection system has experienced reduced H₂S levels. By eliminating the FOG within the wet well of the lift station, the costs of a vac truck have been avoided. **See Figures 2 and 3.**

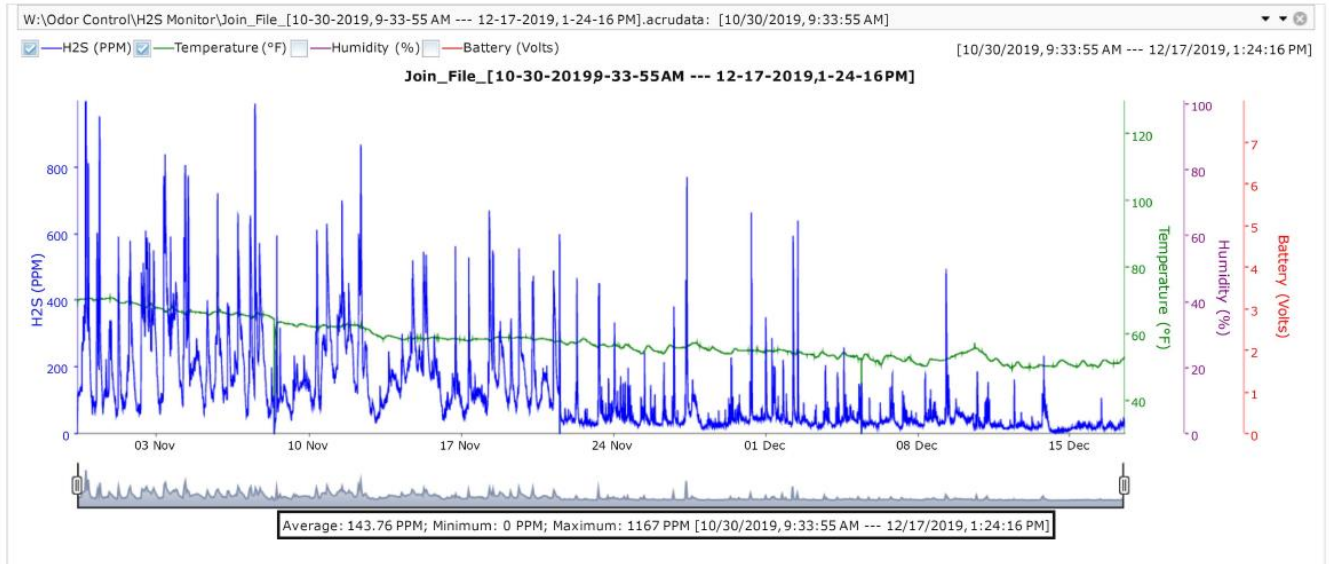


Figure 1 Wet Well Wizard System installed on 11/18



Figure 2 At time of Wizard installation



Figure 3 Within hours of Wizard Installation

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