

# AWPCA 2004 WATER PROJECT OF THE YEAR AWARD

## CITY OF PHOENIX - ARSENIC TREATMENT FACILITY AT WELL 280

Congratulations to the project team of the Arsenic Treatment Facility at Well 280. This project was selected as the AWPCA 2004 Water Project of the Year. The project team includes the City of Phoenix, Narasimhan Consulting Services, and Felix Construction Company as well as many other subconsultants and subcontractors.

This project consists of building and commissioning the Nation's first large capacity arsenic removal facility for potable water. As many of you are aware, the EPA is lowering the MCL for arsenic from 50 parts-per-billion (ppb) to 10-ppb effective January 2006. In response to this change in the standards, the City decided to build a full-scale Arsenic Treatment Facility (ATF) as a demonstration project and identify operational issues prior to implementing the technology at the City's 22 well-sites that have an arsenic concentration greater than 10-ppb.

The demonstration facility was built at Well 280 which has a capacity of 2.5-MGD and is located north of Tatum Boulevard off Cave Creek Road. The well site also contains a 1.0- MG reservoir, sodium hypochlorite generator, and booster pump station for pressure zone 9. Water quality for Well 280 includes a pH of 7.6 and arsenic concentration of 16.5-ppb.

Due to the water quality and ease in operation, the City chose to implement an adsorption process using granular iron media (GIM). GIM is a throw-away media which after exhausted may be hauled to a non-hazardous waste landfill. At the pH range of Well 280, the process requires no chemical addition other than chlorine to disinfect the media. The process is fairly simple to operate and includes a pre-filter (50-micron mechanical screen), two 14-foot diameter steel contactors with media, rate of flow control valves, equalization basin, spent media drain area, PLC, and several valves & flowmeters.

As the ATF is on-line, the water passes through two contactors in series making it a lead-lag operation. The City chose to implement two contactors to provide flexibility and excess adsorptive capacity should the standard be lowered again in the future. In addition, once the media in one contactor is exhausted, having dual contactors allows the operator to run the system through one contactor

until new media is installed. Each contactor contains 12-inches of garnet as support media and 2.8-feet of GIM resulting in a 2.5 minute empty bed contact time (EBCT).

Adding some safety factor, the City set a water quality goal of 8-ppb for arsenic. Since the ATF will remove arsenic to a concentration less than 2-ppb, the ATF was designed to treat only a portion of the well's flow to create a blended arsenic concentration of 8-ppb from the untreated bypass flow + treated flow. The advantages of partial stream treatment include lower operation & maintenance costs due to reduced media replacement and lower capital improvement costs due to a smaller overall facility.

Other social and economic considerations involving the Project Team and the general public were addressed in the implementation of the ATF at Well 280. Key social considerations that were addressed include integration of the facility into the neighborhood, minimizing handling of chemicals, minimizing the generation of wastes, minimizing vehicle traffic in the neighborhood, and providing a safe facility.

In conclusion, the City has gathered significant operational data on the ATF that will help in the design of future ATFs. Although minor changes will be made to the design of these facilities, the overall project exceeded the City's goals as far as arsenic removal, meeting the budget, and meeting the compliance deadline.



*Arsenic Treatment Facility at Well 280*