

DEPENDABLE PRETREATMENT FOUND FOR UF MEMBRANE WATER TREATMENT SYSTEM

Lake Forest is a small upper class community along the west shore of Lake Michigan about 35 miles north of downtown Chicago, IL. In 1890 a group of residents started the Lake Forest Water Company on the present site to provide water for the residents of the community. Prior to the spring of 2004, the Lake Forest Water Plant provided traditional water treatment. Coagulating chemicals were added to the incoming water allowing flocculation to take place and then settlement in an appropriate basin. Next the water was run through gravity media filters with anthracite and sand. After chlorination the water was pumped to an elevated 1,500,000 gallon storage tank. In order to meet the demands of a growing population and the likelihood of more stringent water quality standards in the future, the city board decided that a non-conventional water treatment system should be implemented. New technologies were reviewed causing the core of the new treatment process to change to ultrafiltration (UF) membranes. The design capacity was to be 14 MGD and expandable in the future to 18 MGD if the need arose. There was no shortage of UF system suppliers all capable of meeting the challenge. However, proper pretreatment is paramount to a successful UF system and the membrane suppliers approached did not supply pretreatment equipment. Algae had always been a real problem for this water treatment plant and now raw lake water was to enter the plant without the addition of any oxidizing or coagulating chemicals. Mechanical filtration to remove all suspended organic and inorganic solids 200 microns and larger would provide the simplest pretreatment solution. But dependability was a key concern. Since water conditions in Lake Michigan can vary considerably from day-to-day and season-to-season, the pretreatment system had to be robust and easy to maintain. Granular media filters take up a lot of space and use a tremendous amount of flush water. Besides, they must be taken off-line for cleaning. The solution was automatic self-cleaning screen filters. Four 14" EBS Filters and PLC controls from Amiad Filtration Systems with 200-micron 316L stainless steel screens were determined by the design engineers to be the best equipment for the pretreatment process. Because of their motor driven suction scanning cleaning design, organic and inorganic filter cakes are removed with equal ease. A 7-psi pressure drop across the inlet and outlet manifolds initiates the cleaning cycle that assures that all four filters are cleaned sequentially and thoroughly. After nearly six months of continuous operation, the pretreatment system has never failed to remove all particles greater than 200 microns in size that could potentially damage the UF membranes and has reduces the suspended solids concentration reaching the membranes by as much as 92%. Membrane water treatment is a proven, rapidly growing technology that depends upon adequate pretreatment requiring no operator and little maintenance. The residents of Lake Forest, Illinois can rest easy knowing they have a water treatment system that can meet the expected population growth and, more importantly, a system that will meet any foreseeable stringent water quality standards, keeping the community safe from water borne illnesses.

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Figure 1



Figure 2