

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

Client Name: Knoxville Borough Water Department  
Location: Knoxville Borough, Tioga County  
Project Name: Finished Water Reservoir Cover Replacement

## Background:

The Knoxville Borough Public Water System (PWS) serves approximately 590 people through 320 connections and has an average daily use of 45,000 gallons per day. The system is served by ground water wells, which are treated and pumped through the distribution system to an existing 500,000-gallon reservoir. An inspection by PADEP determined that the geomembrane cover over the reservoir had holes and tears and needed to be repaired. A large amount of standing water with an algae bloom was collecting on the cover.

## Public Health Challenges:

The tears in the cover were a potential pathway for contamination into the finished water storage in violation of the PA Filter Rule. PADEP issued a consent Order and Agreement that required the Borough to provide increased chlorine levels until the reservoir cover was replaced.

## Capacity Issues:

**Technical** – The 90-foot diameter reservoir cover needed to be replaced with a cover suitable to the environmental conditions (high on a mountainside). The existing geomembrane floating cover did not last through its design life.

**Managerial** – Due to the location of the reservoir and its inaccessibility during winter months, the replacement cover had to be able to withstand snow loads and require minimal operation and maintenance (O&M).

**Financial** – The higher chlorine disinfection residual required until reservoir cover replacement increased O&M costs substantially.

## Actions:

Based on a Feasibility Study, completed as part of the ESP, it was determined that construction of an aluminum dome cover over the existing reservoir was the most feasible option through a 20-year life cycle cost analysis. The ESP provided engineering services that included project design, contract and construction administration, and project financing. The construction project was funded by an interim loan from a local bank and long-term funding was provided by the Pennsylvania Infrastructure Investment Authority (PENNVEST).



## Outcomes:

The aluminum dome was completed in accordance with design specifications and DEP issued an operations permit for the reservoir with the aluminum dome cover in August 2003. The completed project allowed the Borough to reduce the amount of chlorine used for disinfection. The project eliminated a source of contamination and brought the PWS into compliance with the PA Filter Rule.

