Breakdown of organic wastes entering a wastewater treatment plant is accomplished by using a biomass or blend of beneficial microscopic organisms, bacteria, and solids. This converts the non-settleable solids (dissolved and colloidal matter) into settleable solids, carbon dioxide, water, and energy. The biomass must be kept alive by maintaining the proper concentration of dissolved oxygen throughout the treatment process.

When not enough dissolved oxygen is present, at least some of the biomass will die, and the organic wastes will not be properly treated. If this happens, the plant may have to replace the beneficial "bugs" which, in most cases, proves to be very expensive and time consuming. Conversely, when there is too much dissolved oxygen, usually from over aerating, the treatment plant is needlessly wasting costly energy.

The "starred" areas in Figure 1 below show where typical applications for measuring and controlling dissolved oxygen are found in various stages of a wastewater treatment plant.

**Figure 1** Dissolved oxygen monitoring/controlling locations (star symbol) within a typical wastewater treatment plant
Aerobic/A Anaerobic Digester
Most wastewater treatment plants have sludge handling facilities that use an aerobic or anaerobic biological process to treat the sludge, rendering it harmless. When using an aerobic digester the operator wants to ensure the presence of oxygen, similar to monitoring in the aeration basin. When using an anaerobic digester the operator wants to ensure the presence of nitrogen, which is directly correlated to the lack of oxygen.

Final Effluent
When plant effluent is discharged into a lake or river, its dissolved oxygen level must be maintained to sustain the aquatic life near the discharge point. Also, measuring dissolved oxygen at this point ensures local permit compliance for the plant discharge.

Summary
Monitoring dissolved oxygen is an important part of the activated sludge process. It assists in ensuring that there is sufficient dissolved oxygen in the process for the biological activity to take place, and helps to optimize energy usage through controlled air addition. In some cases, aeration accounts for between 2% and 3% of their annual energy costs.

Maintaining a proper level of dissolved oxygen can only be accomplished by using an on-line instrument that will accurately and continuously measure the dissolved oxygen concentration at the various stages throughout the treatment process.

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