

PA DEP Small Drinking Water Systems Engineering Services Program (ESP) Case Study

Client Name: Madisonburg Water Works
Location: Miles Township, Centre County
Project: Pilot Study

Background:

The Madisonburg Water Works (MWW) Public Water System serves approximately 250 people through 90 service connections with an average demand of 15,000 gallons per day (gpd) through nine (9) spring sources. Treatment of the spring water consists of chlorination. Treated water is stored in a 19,200-gallon concrete reservoir. Distribution from the reservoir is via gravity. The nine (9) spring sources have been determined to be groundwater under the direct influence of surface water (GUDI) by the Pennsylvania Department of Environmental Protection (DEP) based on Surface Water Identification Protocol (SWIP) testing.

Studies:

A Feasibility Study was completed to determine the most viable alternative to treat the spring water sources or to develop a new groundwater source to provide safe drinking water. It was determined to pilot test Slow Sand Filtration (SSF) and Membrane Cartridge Filtration



Membrane Cartridge Pilot System



Slow Sand Pilot System

Piloting Issues:

Slow Sand Filtration - A nine month pilot study was needed prior to implementation of the selected technologies. A protocol was required to be submitted and approved for each of the selected technologies. The SSF Pilot started in April 2002 and ran for nine months. The slow sand filtration pilot produced unfavorable results and it does not appear to be an appropriate technology for treatment of the spring sources at MWW. The lack of ripening of the sand and the slow formation of the schmutzdecke layer as well as the increased turbidity of the effluent indicates that there is not enough nutrients/biological matter in the raw water to support a schmutzdecke on the filter.

Membrane Cartridge Filtration - The Membrane Cartridge Filtration pilot testing consisted of three (3) separate runs of the membrane cartridge. Run #1 never really got started. On February 21, 2003 the pilot unit was set up and a preliminary run was started. The pilot was supposed to officially start on February 23, 2003 but it was plugged before the official start time was reached. Run #2 started on June 18, 2003 and lasted approximately 8 days before the membrane cartridge was plugged. Run #3 started on July 8, 2003 and lasted for 12 days before the filter was plugged due to heavy rain events

Outcomes:

A Final Comprehensive Report was completed and submitted to PADEP to evaluate the two piloted technologies. The report concluded that neither the slow sand filtration nor the membrane cartridge filter are appropriate filter technologies for treating the raw spring water for MWW. It was recommended that MWW start investigating groundwater wells for a primary source of water supply.



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