

Fort Loudoun Membrane Filtration Water Treatment Facility

Client: Bear Valley Joint Authority

Peters Township, Franklin County, PA

Year: 2017 Cost: \$11,500,000



The Bear Valley Joint Authority selected GD&F to design a new water treatment plant for its Fort Loudoun well fields. The new 1.0 MGD plant is technologically advanced with a high degree of operational reliability. The project included the following major systems:

- Fully integrated coagulation and flocculation processes for pretreatment of high-turbidity well source. Coagulation and oxidation processes are designed for full system redundancy at a peak hydraulic rate of 2.0 MGD. Rapid mixing achieved by static helicoidal mixing elements with single-stage flocculation using variable-speed mechanical mixers (axial flow, hydrofoil type) and baffled inlets
- Two (2) rectangular sedimentation tanks with mechanical sludge collectors designed for a four (4) hour detention period
- Membrane filtration system consists of Pall Corporation ARIA Model AP-6 membrane cartridge technology (2 skids, 1.0 MGD each). The microfiltration (MF) system has capability for achieving 4-log pathogen removal with finish water turbidity of 0.01-0.02 NTU and 98% MF recovery
- The plant also includes an extensive chemical feed system (sodium hypochlorite, sodium permanganate, caustic soda, coagulant, fluoride and corrosion inhibitor), baffled clearwell (designed for 3-log inactivation), filtrate waste storage/recycle tank and waste solids drying beds
- Two (2) ultraviolet disinfection units for pathogen deactivation with a capacity of 1.0 MGD each
- Finish water pumping consists of two (2) vertical turbine finish water pumps
- Development of five (5) new groundwater sources



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- Design of control building including chemical feed and storage systems, mechanical and process piping systems, MF “clean-in-place” chemical cleaning system, hot-water boiler system (for MF make-up cleaning water), control room/laboratory, conference rooms, and offices
- Supervisory Control and Data Acquisition (SCADA) system for operation, control and monitoring the MF equipment and related process and equipment systems
- Electrical work, lighting systems, power wiring, telemetry system and emergency generator
- Advanced Metering Infrastructure (AMI) system with mobile receivers including installation of 4,200 magnetic water meters with AMI-compatible technology



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Although one of the most advanced plants in the region, the microfiltration system is one of the easiest to operate and maintain. The project was financed by a low interest Pennvest loan and a grant from the PA H2O program. GDF provided all planning, design and construction phase services for the project.