

# May the FORSe Be With You

## Innovative water treatment system lowers hydrogen sulfide discharge

By Larry Burbach, Anue Water Technologies

**A**t the 3A Lift Station Force Main and Plant Headworks in Dayton, Nevada, officials from the Lyon County Utilities Department discovered high sulfide levels present and desired to find a solution. Hydrogen sulfide can lead to odor and corrosion within a water system, so it was highly important that the county find an answer that is both effective and limits ongoing costs. To tackle this issue, Anue Water Technologies (AWT) demonstrated its FORSe 5 odor and corrosion system for treatment of the force main.

### PILOT TESTING

A 2-mile force main was expressing high concentrations of H<sub>2</sub>S, with peaks of 3400 parts per million and averages of 340 parts per million at its outfall.

A FORSe 5 pilot was installed with an output of 120 grams per hour of ozone and 40 liters per minute of oxygen. Prior to the commissioning of the pilot, total sulfides were measured at a whopping 17 milligrams per liter. After just five days of FORSe 5 operation, these values were reduced to 0.2 milligrams per liter, a 99 percent reduction. Even more, the vapor phase measurements showed similar results, where H<sub>2</sub>S levels were ultimately driven from over 3400 to less than 10 parts per million.

Under extreme temperature conditions with daily ambient temperatures exceeding 110 degrees Fahrenheit (43.3 degrees Celsius) and high levels of H<sub>2</sub>S, Anue's FORSe 5 odor and corrosion control system achieved significant levels of control in less than one week.

Further improvement occurred when the city closes the ARV. The H<sub>2</sub>S level drop from 95 average to 11 parts per million.

### PROJECT AT A GLANCE

**Location:** Lyon County, Nevada

**Site:** 3A Lift Station Force Main and Plant Headwork (Dayton, Nevada)

**System Size:** FFM-350-150-M1

- Compressor: Kaeser SK20, max. 88 cfm @125 psi
- Oxygen Generator: AirSep AS-G, max. 150 LPM @65 psi
- Ozone Generator: Primozone GM12, max. 600 g/hr
- Chiller: Lauder Untracool 7.1 kW

### Force Main Specifications:

- Force Main (FM) Length: 8,150 feet.
- FM Diameter: 12 inches.
- Average FM Flow: 300,000 gallon per day.
- Pressure: 12 psi (dynamic).

### Treatment Goal:

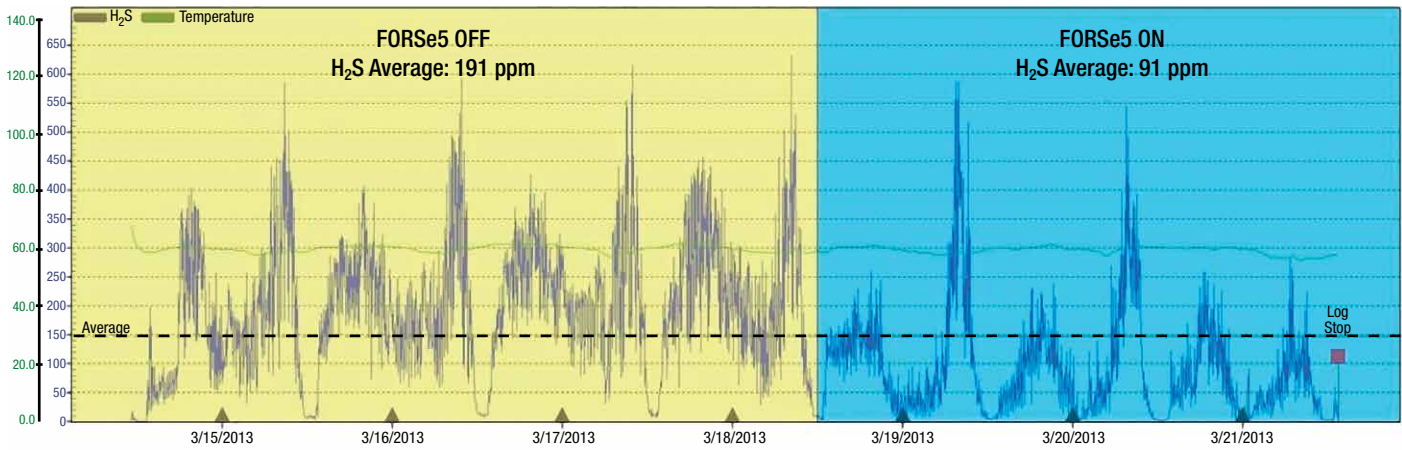
- H<sub>2</sub>S (vapor phase) weekly average ≤ 50 parts per million.
- DO ≥ 1mg/L.

### Demo:

- The H<sub>2</sub>S average at the discharge point without a running demo unit is 191 parts per million.
- After install the demo unit (O<sub>3</sub> – 690 g/hr, O<sub>2</sub> – 152 LPM), the average drop to 91 parts per million within the first three days.

**Lyon County Rolling A Headworks - OdaLog s/n 01001247**

Lyon County Utilities Customers OdaLog 032013: Session 1.



Period Displayed: 3/14/2013 - 3/21/2013 (Oda File: Lyon County Utilities Customers OdaLog 032013 oda - Serial Number: OdaLog Type L2 RTx01001247 Instrument Range 0-1000PPW)

--- Average 148 ▲ Month Transition Min 0 Max 631 (Use Screen Data Only)

**SYSTEM PERFORMANCE**

The system completed its installation on May 1, 2014. With the resident pump off, the measured dosing of O<sub>2</sub> was only 100 liters per minute. With the resident pump on, the dosing of O<sub>2</sub> continued at 100 liters per minute with O<sub>2</sub>+O<sub>3</sub> at 40 liters

per minute at 250 gallons per hour. The performance was charted at a constant H<sub>2</sub>S average of 15 parts per million from May 24 to June 11 of that year.

To ensure that the result is based on Anue's FORSe5 system, the city of Lyon County monitored the H<sub>2</sub>S reading

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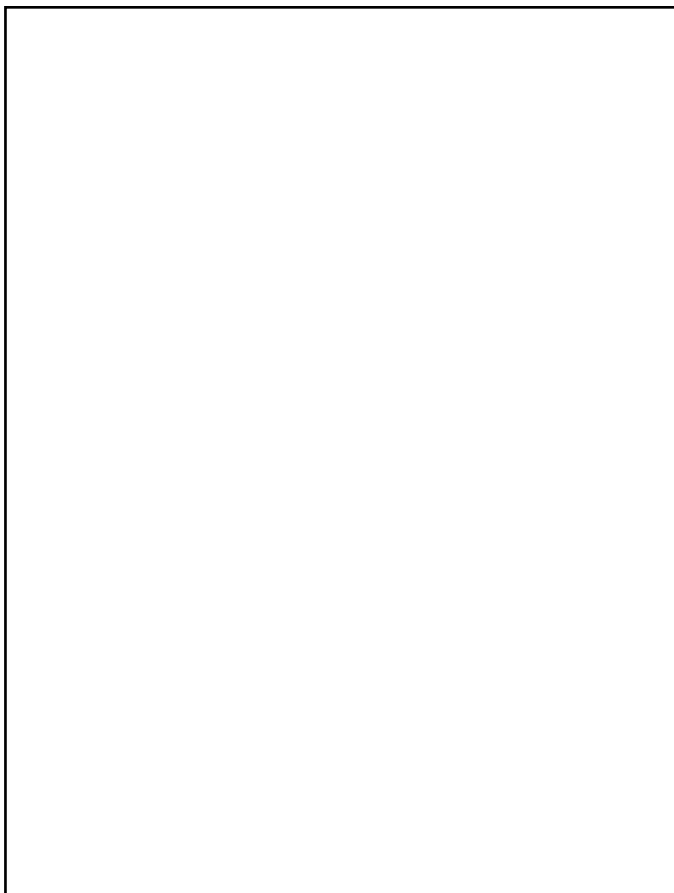
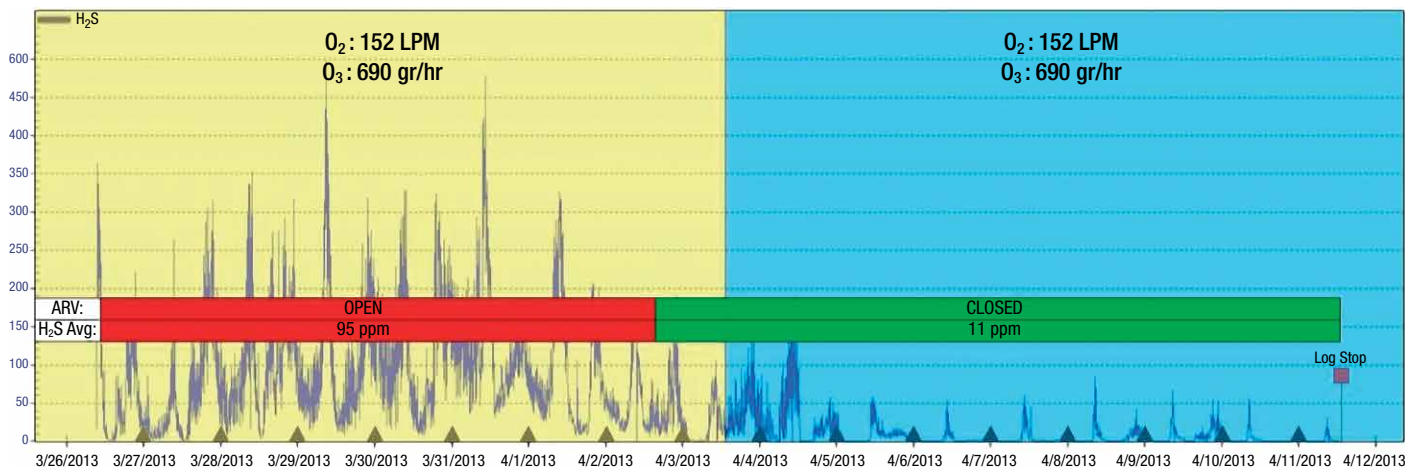
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during the power outage in February 2015. The average  $H_2S$  level before the power shut off was 11 parts per million. After the power shut off, the  $H_2S$  gradually increased, with a peak measured at about 770 parts per million on February 9 of that year. The average from February 7 to February 9 was about 150 to 190 parts per million. With the power resumed on the evening of February 9, the  $H_2S$  level dropped almost immediately and remain the average of 15 parts per million after one day.

**CONCLUSION**

The operators were very pleased to find that Anue system's performance meets  $H_2S$  target goal of less than 50 parts per million at the discharge location, and the direct injection method performs well with gravity line and low pressure profile force main. Also, closing some of the ARV(s) improved system performance and further reduced the  $H_2S$  level in the force main and at the discharge location.

A real boon to the process was showing that the effect of the dosage requires fewer than twenty-four hours to see a result at 3A Lift Station Force Main and Plant Headwork. Today, operators report that the system performs with no fault after one year with only routine maintenance recommended by manufacturers required to keep the system running. ♦

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**Larry Burbach** is general manaer and COO at Anue Water Technologies, a leading manufacturer of engineered solutions for water treatment, empowering municipalities, industrial, and commercial companies who encounter challenges with wastewater by creating tailored and turn key product lines that provide highly effective solutions for odor, corrosion, fat, oil, and grease issues. Anue Water Technologies focuses on the delivery of technology that is sustainable with proven applications that enhance people's lives. For inquiries, write [lburbach@anuewater.com](mailto:lburbach@anuewater.com). For more information, visit [www.anuewater.com](http://www.anuewater.com).