Drinking Water Pilot Case History:
H2S Removal

Background

A Water Utility wants to bring online a groundwater well to supplement existing drinking water supplies. The well water has high levels (2500 ppb) of hydrogen sulfide (H_2S) which gives the water a rotten egg odor. Removal of H_2S below the aesthetic objective of 50 ppb is required to eliminate odor from the water. A cost effective, low maintenance solution is required with a ~1 mega litre/day capacity (250 gpm).

Solution

Purifics' Cuf (Ceramic Ultra-Filtration) Technology is used to remove the H_2S from the water. A Cuf system was piloted on the site to verify treatment capability, cost structure, to obtain full scale design data and to demonstrate sustainability. The Cuf pilot unit is a standalone system housed in a shipping enclosure that requires only power, communication and water connections as shown below. After piloting the full-scale design is a simple linear scale-up from the pilot platform results.

Performance

The test program was run 24/7, accumulated over 1400 run hours and was remotely controlled. Several sample/drinking water events where used to assess the effectiveness in addition to detailed analytical.

H_2S levels were reduced from 2500 ppb to <6 ppb (detection limit) which exceeded the aesthetic requirements and odor removal requirements. This was achieved while running a membrane flux of 350 LMH and TMP of 2-15 psi. Treatment cost consists of 0.1 kW-hr /m^3 in unpressurized mode.

The test program evaluated several reaction mechanisms before adopting the most advantageous solution. The H_2S is removed and recovered as elemental sulfur and sulfate ion. This is essentially a ZLD Process (Zero Liquid Discharge). The only fluid loss is the periodic flux maintenance rinse which is 0.05% of flow and is sent to the municipal sanitary sewer.

The Consultant for the client brought Purifics' Cuf technology to this municipal drinking water application. The Cuf process displaces the complexity and other operating issues of conventional approaches such as pH shifts or air strippers.

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