an activated sludge process. In this case, water is treated in process tanks upstream of the membrane tank to produce mixed liquor, which flows to the membrane tank. Permeate is withdrawn through the membrane units leaving activated sludge in the membrane tank. The activated sludge is withdrawn from the membrane tank and divided into waste activated sludge (WAS) and return activated sludge (RAS). The RAS is returned to the process tanks and becomes part of the activated sludge. The influent (raw wastewater) flow rate (Q) is roughly balanced by the total of the permeate flow rate and the WAS flow rate. The RAS flow rate is typically in the range of 2Q to 5Q.

SUMMARY

[0005] This summary is intended to introduce the reader to the invention and the detailed description to follow but not to limit or define the claimed invention.

[0005a] According to a first aspect of the present invention, there is provided a method of operating an immersed membrane system comprising the steps of,

providing a membrane tank having a plurality of immersed membrane units;

feeding influent to the membrane tank;

dividing the influent into multiple portions; and

directing one of the portions of influent to the bottom of each one of the plurality of immersed membrane units.

[0005b] According to a second aspect of the present invention, there is provided a membrane filtration system comprising,

a membrane tank;

a plurality of immersed membrane units spaced apart within the membrane tank; and,

one or more ducts extending from an inlet to the membrane tank to a plurality of openings corresponding to the plurality of immersed membrane units.

[0006] In an immersed membrane system, an influent flows into an open membrane tank, permeate is removed through the membranes, and a concentrate flows out of the membrane tank. The inventors have observed that, despite scouring each membrane unit equally with bubbles, fouling rates can differ between membrane units in different parts of a tank. For example, in a system where membrane units are distributed in a line along a narrow tank, and the tank is fed with influent from one end, the most downstream membrane unit fouls the most. This may be caused, at least in part, by a solids (or other foulant) concentration gradient that develops along the length of the tank. However, the membrane units are typically all connected to common permeate and backwash pipes and operated with the same permeation and cleaning protocols. As a result, either the upstream membrane units are not operated efficiently or the downstream membrane units foul excessively. However, this configuration is used in many immersed membrane plants, including membrane bioreactors (MBRs), among other reasons because it facilitates creating large systems with having multiple parallel membrane tanks. Accordingly, there is already a large installed base of immersed membrane systems with narrow tanks.

[0007] This specification describes an open membrane tank having one or more immersed membrane units. Each membrane unit may have one or more cassettes or other structures containing filtering membranes. Optionally, the membrane units are spaced along the length of the tank. Optionally, the immersed membrane units may have flat sheet membrane elements, which may be located within a membrane case. An inlet is provided on one end of the tank, optionally near the bottom of the tank. One or more ducts are provided