

ANALYSIS OF A SEWAGE TREATMENT PLANT A FIELD TRIP

Introduction:

Urban sewage consists of household wastes, industrial wastes and street runoff. Much of the household sewage consists either of food products which made it into the garbage disposal rather than into the body, food which made it through the body undigested, food materials which were absorbed and modified before being excreted or secreted onto the skin to be washed off later, and those which work their way into clothing before entering the water in the washing machine. Street runoff often contains oils and grit. Industrial wastes vary but are not supposed to contain hazardous wastes. In recent years an attempt has been made to keep street runoff separate from the sewage waste waters. It may then be processed differently.

The treatment of urban sewage consists of three phases: primary, secondary and tertiary treatment. These are briefly described below.

Primary Treatment generally involves first mechanically filtering out large materials such as sticks, tires, rags etc. It may also include the sedimentation of grit and other heavy solids and the skimming of floating oil and grease from the surface.

Secondary Treatment involves biological digestion of biodegradable organic wastes. This is usually an aerobic process requiring large amounts of oxygen. This process should reduce the biological oxygen demand (BOD) by about 90%. (That is the amount of oxygen needed to decompose these compounds, e.g., the amount that would be taken from a lake if the sewage were dumped into a lake.) This process is carried out by bacteria which are settled from the water before the water is released into natural bodies of water.

Tertiary Treatment involves removing mineral nutrients and other compounds remaining after secondary treatment. This may be done by chemical means or by biological means such as running the sewage through a marsh to remove most of the nutrients, heavy metals etc.

The sewage plant effluent may be treated with chlorine or ultraviolet light to kill any bacteria and other microorganisms which remain after the treatment process.

The treatment of sludge from the primary settling tanks and the sludge from the secondary bacterial settling tanks (activated sludge) may differ from plant to plant. Often the two sludges are treated differently. Sludge from small towns is often used on farmland. Sludge which contains heavy metals, especially cadmium which is carcinogenic, should not be used for treatment of land on which agricultural products might be grown. Cities with various industries must find other ways to dispose of their sludge.

II. A trip to The Landis Sewerage Authority

You will have the unique opportunity to visit one of the most state of the art sewage treatment plants in South Jersey. The Landis Sewerage Authority provides treatment for 80 square miles of land in and around Vineland NJ. The plant is located on 1776 South Mill Rd. Take highway 55 (south if leaving from Rowan) and exit at **32A (both A and B are at the 32 exit, B is the second exit at the 32 interchange)** which is highway 56, towards Vineland. At the first light (there will be an automotive dealership on the left and Adamo's Deli on the right) make a right on to Mill Rd. Go to the

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III. Field Questions

1. What is the daily capacity of The Landis Sewerage Authority?
2. Does LAS have the capacity to deal with street runoff during heavy rainstorms?
3. List several things removed from the sewage during primary treatment and tell how each type of material is removed. What happens to this material after it is removed?
4. How much does primary treatment reduce the BOD?
5. Explain how this sewage treatment plant carries out secondary treatment of the sewage. Include what types of organisms are involved, what they feed on, what is added to the sewage to make them grow and what they remove from the sewage.
6. What happens to the bacteria which carry out the digestion of the sewage? Tell how they are taken out of the sewage and all of the places they might go after being taken out.
7. Where do the carbon compounds which are removed from the sewage go?
8. Does The Landis Sewerage Authority perform tertiary treatment? It should be pointed out that if the plant itself doesn't do tertiary treatment it must be done by the habitat into which the effluent goes. If the plant doesn't do tertiary treatment, where is it done?
9. What is left in the sewage effluent when it is dumped into the receiving waters?
10. Does The Landis Sewerage Authority ever dump raw sewage into the receiving waters? Are there ways other than plant capacity to help prevent the dumping of raw sewage during heavy rains?
11. Is the sewage effluent chlorinated or ultraviolet light before release into the receiving

waters? How effective is this treatment against viruses?

12. If anaerobic digesters are used at The Landis Sewerage Authority, tell what they are used for and what the methane which they produce is used for.

IV. Field Notes: