

Background: In pursuit of safer, more efficient operations, the Orlando Utilities Commission (OUC) proactively sought to eliminate confined space entry for its operators by upgrading the ozone dissolution system at its Conway Water Treatment Plant (WTP). The existing fine bubble diffuser (FBD) system, while functional, required frequent inspections and maintenance inside large contact basins posing safety risks and operational challenges.

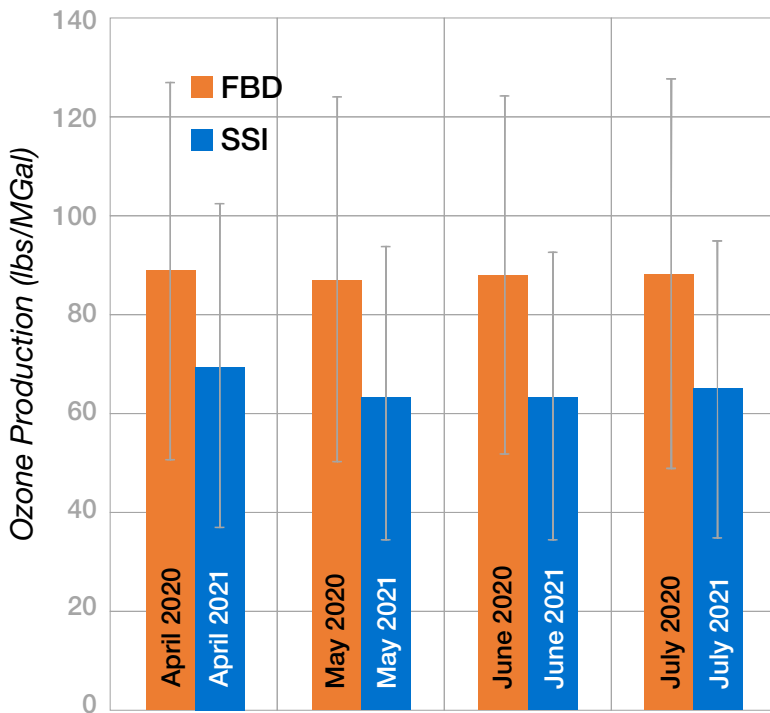
Challenge: OUC needed to improve operator safety, simplify maintenance, and increase the reliability and automation of its water treatment process. The FBD system also struggled to deliver uniform ozone distribution, exhibited high hysteresis, and consumed significant amounts of energy and liquid oxygen (LOX).

Solution: Conversion to Sidestream Injection
OUC replaced the FBD system at Conway WTP with a Mazzei sidestream injection (SSI) system featuring venturi injectors and a Pipeline Flash Reactor (PFR). This strategic upgrade delivered substantial benefits:

- ▶ **Operator Safety:** Eliminated the need for confined space entry to inspect and replace diffusers.
- ▶ **Higher Ozone Transfer Efficiency:** The SSI system achieved mass transfer efficiency (MTE) greater than 98%, substantially improving ozone dissolution.
- ▶ **Lower Energy and LOX Consumption:** Conway WTP reduced LOX use and the required ozone production by 20% - 30%, lowering electrical consumption, while maintaining the desired water quality.
- ▶ **Compact Footprint:** Only 12 feet of pipeline was needed for dissolution, replacing expansive concrete contactor structures.



OUC Conway WTP



Performance Results:

- ▶ **Improved Efficiency:** The Conway WTP consistently maintained stable ozone doses between 9.4 and 9.9 mg/L with the SSI system.
- ▶ **Automation & Control:** Uniform mixing (COV <5%) enabled real-time SCADA-PLC ozone dose control based on oxidation reduction potential (ORP) readings.
- ▶ **Data-Driven Success:** After converting to a more effective ozone dissolution system, Conway's average required ozone dose dropped significantly, resulting in substantial reductions in both the ozone production and LOX usage while still achieving their treatment objectives.

Conclusion: The conversion from FBD to SSI at OUC's Conway WTP demonstrates how a commitment to operator safety can drive wide-ranging operational improvements. By embracing sidestream injection technology, OUC enhanced ozone transfer, reduced oxygen and energy consumption, extended equipment life, and paved the way for future automation. Encouraged by these results, OUC plans to continue converting their other WTPs to SSI systems. The Conway project sets a model for modern, resilient, and operator-friendly water treatment infrastructure.

Average LOX SCFM/ MGD for May, June, and July

