

S2.4.3 REUSE OF COOLING TOWER BLOWDOWN WASTEWATER THROUGH MEMBRANE FILTRATION

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Wastewater reuse is one of the fastest growing water treatment segments in the world today. Within the industrial sector, one of the largest and often untapped sources of water reuse is cooling tower blowdown. This water is typically high in hardness, alkalinity and suspended solids, and has a high propensity to foul filtration equipment. In this talk we provide a technical overview of the size, chemical makeup and other characteristics of cooling tower blowdown wastewater and present a spectrum of treatment solutions which incorporate reverse osmosis (RO) membranes to purify and reuse the water within an industrial facility. Discussion is provided on the trade-off between cost and water recovery, as well as operational and design recommendations to mitigate the occurrence of fouling and scaling. Ultrafiltration (UF) is an excellent pretreatment solution to protect the operation of the reverse osmosis membranes from colloids, suspended solids, bacteria and large molecular weight organics. Several case histories will be presented in which ultrafiltration membranes are used upstream of reverse osmosis, illustrating the design and operability of these systems. In one of the examples, a power plant in Beijing, UF, degasification and elevated pH are all used in conjunction to prevent fouling and scaling on the RO membranes, enabling more than 70% of the blowdown water to be reused within the plant.