

Progress Report #1
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Improving Recovery: A Concentrate Management Strategy for Inland Desalination

A project funded by the Texas Water Development Board
To the University of Texas at Austin

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The beginning date of the contract was August 1, 2007. New graduate students came into our program in late August and had several days to express their preferences for research projects. We now have a new Master's level student working on this project.

Task 1 in our contract is concerned with laboratory studies on oxidation of anti-scalant compounds used (or likely to be used) to prevent precipitation in reverse osmosis desalination systems. The first two sub-tasks are to identify the anti-scalants and begin to show the feasibility of their oxidation using ozone and hydrogen peroxide (so-called "advanced oxidation processes").

We have begun both of these sub-tasks. Admittedly, progress is a bit slow with a late start and with a new graduate student with little laboratory experience, but we are making progress and I expect it to catch up to the projected pace in the coming months. The student is learning how to operate the ozone generator and set up an experimental system with a controlled dose of ozone, as well as to measure ozone usage.

Laboratory ozone systems for water treatment are complex because ozone gas is generated from oxygen through an electrolytic process and passed into the water phase through a gas transfer process. Because ozone is so reactive in water (including self-decomposition), the ozone transfer is not measured in the liquid phase. Instead, one monitors the amount of ozone produced and transferred into water by using a gas phase mass controller on the influent side and the amount remaining in the gas phase after passing through the reactor. The last step is done by reducing the ozone in a potassium iodide (KI) solution and measuring the difference in iodide concentration before and after. A schematic diagram of the apparatus that we have assembled in the laboratory is shown in Figure 1. There is a steep learning curve in getting all these pieces working together, and we are making progress in accomplishing these tasks.

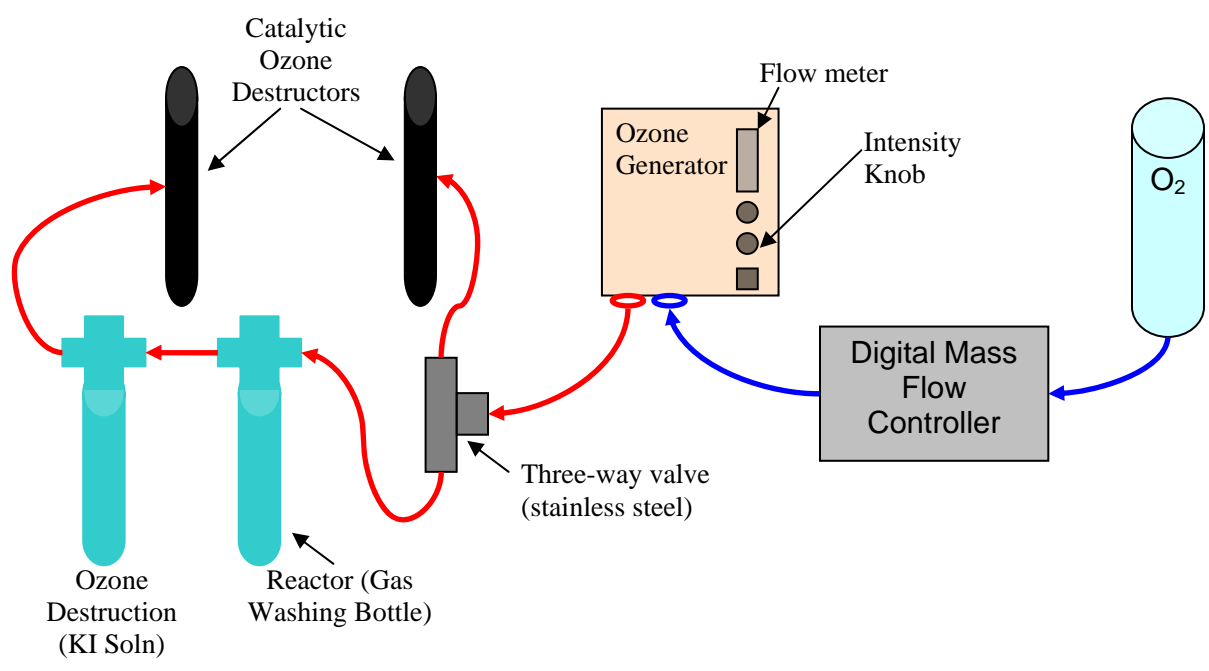


Figure 1. Schematic Diagram of Ozone Generation and Reactor System