

Irvine Ranch Water District of California's Water Reclamation Plant

This is a pictorial tour of my trip to the Irvine Ranch Water District of California's water reclamation plant. They process 15mgd of wastewater through primary, secondary and tertiary treatment. The reclaimed wastewater is used mostly for irrigation of farmlands and landscaping but some goes to other uses such as flushing toilets in large buildings and filling local reservoirs.

Headworks

- Wastewater comes in to the headworks through 56-inch mains. These are the two headworks mains.



Behind each of the pumps is a basin like this one. Those two metal cylinders are grinders; they spin around. As the raw wastewater flows through, they grind any solids so the solids won't get stuck in later steps.



This is a close up of the grinder and the raw sewage.

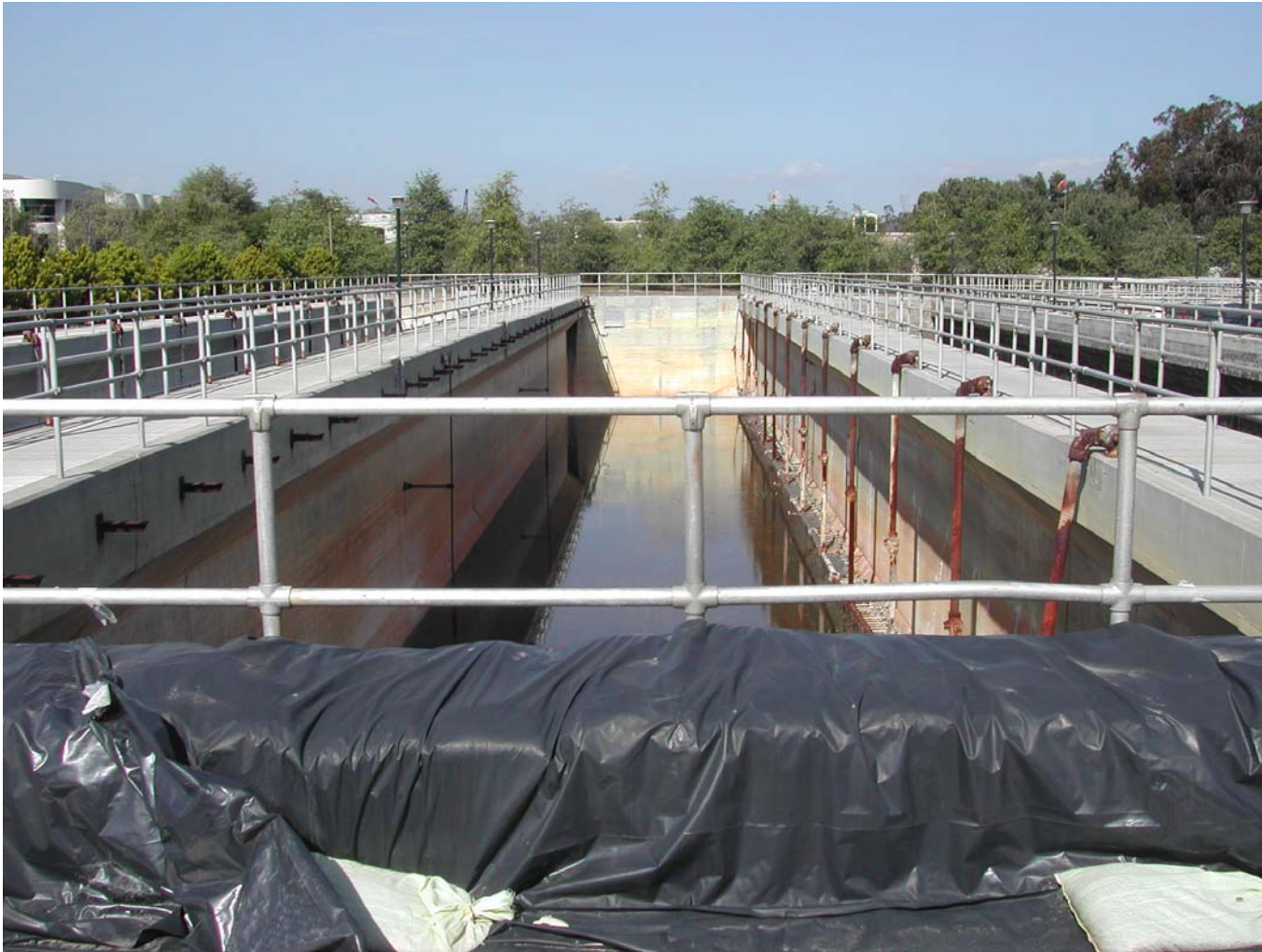


Primary Treatment

Next, the water goes to primary treatment. These are the primary clarifiers. The water spends about 2 hours in these long basins with scrapers (you can see them in the secondary treatment part). The ones with the wastewater are covered, because of odor problems. They are about 20 feet deep.



