



Technical Bulletin Advanced Primary Treatment

Process Description

Advanced Primary Treatment (APT)* is a method of wastewater treatment that utilizes a chemical coagulant/flocculant to remove not only suspended solids but also the soluble organic matter that makes up biological oxygen demand (BOD). APT technology requires the application of a higher dosage of coagulant than that used to achieve normal sedimentation. Normal sedimentation being the removal of common wastewater suspended solids and precipitates generated through the removal of sulfides and phosphates. APT goes beyond this and additionally allows the removal of soluble and semi-soluble organic matter.

The benefits of APT not only apply to primary wastewater treatment processes but are also beneficial to biological treatment operations. APT technology brings many positive improvements to the operation of a biological WWTP, in the way of economic savings, more effective utilization of manpower, and operation improvements.

Major Benefits of APT

APT increases TSS removal in the primary sedimentation stage of the wastewater process and directly reduces BOD loading on the biological stage of the process. Resulting in:

- Reduced energy consumption for biological oxygenation
- Lower biological solids production, resulting in,
 - Lower capital requirements for biological solids handling
 - Lower O&M costs for biological solids handling
 - Increased primary to secondary sludge ratios leading to increased dewaterability of sludge streams
 - Lower disposal costs
 - Increased digester detention time
 - Increased dewatered sludge concentration leading to reduced incinerator energy costs or sludge disposal costs

APT will also provide persistent sulfide odor adsorption, which leads to:

- Reduced odor production in primary sedimentation and sludge dewatering
- Reduced hydrogen sulfide in digester gas

Treatment Protocol

Although, conceptually other coagulants can be used to achieve enhanced sedimentation, by far, ferric chloride has proved to be the most effective and is most commonly prescribed for this application. The APT program requires addition of the Ferric Chloride at a point just upstream of the primary clarifiers. To ensure optimal usage of the coagulant, proper mixing is essential. The addition of an anionic flocculant, 30 seconds to 3 minutes down-stream from coagulant addition is usually the next step required. Though not always required, the addition of anionic polymer helps build strong, dense floc aggregates that will guarantee the optimum removal of BOD from the primary sedimentation stream. Dosage of the ferric chloride will vary according to the concentration of TSS and BOD and the level of treatment desired. Typical levels will vary from 3 to 15 ppm Ferric iron and a typical dosage of anionic polymer will be in the range of 0.5 to 3 ppm of product. In general the higher the dosage of coagulant the more BOD will be removed. Coagulant dosage will be limited by the amount of alkalinity available to react with the ferric chloride and by process economics.

California Water Technologies realizes that each treatment facility must be approached individually. While the basics of water treatment remain constant, differences in water quality, treatment requirements, facility capabilities and staff expertise generally require solutions to treatment that are custom designed for the facility. Contact your California Water Technologies representative for knowledgeable, insightful, and fully committed assistance in developing solid solutions to your treatment needs.

*APT is also known as Chemically Enhanced Primary Sedimentation