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CE 321  
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### Easton Wastewater Treatment Plant Discussion Questions

1. *What is the typical flow rate?*

The Easton Wastewater Treatment Plant stores 10 million gallons of water, and discharges about 5 million gallons of water a day.

2. *Does Easton have a combined sewer system? If so how do storms affect the treatment process?*

Yes, the City of Easton does have a combined sewer system. For a storm to affect the treatment of the water, there needs to be a heavy amount of precipitation. If there is a little light rain, there is no effect. If it rains a normal amount, the flow going in will increase by a few gallons. During a heavy rainstorm, overflow is collected, disinfected, and then discharged into the river, while the regular flow continues through the treatment process.

3. *Discuss various treatment steps at a typical WWTP.*

When wastewater flows into the treatment plant, any inorganic solids are pumped into the pumping station. At the EWWTP, eight pumps pump about three tons of inorganics every week. Next, chambers remove other solids from the water, such as pebbles and sand. Some treatment plants will even rake these solids out manually. Next, the wastewater will go to the primary clarifiers, where any other solids are allowed to settle and any floating materials are allowed to surface while the water moves at a slow velocity. Scrapers pick up the solids and bring them elsewhere to be brought to landfill (centrifuges also separate water and solids). Eventually, the water is sent to the oxidation ditch, where it is strongly pumped and aerated, and "bugs" (bacteria) eat up all the smaller inorganic particles. Next, the water goes to secondary clarifiers, until the bugs need to eat again. After being treated with chemicals, the water is discharged into the river. The water that is discharged from EWWTP is actually cleaner than the river water.

4. *What chemicals are added, and why?*

The Easton Wastewater Treatment Plant adds 3 essential chemicals: magnesium hydroxide is added to neutralize acids, in other words adjusting the pH (adds alkalinity). Chlorine is used to disinfect the water (like at most WWTPs). Finally, sodium bisulfite is added, which gets rid of the chlorine before the water is discharged into the river. Adding this chemical is an important step because chlorine has the potential to destroy the river's ecosystem.

5. *Which river is the treated water emptied into? Compare the river flow to the effluent flow.*

The treated water is emptied into the Delaware River. The effluent flow is about five million gallons a day, which does not highly impact the river's flow.

6. *Is chlorine used in any part of this treatment?*

Yes, chlorine is used in this treatment to further disinfect the water after the magnesium hydroxide adjusts the water's pH. The chlorine is why the sodium bisulfite is also added, for it gets rid of the chlorine before the water flows into the Delaware River.

7. *Are there any water treatment plants downstream, if so how far?*

Yes, the next treatment plant is 20 miles downstream. This plant is much larger than the Easton plant, for it has a larger discharge and stores 33 million gallons of water (as opposed to the 10 million Easton stores).

8. *What is the average BOD entering the EWWTP, and the average BOD leaving the plant?*

The average BOD concentration entering the plant is about 3.29, and leaving is about 6.44.

9. *What is the most dramatic event that has taken place at this particular treatment plant in the past 20 years?*

The most dramatic event that has occurred at the EWWTP was the flooding from the Delaware River in 2005/2006, when the gage river height rose several feet. These floods were catastrophic to Easton Pennsylvania.

10. *What upgrades have been made to comply with EPA, DEP, and local regulations?*

So far, the EWWTP has installed centrifuges to separate solids from the wastewater (to use with primary clarifiers), they have replaced many tanks, and they have replaced most of the plant's original equipment from when it was built in 1953.