

Pressure Filters for Arsenic Removal

Vertical Pressure Filters and SuperSettler™ Clarifiers



CASE STUDY

Location: Fallon, Nevada
Owner: City of Fallon
Engineer: Shepard Miller Inc.
Contractor: Western Summit Constructors Inc.

Substantial Problem

Located 60 miles east of Reno, the thriving farming community of Fallon, Nevada, was once described as being on a "Mount Everest of an arsenic problem." Several wells in the area draw water from an underlying basaltic aquifer that is high in naturally occurring arsenic.

These wells, which supply drinking water to the City of Fallon and neighboring Fallon Naval Air Station, have arsenate concentrations as high as 110 µg/L.

Simple Solution

In 2000, the City began pilot testing arsenic removal technologies, including ion exchange and enhanced coagulation followed by different filtration technologies. Based on the results of this study, enhanced coagulation followed by granular media filtration proved to be the most cost-effective treatment for this source water. In 2002, construction began on a new \$17 million groundwater treatment plant.

This 10 MGD treatment plant utilizes enhanced coagulation, followed by WesTech granular media pressure filters, to reduce treated water arsenic concentrations to less than the current MCL of 10 µg/L. The plant achieves this by reducing the pH of the raw water to 6.8 pH units using sulfuric acid, and then adding approximately 12 to 14 mg/L ferric sulfate. The water is filtered through 16 deep-bed, vertical pressure filters. The pH is elevated with hydrated lime and is subsequently chlorinated and fed into the distribution system.

The 16 WesTech-supplied vertical pressure filters are 12'0" dia x 15'7" high and have 18" of 1.2 mm anthracite, 12" of 0.55 mm silica sand, and 6" of 0.22 mm garnet. The pressure filters are designed to automatically backwash based on headloss or time, but are occasionally preemptively backwashed manually once per day.

Backwash wastewater is collected in a backwash waste equalization tank and then fed into two WesTech SuperSettler™ high-rate inclined plate clarifiers. Supernatant from the clarifiers is fed back to the front of the plant and underflow is fed onto a filter press once per day. Dry solids are landfilled and filter press filtrate is sewerred. This backwash recovery system allows the plant to be greater than 99% efficient.

