Overview
Selenium concentration in this mine-influenced surface water was an average of 160 ppb, well in excess of the EPA-recommended standard of 5 ppb. These elevated concentrations pose potential toxicological concerns due to bioaccumulation in aquatic species, resulting in potential reproductive and developmental deformities. Reverse osmosis (RO) was selected for this project due to its ability to achieve >99% rejection of selenium in natural mine-influenced waters where selenate ($\text{SeO}_4^{2-}$) is predominant.

In this project, WesTech designed and fabricated a system consisting of open-platform ultrafiltration (UF) as pretreatment to RO for selenium removal. Both packages were customized to meet stringent footprint and operational requirements, including integration to allow for RO permeate to be used for UF backwashing to reduce blended selenium concentration in the discharge.

RESULTS

- **<3.0 ppb** Permeate Selenium Concentration
- **30%** Less Footprint Required to Comparable Systems
- **3+** Number of Compatible UF Modules

Project Summary

Smoky Canyon Mine Treatment System

**Location:**
Afton, Wyoming, USA

**Application:**
Selenium Removal from Surface Water

**Process:**
Ultrafiltration ▶ Reverse Osmosis

**Size:**
2,000 gpm / 2.88 MGD

**Design Flux:**
59.7 gfd

Highlights

- Open-platform UF system with 3+ compatible modules
- Integrated UF/RO systems processes
- Unique UF backwashing strategy for selenium compliance
- Limited chemical and energy consumption