

# Project Profile



## Lummi Island, Washington Arsenic, Iron, Sulfide Treatment System

### Background

In mid 2004, AdEdge Technologies Inc. (AdEdge) was selected by Miller Water Association and Anvil Corporation to assist in the design of a full-scale arsenic treatment project for this small community. Arsenic levels are alarmingly high at 0.18 mg/l, 18 times higher than the new Federal standard of 0.010 mg/l. In addition to arsenic, many of the homeowners using the water objected to the sulfide odor resonating from the water. AdEdge worked closely with Anvil Corporation and the Homeowners Association to provide a suitable treatment train that would achieve the treatment objectives in accordance with the Washington Dept. of Health (WDOH) guidelines for an arsenic treatment.



### Treatment System

The AdEdge arsenic treatment system consists of two main components: an iron and sulfide removal system and an arsenic adsorption system. Based on the high pH, the site chose to utilize an innovative CO<sub>2</sub> gas membrane injection system for reducing pH of the incoming water (typically 8.6-8.7) to 7.1 prior to treatment for enhancing performance and media life. This pH adjustment system is being used as an alternative to strong acids such as hydrochloric and sulfuric. The first component in the treatment train is the iron/sulfide removal system, which consists of a modular AD26 system using a 12-inch diameter vessel and AD26 media. The AD26 catalytic media oxidizes and filters iron/sulfide from the water supply. The second component is a twin vessel modular arsenic adsorption system in series rated for 10 gallons per minute (gpm). The vessels are configured in a lead / lag arrangement. Groundwater is pumped from the water supply well pump through the AD26 pre-treatment unit, then through the two 14-inch diameter arsenic adsorbers before entering the 2,400-gallon storage tank. The adsorbers each contain Bayoxide E33 adsorption media. Bayoxide E33 is a granular ferric oxide (GFO) media that has been in commercial use since 1999. AdEdge has used GFO media in over 50 small community system applications and in over 1,000 residential applications.

pH **	8.6-8.7	
Total As **	0.180	mg/L As
As(III)	no data	mg/L
Alkalinity	180	mg/L @ CaCO <sub>3</sub>
Hardness **	100	mg/L @ CaCO <sub>3</sub>
Silica **	no data	mg/L SiO <sub>2</sub>
Phosphate **	<0.1	mg/L P <sub>04</sub>
Sulfate **	85.0	mg/L SO <sub>4</sub>
Iron **	0.03	mg/L Fe
Manganese **	0.00	mg/L Mn

### Performance

The system is installed with automatic controls, backwashing features, pressure gauges, and sample ports for a complete arsenic treatment module. Total gallon throughput and flow rate for each unit is measured continuously with dedicated flow totalizing meters. The AdEdge iron/manganese/sulfide and adsorption systems do not require any chemicals or regeneration, and the process does not generate liquid or solid hazardous waste. The system was installed in October 2004 and has been operating at 1,800 gallons per day with arsenic levels below detection for over 10 months.

### For More Information Contact

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