



#### 5-5. Control of Microorganism Growth in RO System

Bio-fouling is one of the most common and severe problems in the operation of RO systems. Thus it is very important to control the microorganism growth using properly designed and operated pre-treatment including an equipment for efficient chlorination and dechlorination (before RO membrane) process.

It is a good idea to build the systems in such a way to reduce spots of stagnant flow such as blind long pieces of piping where microorganisms can easily be settled to grow.

Most of all, checking the microorganism load in the system and sanitizing the system periodically is the usual and best way to keep the microbiological activity under control. The frequency of sampling of microorganisms and analysis depends on the risk of bio-fouling. A daily check of the feed water after dechlorination and a weekly check of all points as shown below is recommended for surface water plants.

- ① Intake before chlorination
- ② After a clarifier or similar sedimentation process
- ③ After filtration units (sand, multimedia, activated carbon or other)
- ④ After dechlorination (usually after cartridge filtration or just before entering RO units in the case that sodium bisulfite is used for the dechlorination)
- ⑤ Concentrate water
- ⑥ Permeate water

The following system checking is very helpful in controlling microbial activity. Open basins or tanks should be disinfected properly at the open source and the part of the system down-stream from it should also be sanitized frequently. The air breathing (ventilation) systems of sealed tanks should be equipped with HEPA filters.

The backwash of the media filters should be done with water free of microorganisms or sufficiently chlorinated water. In general, the water used for disinfection, flushing and cleaning solutions should be of good quality and free of microorganisms (e.g. permeate water).

The whole pre-treatment system including all piping, tanks, manifolds, the retention tanks and filters should be disinfected before each start-up following shutdown times and periodically even when the RO plant is being operated continuously.