
MEMORANDUM

TO: SINTANA VERGARA

FROM: GARRETT WENDEL

SUBJECT: REVIEW OF THE WASTEWATER FACILITY IN ARCATA

DATE: OCTOBER 3RD, 2018

Purpose: The objective of this memorandum is to provide an overview of the processes and the management of wastewater through the Wastewater treatment plant observed on September 28, 2018 in Arcata California.

Discussion: The arrival to the wastewater plant lead to the beginning of the facility, in terms of treatment, where the wastewater is pumped into the pretreatment section. The water is forced uphill with the help of rotating drills and most of the larger objects are caught with metal screening. It was made clear that disposable wipes were not actually disposable due to being made out of rayon which keeps its form in water and tends to wrap around machinery.

From the pretreatment the effluent is sent to a primary clarifier where the water is detained for up to 3 hours to allow the particles to settle at the bottom of the clarifier. The effluent before reaching the plant will have a BOD of roughly 200-300 mg/L and can be lowered to about 100-150 mg/L after the primary treatment, which is still much higher than the standards that must be met. The effluent flow is greatly affected by the weather and seasons and this is due to how old the piping systems that were put in place when Arcata was first established. This piping system is very inefficient and can leak into the ground causing more water to reach the plant. The seasons also have a major effect on the flow of effluent where the flow in summer can be 1.5 million gallons daily compared to winter which can have up to 3 million gallons a day, forcing the plant to use multiple primary clarifiers.

Sludge is sent form the primary clarifier to a sludge digester where it is detained for 30-40 days to have anaerobic respiration performed on it. The products are methane and a less hazardous sludge filled with organic matter. The sludge is then sent to the drying beds and is graded on the quality of what the sludge is composed of.

The effluent flows from the primary clarifier and is pumped to secondary treatment. Arcata wastewater treatment plant utilizes a power free system called the oxidation ponds where much of the BOD is removed from the wastewater and also allows more sediment to settle. This process is unlike most other facilities that use a rotating shaft to aerate the water for microorganisms to use, costing a lot of energy in the process. Instead Arcata wastewater treatment plan uses the ponds natural environment such as algae to create enough oxygen that is demanded by the microorganisms to decompose organic matter.

The effluent then flows to the next step of secondary treatment which are called the treatment wetlands. These wetlands are used to breakdown unwanted algae using tall cattail plants and to further reduce BOD concentration.

Tertiary treatment is done in the enhancement marshes where the BOD is further reduced and is also used as a filter for phosphorus and nitrogen. The water from here will get chlorinated then dechlorinated and cycled back in order to dilute the water before exiting the facility.

The final step is disinfection which is mainly to rid the water of any pathogens that may still be present. Currently the facilities is using chlorine, a potentially hazardous and expensive chemical, to disinfect their water but they plan on solely using UV lighting to safely disinfect the water in the near future.

Conclusion: The Arcata Wastewater Treatment Plant uses the standard pre treatment, primary treatment, secondary treatment, tertiary treatment and disinfection model to ensure that the incoming water leaves the facilities safe and fit for public use. Although the whole process is the standard model this was the first facility to incorporate oxidation ponds to create an energy clean process into the system.