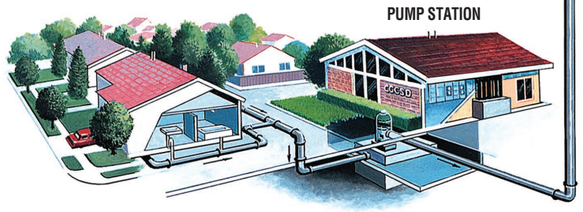
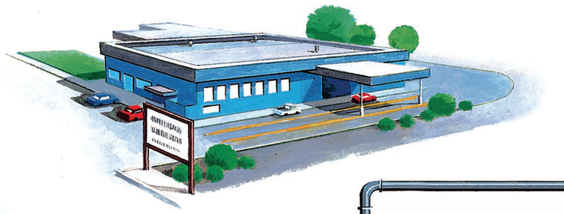
# Following the Flow—CCCSD's Wastewater Treatment Process

Central Contra Costa Sanitary District (CCCSD) provides wastewater collection and treatment services for more than 448,000 residential and business customers throughout central Contra Costa County. Whatever they flush or pour down an inside drain comes to our treatment plant.

Each day, about 45 million gallons of wastewater flow by gravity to the treatment plant through more than 1,500 miles of underground pipe in our sewer collection system. In hilly areas where gravity flow isn't possible, 18 pumping stations throughout our service area lift sewage to the main sewer trunk lines that flow to the plant in Martinez.



PUMP STATION



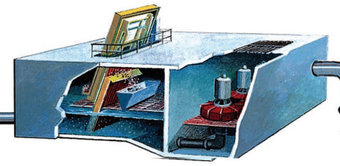
**HOUSEHOLD HAZARDOUS WASTE COLLECTION FACILITY**

The household hazardous waste (HHW) collection facility, located at CCCSD's plant site, provides the community with an alternative to dumping toxics down household drains. The permanent facility allows residents to dispose of or recycle common HHW, such as pesticides, motor oil, batteries, fluorescent lamps, and paint.

**HYDROGEN PEROXIDE**

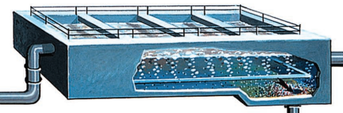
Hydrogen peroxide is added to the wastewater for odor control just before it enters the plant.

The wastewater flows through bar screens where rags, trash, branches and other large debris are mechanically raked from the sewage. This debris is then ground up in mechanical grinders and returned to the treatment process.



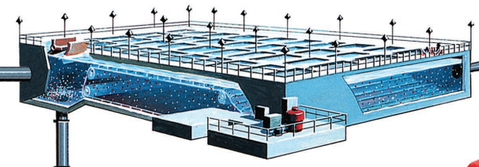
BARSCREEN/HEADWORKS

The screened wastewater is pumped to the pre-aeration tanks where sand and silt (grit) settle to the bottom of the tank and are pumped to the dewatering process.

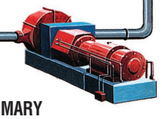


PRE-AERATION

The wastewater then enters primary sedimentation tanks (clarifiers). Material that floats (scum) is skimmed, thickened and later burned in the furnace. Material that settles to the bottom (sludge) is pumped to a centrifuge for further dewatering.

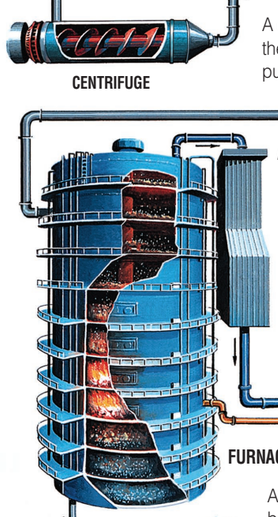


PRIMARY SEDIMENTATION



PRIMARY EFFLUENT PUMP

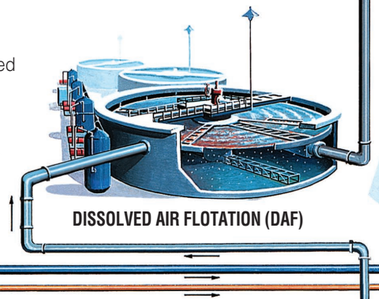
Steam from the process generates air (via a turbine and blower) that is bubbled through the wastewater in the secondary aeration tanks. An abundance of oxygen is needed to keep bacteria alive during secondary treatment.



CENTRIFUGE

A centrifuge is used to remove water from the sludge. The dewatered sludge is then pumped to the furnace for incineration.

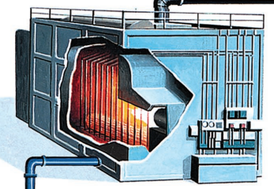
The waste-activated sludge is separated from the water in the DAF process. This thickened sludge is combined with primary sludge and sent to centrifuges.



