

Bray Park Drinking Water Treatment Plant, Murwillumbah, Australia

Application – Innovative ultrafiltration membrane system boosts capacity and drinking water quality

Capacity – 100 MLD

Location – Murwillumbah, Australia

Customer assumed operation – August 2010

Challenge

To meet the drinking water supply demands of a regional population that is projected to grow from 70,000 to 120,000 by the end of this decade, the Tweed Shire Council needed to upgrade the 50 million litre per day (MLD) capacity of its existing Bray Park Water Treatment Plant in Murwillumbah, located on the far north coast of New South Wales, Australia.

At the same time, the council had to solve a persistent quality problem with the raw water it drew from the Tweed River to Bray Park. Lengthy periods of heavy rainfall could cause wild swings in water quality, with big changes in colour along with highly volatile, upward spikes in turbidity followed by abrupt decreases in alkalinity. Occasional prolonged droughts spawned algal blooms that made the water smell and taste bad. Farming operations in the steep catchment area introduced more protozoan pathogens into the water.

Solution

The council opted for immersed membrane filtration as the superior way to achieve the water quality it desired for a new treatment plant.

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Because only one plant with this technology had previously been built in Australia to match the 100 MLD capacity of the proposed new facility, the Council needed a supplier who had the experience, a robust installed base, advanced skill set and product features to handle the project. It chose GE and its ZeeWeed* 500 membrane system, with its innovative twin membrane cassette configuration.

With this system configuration, which joins two cassettes before they connect to a header, GE reduced the number of required treatment trains and attained a corresponding reduction in the number of valves, pumps and pipework.

The UF membranes can filter out more organic matter with less coagulant addition than other methods, such as granular filtration. With four treatment trains – each containing a 30 kW pump and eight membrane cassettes within a membrane tank – the ZeeWeed system deployed about 6.5 million membrane fibres to create the large surface area needed to achieve that high 100 MLD flow through the membrane pores.



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Results

ZeeWeed membranes removes most of very fine particles and more than 99.99 percent of microorganisms (bacteria and parasites) from the raw water at Bray Park, along with greater than 99 percent of viruses.

Since the twin cassette option required much less treatment infrastructure, the plant operator has realized major capital and operating cost savings and shrunk the carbon footprint. Because GE and its project design partner, Hunter Water Australia, decided to place the new plant on higher ground at the top of the site and above the existing plant, they didn't need to operate continuously a permeate pump to provide the membrane-driving suction that could accommodate a substantial average daily treatment capacity (i.e. up to 60% of the treatment capacity is achieved by siphoning). That resulted in big savings on power and greenhouse gas emissions.

Economies derived from the GE technology and plant siting for the new Bray Park WTP, which opened in June 2010, are projected to save \$1.1 million over a 20-year period. Treatment capacity has been boosted by 50 MLD and is designed to grow to 150 MLD when that becomes necessary, effectively drought-proofing the Tweed Shire region.