This is how long the primary clarifiers are. However, this tank is 30 feet deep and the primaries in use are only 20 feet deep. This will be a primary clarifying tank after the plant is remodeled. Right now the plant can only process 15 mgd of wastewater, but needs to process 33 mgd for the future.



These pipes going out of the primary clarifiers go to the air scrubber building which is the pink one. The white tank in front is filled with sodium hydroxide which they use to clean the odor out of the air.



The wastewater reclamation plant gets its highest inflow in the morning and evening. After the water leaves the primary clarifiers, if it is a high flow time, some of the water is pumped, using this pump, to one of two holding tanks. If it is not a high flow time, the water from these two tanks is processed along with the rest of the water coming in.



Here are the two tanks, side by side.



Here are some ducks swimming in the wastewater that has only had primary treatment!



The water cannon and the sprinklers on the side of the tank are used to clean off the sides when the water is at a low level. Notice the birds, hanging out in the wastewater.



Secondary Treatment

There are five secondary treatment tanks, each this long. The water goes through in this long tank and concrete walkways run over the whole thing. The tank has several parts: activated sludge addition, aeration, scraping, and flow over a weir. It takes about four hours for the water to get through this part.



When the water first enters the secondary tank it is this weird murky brown color. This is a mix of wastewater and activated sludge.



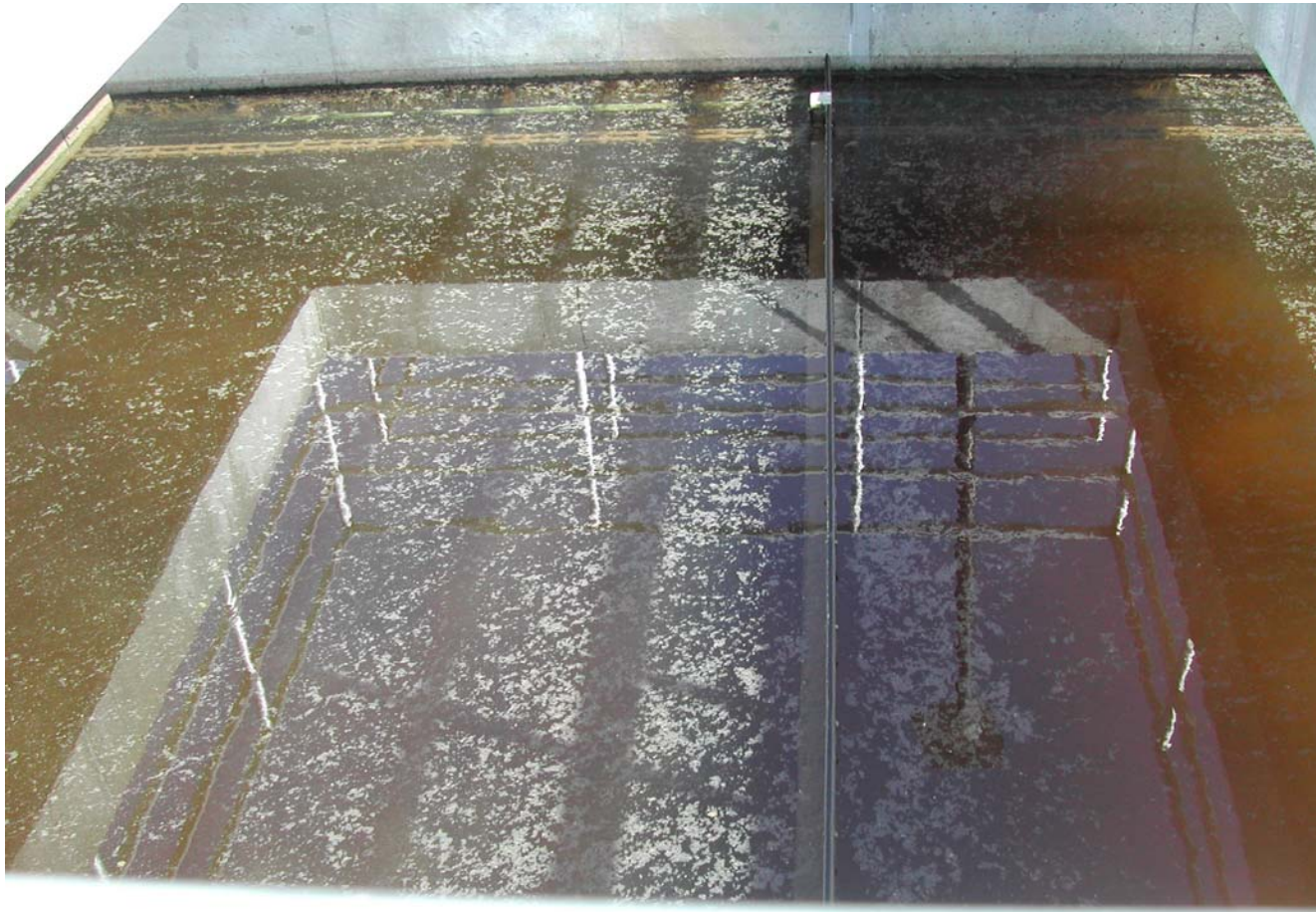
Next, the water flows into a baffled area, on one side the water is not being aerated, on the other side, it is.