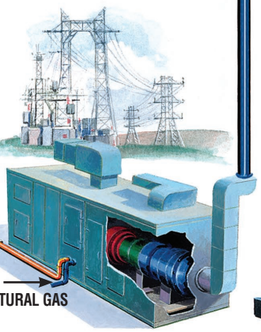
DISSOLVED AIR FLOTATION (DAF)

The waste-heat boiler uses heat recovered from the furnace exhaust to produce steam. The steam is piped to a turbine which drives the blower to produce air for the aeration tanks.

WASTE-HEAT BOILER



The cogeneration facility uses natural gas and methane gas from the landfill to produce electricity and steam, providing 90% of the plant's daily power needs.



LANDFILL GAS

NATURAL GAS

COGENERATION

TURBINE

BLOWER



AIR POLLUTION CONTROL

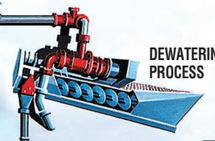
A 4-story, multiple-hearth furnace, fueled by methane gas from a local landfill, incinerates the sludge. Dry and wet scrubbers provide air pollution control for the furnace exhaust. The sterile ash from the furnace is hauled off-site and combined with other waste products to produce a soil amendment.

FURNACE

At a landfill site, bacteria feed off decomposing garbage and produce methane gas. This gas is utilized by the plant to fuel the furnace and auxiliary boiler.

LANDFILL GAS

The dewatered grit is now hauled to the local landfill.



DEWATERING PROCESS

GRIT

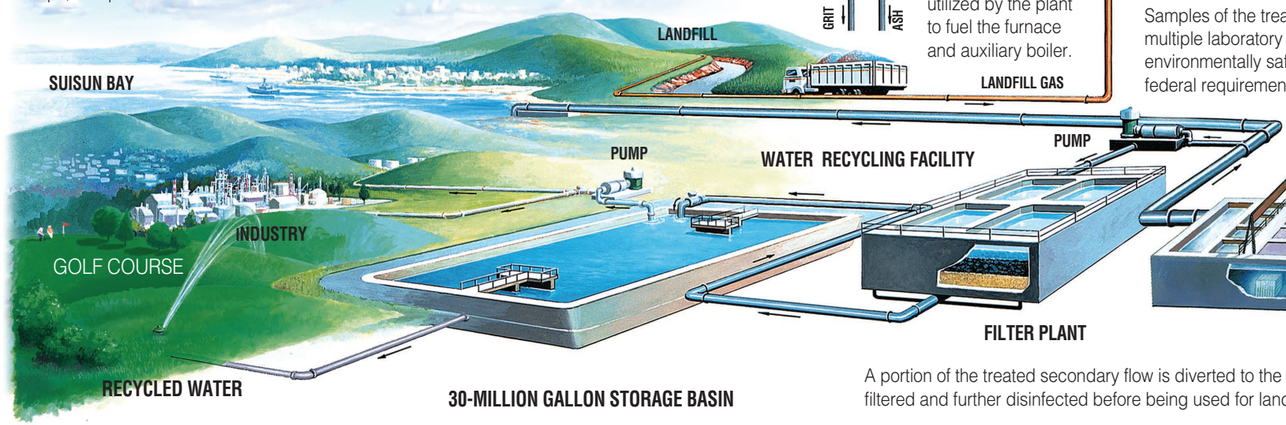
ASH

The wastewater is then disinfected. About 10,000 UV light bulbs are submerged in channels to safely disinfect treated wastewater flowing through them. The UV light breaks down the DNA in the bacteria, destroying their ability to survive and reproduce. Most of the disinfected wastewater is then discharged into Suisun Bay. A portion is diverted to the water recycling facility.

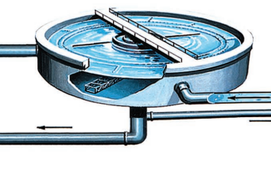
Samples of the treated wastewater undergo multiple laboratory analyses to ensure the water is environmentally safe and complies with state and federal requirements for water quality.

In the secondary clarifiers, the bacteria (known as activated sludge) sink to the bottom of the tank. A portion of the bacteria is pumped to the dissolved air floatation thickeners and later to the furnace for incineration. The remaining portion is returned to the aeration tanks where bacteria again break down the organics. The water that comes off the top of the clarifier has more than 95% of the impurities removed.

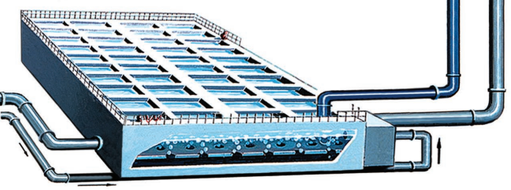
Primary treated wastewater containing dissolved and suspended organic material is pumped to the aeration tanks. Here, secondary treatment occurs as bacteria biologically break down the organics into carbon dioxide and water.




A portion of the treated secondary flow is diverted to the recycled water filter plant where it is filtered and further disinfected before being used for landscape irrigation and other purposes.



SECONDARY CLARIFIER



SECONDARY AERATION

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