



Tour of Regional Water Reclamation Facility

High School Physical Science | Fall Module 3 | Regional Water Reclamation Facility

NGSSS Big Idea: Standard 17—Interdependence

Benchmark Code & Description:

SC.912.L.17.15—Discuss the effects of technology on environmental quality.

SC.912.L.17.16—Discuss large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surfaces and groundwater pollution.

SC.912.L.17.17—Assess the effectiveness of innovative methods of protecting the environment.

NGSSS Big Idea: Standard 8—Matter

Benchmark Code & Description:

SC.912.P.8.2—Differentiate between physical and chemical properties and physical and chemical changes of matter.



LEARNING GOAL/OBJECTIVE

Students will learn how scientists designed a system to reduce impacts on the environment from a basic human function and turn a waste product into a resource.



PREREQUISITES

Review:

- Process Diagram
- Applicable Textbook Sections
- RWRF Safety Rules (see Support Materials)



VOCABULARY

See vocabulary sheet.



HANDS-ON ACTIVITY

Tour of the Regional Water Reclamation Facility.

Provided Materials:

- Clipboard/Pencil
- Process Diagram

Career Options: Engineer (BS Degree) , Mechanic (Certification), Electrician (Certification), Instrumentation Specialist (Certification), Operator (High School Diploma and Certification)

Lesson Steps:

1. Staff will tour students around the water reclamation facility.
2. Operators will emphasize chemical reactions that occur during the different processes.
3. Students are shown the SCADA system.
4. Discuss responsibilities, job description and educational requirements of operators.



Regional Water Reclamation Facility Physical Science Vocabulary List

Activated Sludge—small clumps of organisms that grow in wastewater. It's called "activated" because the particles are alive with microorganisms.

Aeration—combining air with a liquid

Aerobic—to need oxygen.

Aerobic Digestion—the process of stabilizing sludge.

Anaerobic—not needing oxygen.

Biosolids—solids that have been treated enough to become fertilizer.

Clarifier—a tank that lets the solids settle to the bottom.

Colorimeter—a meter that uses light to determine chemical concentrations. When light is passed through a sample some is absorbed and the meter measures the difference.

Conductivity—a measure of the amount of electricity that can pass through water.

Disinfection—the process of killing or disabling pathogenic organisms.

Dissolved Oxygen (DO)—a measure of the amount of oxygen that living organisms can use to survive. Usually measured in milligrams per liter (mg/l).

Effluent—treated wastewater ("reclaimed water") leaving the plant.

Influent—wastewater flowing into the wastewater treatment facility.

Microbe/Microorganism—microscopic organisms that can be either single-cell or multi-cell.

MLSS (Mixed Liquor Suspended Solids)—the mixture of solids and water in the aeration tank.

Nutrients—elements necessary for organisms to live and grow (including carbon, nitrogen, phosphorus).

pH—a measure of how acidic ($\text{pH} < 7$) or how basic ($\text{pH} > 7$) a solution is.

Phosphorus—one of six essential elements needed by all life forms to survive.

Potable Water—water that is safe for people to drink. This is the water that comes from homes.

Preliminary Treatment—the first treatment process that removes larger particles and heavier grit particles (sand, gravel, metal or glass).

Reagent—a chemical added to a system to bring about a change.

Reclaimed Water—treated wastewater that can be used for a beneficial purpose.

Sand Filters—filtration through sand.

SCADA (Supervisory Control and Data Acquisition)—computer system that monitors pumps, motors and plant processes.

