



CASE STUDY

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Mazzei Degas Separator Selected for Wichita Aquifer Storage and Recovery Project

GDT™ Degas Separator Selected As Best Method For Entrained Gas Bubbles Removal
Wichita, KS

The Problem: In the 1990s, the City of Wichita, Kansas developed a water supply plan that included creating a sustainable water supply through the year 2050. The key component of the plan is recharging the large aquifer that lies under the region with 100 MGD of water from the Little Arkansas River. This undertaking is known as the Aquifer Storage and Recovery project or ASR. Phase I was completed in 2006 with the diversion of up to 10 MGD of river water into the aquifer through bank filtration and recharge basins.

The river basin contains substantial farming operations which, during rain events, spike the river water with the commonly used herbicide Atrazine. Atrazine concentrations in the river frequently rose above the mcl limit the US Environmental Protection Agency set for drinking water sources, forcing the city to shutdown the bank filtration system.

As planners designed phase II of the project—which would add 30 MGD to the existing 10 MGD diversion—they studied several treatment options to remove the herbicide, selecting an advanced oxidation process (AOP), which utilized a multi-point application of ozone and hydrogen peroxide to create hydroxyl radicals, short lived, highly oxidizing molecules that rapidly mineralize organic contaminants to their non-toxic elements.

The advanced oxidation of the 30 MGD of diverted river water required six (6) AOP ozone-peroxide reactors. The AOP reactor's design limited the amount of hydraulic backpressure it could tolerate. Consequently, Mazzei was challenged by the project's design team to remove the entrained gas bubbles that remained from the prior oxidation treatment of the 30 MGD AOP effluent at a "not to exceed" hydrostatic backpressure of 19 feet.

At the time of the AOP project discussions, the City of Wichita was currently using four (4) Mazzei GDT™ degas separators at the city's 74 MGD, Cheney pump station's pre-filter ozone system. These separators removed > 97% of



The six DS1600 LF units installed at the AOP Building in Wichita, Kansas

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the post-injection gas bubbles by accelerating the entering gas/liquid mixture to a velocity that develops a lateral force of many times gravity, creating a water film at the separator wall and a gas vortex at a central, non-membrane, gas extraction core. The separator core then directs the collected gas into a gas relief valve for discharge to the ozone destruct module. However, the standard GDT™ degas separator design and performance could not meet the AOP project's hydrostatic pressure limit of 19 feet.

The Solution: Mazzei agreed to design and fabricate a custom GDT™ degas separator for the ASR-II project. The ASR-II prototype degas separator developed by Mazzei was shorter than the standard separator and had extensive internal modifications which allowed the separator to remove entrained gas bubbles at a substantially lower pressure loss than existing degas separators.

The Results: The final performance test of the prototype ASR-II degas separator, DS1600 LF, was conducted at the Fresno State W.E.T. hydraulics lab and witnessed by the project engineer. The separator exceeded project requirements for gas removal and hydrostatic backpressure at the AOP reactor design flow rate of 5 MGD.

The six DS1600 LF GDT™ degas separators are currently installed at the ASR-II project site, with start-up scheduled for late June 2011.

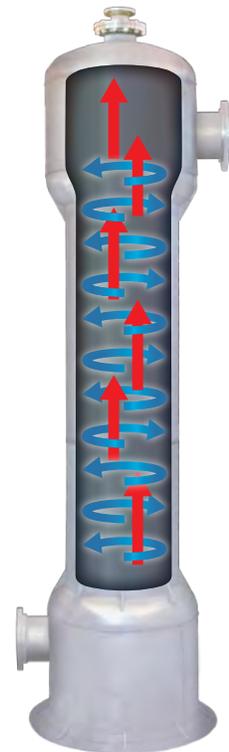
Mazzei would like to thank the Claude-Laval Corporation, Air Products and Chemicals, Inc. and ASR-II project engineers from Burns and McDonnell for providing supportive and encouraging technical assistance.



Aerial view of the DS1600 LFs and the AOP building during construction.



Testing of the DS1600 LF at the International Center for Water Technology at California State University, Fresno



Mazzei DS1600 LF Degas Separators remove the entrained ozone gas from the effluent. It can process 5 MGD with a motive inlet pressure of 1.5 psig.



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