Removal of Arsenic from OU Water

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Executive Summary

Our group has been exploring different treatment options (including water purchase) to remedy the University of Oklahoma's arsenic groundwater problem. Currently, the average level of arsenic in OU's potable water supply is 32 ppb, while the federal limit for arsenic in potable water is 50 ppb. In January 2006, this limit will drop to 10 ppb, forcing OU to address the high level of arsenic in its water. Our group has examined background information on sources of arsenic in OU's water, compliance options, initial design analyses, and cost estimates for several different treatment processes and configurations. For water treatment, our team studied Ion Exchange, Reverse Osmosis, Microfiltration, Nanofiltration, and Ultrafiltration. The most economically viable treatment option was found to be ion exchange.

We have found that the proper course of action and the costs for these courses of action depend heavily on the current demand for potable water (see Figure 1 to read off costs at different water demands). We have found that 50:50 blending of purchased water from OKC with water from south campus wells 2, 10, and 11 (found to be 2 ppb in arsenic and 340 mg/L in hardness) is the cheapest solution to the water problem with a current consumption of less than 1.25 million gallons per day (MGPD). Blending is needed to reduce the hardness of the south campus water to an acceptable level. Above 1.25 MGPD, the north campus wells should be treated with an ion exchange plant to produce the cheapest water. With either of these treatment options, the arsenic and hardness levels in OU's potable water supply would be 5 ppb and 200 mg/L respectively. Both of these levels are safely within regulatory limits.

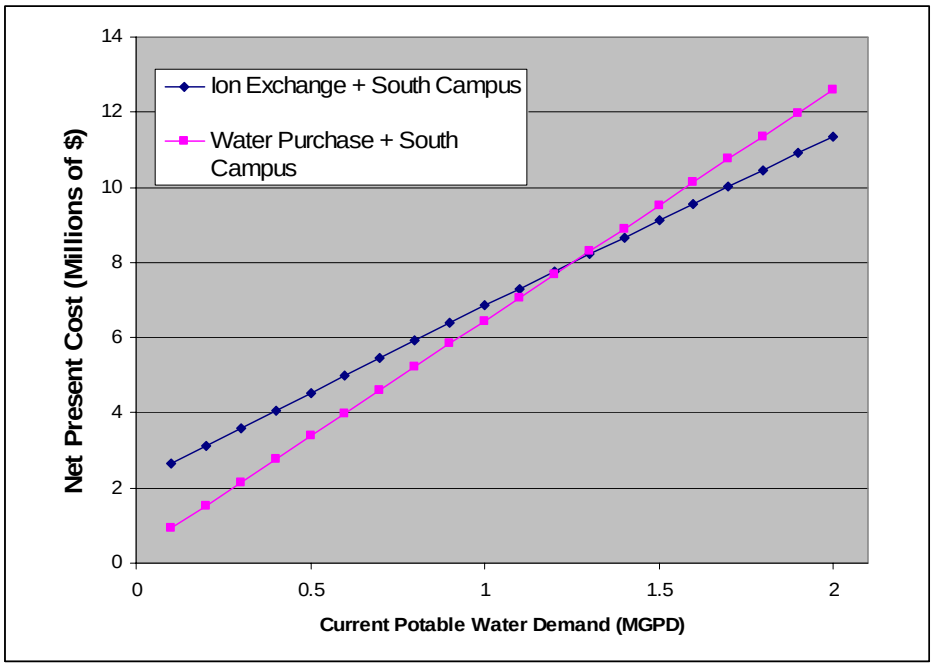

Figure 1: ***Net Present Cost of Ion Exchange and Water Purchase with 50:50 Blending with the South Campus Wells as a Function of Current Potable Water Demand. The lines cross at 1.25 MGPD.***