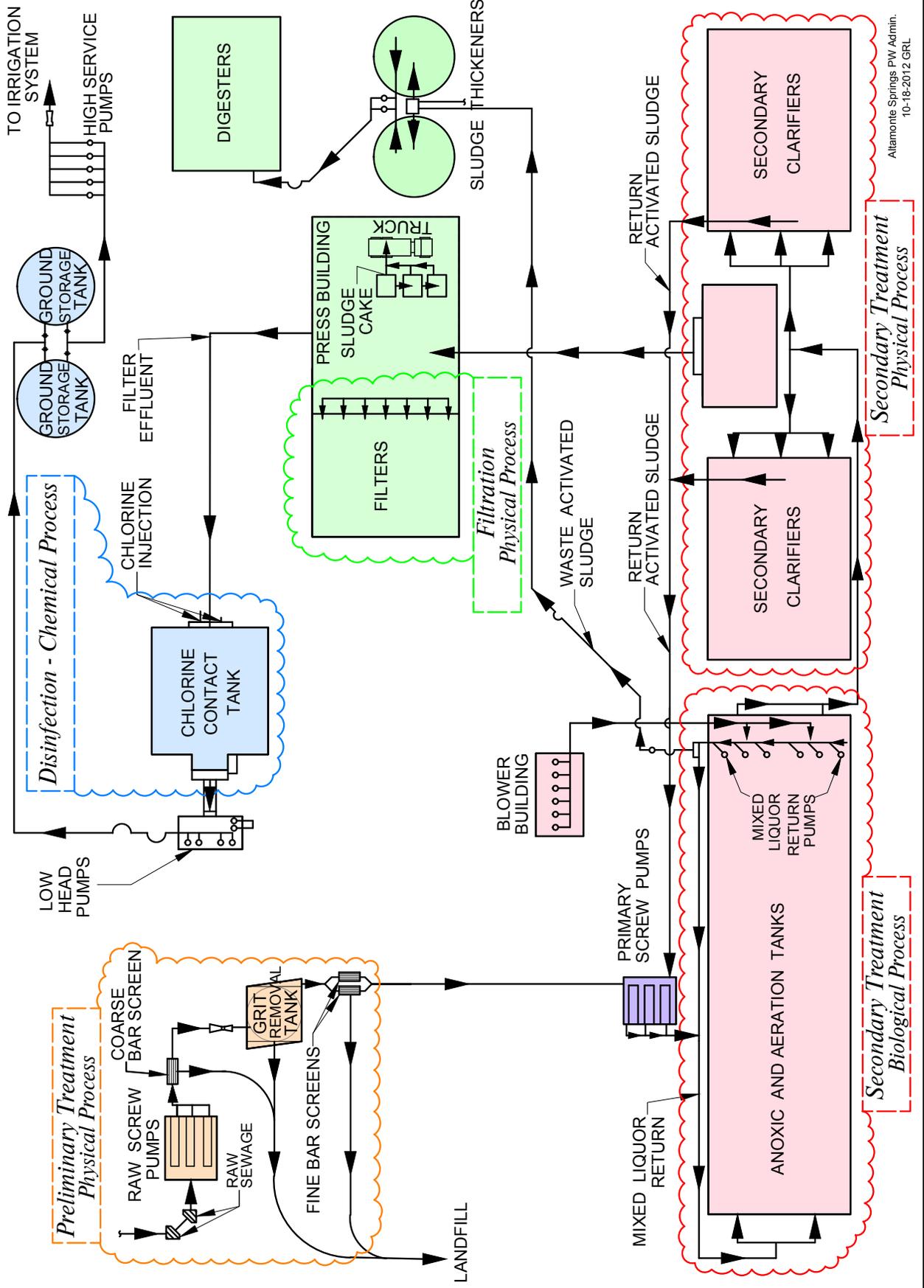
Secondary Treatment—the third process in the treatment plant that includes the aeration tanks and secondary clarifiers. The wastewater is treated by microorganisms in the aeration tank then are removed (settle to the bottom) in the clarifier.

Turbidity—amount of suspended and organic matter in a solution.

Wastewater—water that has been used for purposes such as bathing, cooking, washing clothes, toilets, etc.

Water Reclamation—the physical, chemical and biological process of removing contaminants from wastewater to produce a reusable water source.

ALTAMONTE SPRINGS WATER RECLAMATION FACILITY



Altamonte Springs PW Admin.
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