

# New York's record-breaking UV on track for 2012

● The world's largest installation of ultraviolet disinfection for municipal drinking water treatment is on target for operation in 2012. **JIM FORCE** reports on progress.



Construction work at New York's new UV treatment facility. Courtesy NYCDEP.

**C**onstruction of the world's largest facility using ultraviolet light to disinfect a municipal drinking water supply is on schedule, with completion and initial operation now barely two years away. 'The facility is scheduled for startup in February 2012,' reported Angel Roman, spokesperson for the New York City Department of Environmental

## Protection (NYCDEP).

The \$1.4 billion (€0.9 billion) plant, located in Westchester County, New York, will treat an average of 1.3 billion gallons (4.921Mm<sup>3</sup>) of water daily from the Catskill and Delaware reservoir systems, which supply most of the city's daily water demand. It will have the overall capacity to treat more than two billion gallons a day – all of the city's drinking water needs even

during peak demand times.

The NYCDEP awarded the contract to construct the facility to the joint venture of Skanska USA Civil (White Plains, New York), ECCO III (Yonkers, New York), and J.F. White (Framingham, Massachusetts). A joint venture of Malcolm Pirnie (White Plains, New York) and CH2M Hill (Englewood, Colorado) is serving as the construction management team. The project designer is a joint venture of Hazen and Sawyer (New York, New York) and CDM (Cambridge, Massachusetts). Trojan Technologies, London, Ontario, Canada, is supplying the UV technology.

Paul Whitener, CH2M Hill's project manager, says the project is slightly ahead of schedule, with all major excavation complete, and concrete foundations and all structural steel scheduled for the next couple of months.

'This is a landmark facility within the drinking water industry,' he adds. 'We are proud to be partnering with Malcolm Pirnie and the NYC Department of Environmental Protection to provide high-quality drinking water to the DEP's nine million customers.'

New York City provides its eight million residents and one million upstate customers with high quality drinking water drawn from the largest unfiltered surface water supply in the world. Since the mid-1800s, when local well water sources became polluted as the city's population grew, New York has transported drinking water from reservoir systems located as far as 100 miles (160km) north of it. Most of the water moves by gravity through pipes and aqueducts, saving significantly on energy requirements for pumping. Total storage capacity in the reservoir systems is 580 billion gallons (2195Mm<sup>3</sup>). The Catskill reservoir system, developed in the early 1900s, and the Delaware reservoir system, built in stages between 1930 and 1970, meet most of the city's demand.

Several interconnections among the three water systems increase flexibility by permitting exchange of water from one to another, buffering the effect of localized droughts and capitalizing on

excess water in any of the three watersheds.

The 1996 amendments to the United States Safe Drinking Water Act now require that all drinking water drawn from surface water supplies must be filtered unless the government grants a waiver (known as a Filtration Avoidance Determination, or FAD). To satisfy the requirements of such a waiver, the NYCDEP agreed to build the UV disinfection plant, supplementing the existing chlorination disinfection facilities for the Catskill and Delaware supplies. According to construction estimates, a filtration plant would have been much more expensive.

The new UV system is designed to achieve up to 99.9 percent (3-log) inactivation of cryptosporidium to meet the future requirements for unfiltered water. The system consists of 56 UV units each sized to handle 40 million gallons a day, making them some of the largest ever built.

As reported in a paper at the American Water Works Association annual conference in 2006, project designers and the city evaluated both medium pressure and low pressure-high output UV lamp systems

for an extensive range of factors, including staffing requirements, power consumption, and maintenance. In the end, the low pressure / high output units were selected based on 30-year life cycle (present worth) costing.

The UV units consist of stainless steel disinfection chambers containing an array UV lamps inside quartz sleeves that are immersed in the water flow. UV light alters the DNA of water-based microbes, such as giardia and cryptosporidium, and prevents them from replicating.

Trojan was selected after a rigorous validation process which included Trojan building one full-size UV unit designed for the project, which underwent performance tests at an independent test facility in Johnstown, New York.

According to Jennifer Muller, municipal UV market director for Trojan Technologies, her company has supplied some of the largest UV-based treatment units in the world for wastewater disinfection, drinking water disinfection as well as UV-oxidation for environmental contaminant treatment (Madrid, Milan, Rotterdam, Honolulu and Atlanta among them). But the New

York facility is the largest in the US in terms of flow capacity treated as well as the number of UV lamps. Still, design concepts and components are similar to conventionally-sized projects, she says.

'The physical size and weight of each individual UV unit was larger than any we've had to work with previously, but didn't pose any significant challenges,' she says. 'Each unit includes an access hatch sized such that a person can actually climb into the UV unit (for maintenance) and would likely discover that it's larger than some apartments in New York City.'

'New York has taken a big step toward ensuring the continued quality of its citizens' water supply and protecting them from the many diseases that can be caused by water-borne pathogens,' said Marvin DeVries, Trojan's President. 'This facility will triple the UV capacity in the United States.'

The NYCDEP's Roman said the new facility is being funded out of the department's capital projects budget. He said the project would not provide any additional water supply to New York City, but would assure advanced treatment of the existing supply. ●