

## Gunlock Well Field Arsenic Evaluation

Carollo has worked with the City of St. George over the last several years to develop a drinking water supply consisting of both groundwater and surface water supplies. Groundwater supplies tend to have arsenic at levels ranging between 20 and 30 ppb. Surface water supplies require treatment for virus, Giardia, and Cryptosporidium removal credit. After reviewing different treatment options, Carollo recommended a coagulation/filtration process using low-pressure (MF/UF) membranes.

During preliminary evaluation, Carollo provided a siting evaluation

and bench-scale study to evaluate arsenic removal capabilities.

Bench-scale testing provided the following useful design criteria:

- 5 mg/L FeCl<sub>3</sub> resulted in arsenic levels dropping from 25 ppb to 8 ppb.
- pH optimization from 5.5 to 7.0 offered minimal benefits in terms of arsenic removal.
- All the arsenic that will be removed by the C/F process is removed in the first 10 minutes.
- Higher GT values for flash mixing and lower GT values for flocculation tended to result in an additional 2 to 4 ppb of arsenic removal.

The importance of characterizing membrane performance, especially operating flux and fouling conditions, means that pilot testing will be a necessary step during preliminary design. Pilot testing several low-pressure membrane units is scheduled to begin in Fall 2004. Preliminary design criteria developed during bench-scale testing will provide a useful starting point for pilot testing.

### HIGHLIGHTS

Direct filtration using coagulation/membrane filtration.

11.5-mgd facility will remove arsenic and meet requirements for surface water treatment.

Bench and pilot testing conducted to establish and verify design criteria.



Carollo will follow up bench-scale testing with membrane pilot testing for St. George's planned 11.5-mgd groundwater/surface water treatment facility.