

## ARSENIC IN DRINKING WATER COMPLIANCE SUCCESS STORIES

# Nevada: Tribal System Experience With Arsenic Rule Compliance

### Case Study Contact Information

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The Fallon-Paiute-Shoshone water system in Nevada utilizes a groundwater supply that has arsenic levels greater than 100 ppb. The Tribe investigated two potential treatment alternatives but selected the one that offered the better unit cost for producing water.

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### Lessons Learned

The Fallon Paiute-Shoshone tribe demonstrated that a coagulation/microfiltration treatment system offered a lower cost alternative compared to a coagulation/pressure filtration system in terms of estimated unit cost of water produced (\$1.29 vs. \$1.38 per 1,000 gallons). The unit cost of producing water was considered a better overall indicator of cost rather than capital or annual operating and maintenance costs.

### System Background

The Fallon Paiute-Shoshone water system in Nevada supplies drinking water to all tribal residents in the colony in town and on the reservation approximately six miles west of Fallon, as well as to about 25 non-tribal homes in between. In total, about 313 homes are served by this water system. The sources of supply, Colony Wells No. 1 and 2, are 95 and 130 feet deep, respectively. The treated water travels through up to 13 miles of piping to feed every customer, including the distance across the desert from the colony to the reservation.



For many years, the drinking water served by the Fallon Paiute-Shoshone Tribes' public water system contained arsenic at levels in excess of 100 parts per billion (ppb). The drinking water is drawn from a basalt aquifer that is approximately 4 miles wide by 15 miles in length. The City of Fallon and the nearby Naval Air Station also draw their water from this basalt aquifer. Their arsenic compliance success story is highlighted in a separate case study.

**Arsenic Treatment Program**

A new arsenic treatment system using coagulation and microfiltration was placed into service in January 2005 and is successfully reducing arsenic levels from the range of 90 to 120 ppb to less than 10 ppb. The total construction cost was just under \$1.8 million dollars, including design and start-up. In 2003, the Tribe applied for and was awarded EPA Drinking Water Tribal Set-Aside Grant funding to supplement Indian Health Service funds for the arsenic treatment facilities. The actual increase in cost to the Tribe to provide water has been around \$0.70 per 1,000 gallons.

The treatment process, rated at 500,000 gallons per day, provides carbon dioxide and ferric chloride addition to the raw water. The carbon dioxide lowers the pH to enhance the treatment process. Arsenic binds to ferric hydroxide, precipitates out of the treated water stream, and is removed by the 0.1 micron filters. The sludge is dewatered and then disposed of in a local landfill. The treated water is aerated to strip the carbon dioxide and raise the pH again. The plant is an "on-demand" system, meaning it will only need to be run when demand is needed, often only six hours per day.

**Table 1. Cost Comparison of Pressure Filtration and Coagulation/Microfiltration**

| <b>Cost Measure</b>   | <b>Coagulation/Pressure Filtration</b> | <b>Coagulation/Microfiltration</b> |
|---|--|------------------------------------|
| Capital Cost  | \$1.25 million                         | \$0.99 million                     |
| Annual O&M Cost   | \$71,346                               | \$82,392                           |
| \$ per 1,000 gallons produced based on present worth analysis | \$1.38                                 | \$1.29                             |

**Non-Treatment Alternatives**

The Fallon Paiute-Shoshone tribe investigated purchasing water from the City of Fallon. The two water systems were interconnected several years ago but poor communication and disagreements between the two entities have prevented this alternative from being implemented. The City of Fallon worked collaboratively with the local Naval Air Station to construct an arsenic treatment plant using iron-based coagulation and multimedia filtration to serve both the City and the military base.