An Innovative, New Water Treatment System

Nominating Agency: Town of Hot Sulphur Springs

Accomplishment: Town of Hot Sulphur Springs utilized an innovative treatment process and a fast-track approach to rebuild and modernize its water supply and treatment system to resolve an emergency "boil order" situation. The improvements and the installation of the unique treatment system are now delivering safe, clean and abundant drinking water to the citizens of Hot Sulphur Springs. This project won a 2010 EPA Drinking Water State Revolving Fund Design Award for sustainable Public Health Protection. Hot Sulphur Springs, a historic Colorado town, suffered with a boil water order issued by the Colorado Department of Public Health & Environment due to failures in the Town's 26-year old water treatment plant. Variable water quality of Colorado River water supply contributed to the failure of the Town's existing plant. The new upgrades were designed by Merrick & Company and totaled $3.3 million in value. These upgrades included a new river intake infiltration system on Colorado River, an innovative application of a membrane filtration treatment process, a new clear well at the plant, and a new 220,000-gallon water storage tank installed on the mountain above the Town. The project also included a new treatment plant building, new process piping, equipment, valves, electrical power, lighting, instrumentation and controls. A fast-track design and construction engineering effort was utilized to expedite the installation of these improvements. The Town also obtained an American Recovery and Reinvestment Act grant for this critical project.

Innovation: The new water treatment process is unique. There is only one other system like it in operation in Colorado. The system is based on a total-systems approach to membrane filtration for water treatment. The process employs membrane filtration as the primary treatment method, along with modifications to the existing water treatment facilities to pretreat the water being fed to the membrane filters. The pre-treatment facilities provide an extra level of treatment that is needed during spring runoff season when water quality of Colorado River can deteriorate rapidly and can be highly variable. A key, innovative aspect of the modified pre-treatment facilities is the focus on controlling the pH level and the particle charge of the water that is fed to the membrane filters. This process is known as the Clearlogx Process.

Achievement: The new water treatment process installation is presently controlling the pH and particle charge on the water that is being fed to the membrane filters. The benefits achieved are numerous:

- Reduced need for treatment chemicals
- Reduced membrane filter backwashes (less "wasted" water)
- Extended membrane filter service life
- Improved drinking water quality

Also included in the project is a new raw water intake on Colorado River, which provides an additional

barrier to the debris-laden water of the river by serving as a buried, pre-filter to the intake pumps. The old intake was causing localized degradation of the river due to bank erosion and shallow pools that promoted algae growth and warm water. Also, the old intake was a hazard to the anglers who are a big part of the Town's tourist economy. The new river intake is buried and includes reconfiguration of the river channel with a plunge pool and boulder cross vane structure that help oxygenate the water, promote aquaculture, and stabilize the river banks and cross section. The new intake and river reconfiguration also enhance the adjacent recreational facilities that include a campground, hiking trail and Town park with ball fields.

Transferable: The funding, phasing, technical and program management approaches utilized in this comprehensive water system upgrade are transferable to other small municipalities that are faced with similar raw water supply system issues. The total-systems approach for membrane treatment is the culmination of applying past experience in membrane filter operations to lay the foundation for a new, updated approach to the design of membrane filtration treatment systems. The new approach enhances the capabilities of the membrane filter system to address variable raw water quality. This process will help other communities improve operating efficiency, extend equipment service life and improve the quality of their produced drinking water.

Cooperation: This project involved the cooperation of many agencies including Colorado Department of Public Health & Environment and the US Army Corps of Engineers for a 404 Permit to install the intake in Colorado River. Other agencies included Grand County, Town of Hot Sulphur Springs, local residents, Mountain Parks Electric Inc., Grand Environmental Services, and numerous subconsultants.

Summary: Town of Hot Sulphur Springs utilized an innovative treatment process and a fast-track approach to rebuild and modernize its water supply and treatment system to resolve an emergency "boil order" situation. The improvements and the installation of a unique water treatment system are now delivering safe, clean and abundant drinking water to the citizens of Hot Sulphur Springs. These upgrades included a new river intake infiltration system on Colorado River, an innovative application of a membrane filtration treatment process, a new clear well at the plant, and a new 220,000 gallon water storage tank installed on the mountain above the Town. ●