More aeration-These long tanks are about 20 feet deep. Yum.



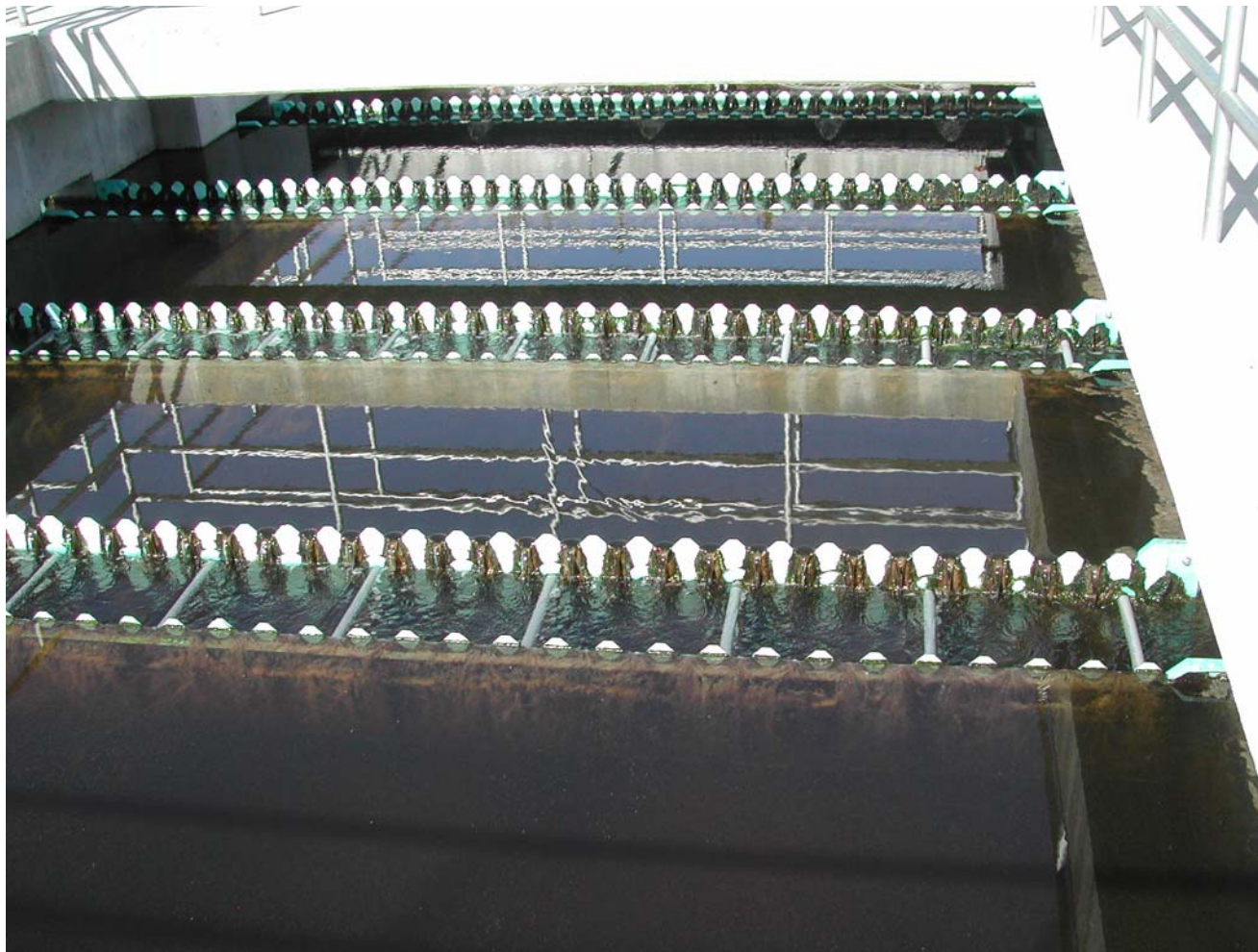
Here is a scraper. It is moving from left to right, traveling back toward the end of the tank where the water enters. When it gets there, it travels in a loop, scraping the bottom of the tank on its way from right to left. The scrapers are spaced about 20 feet apart.



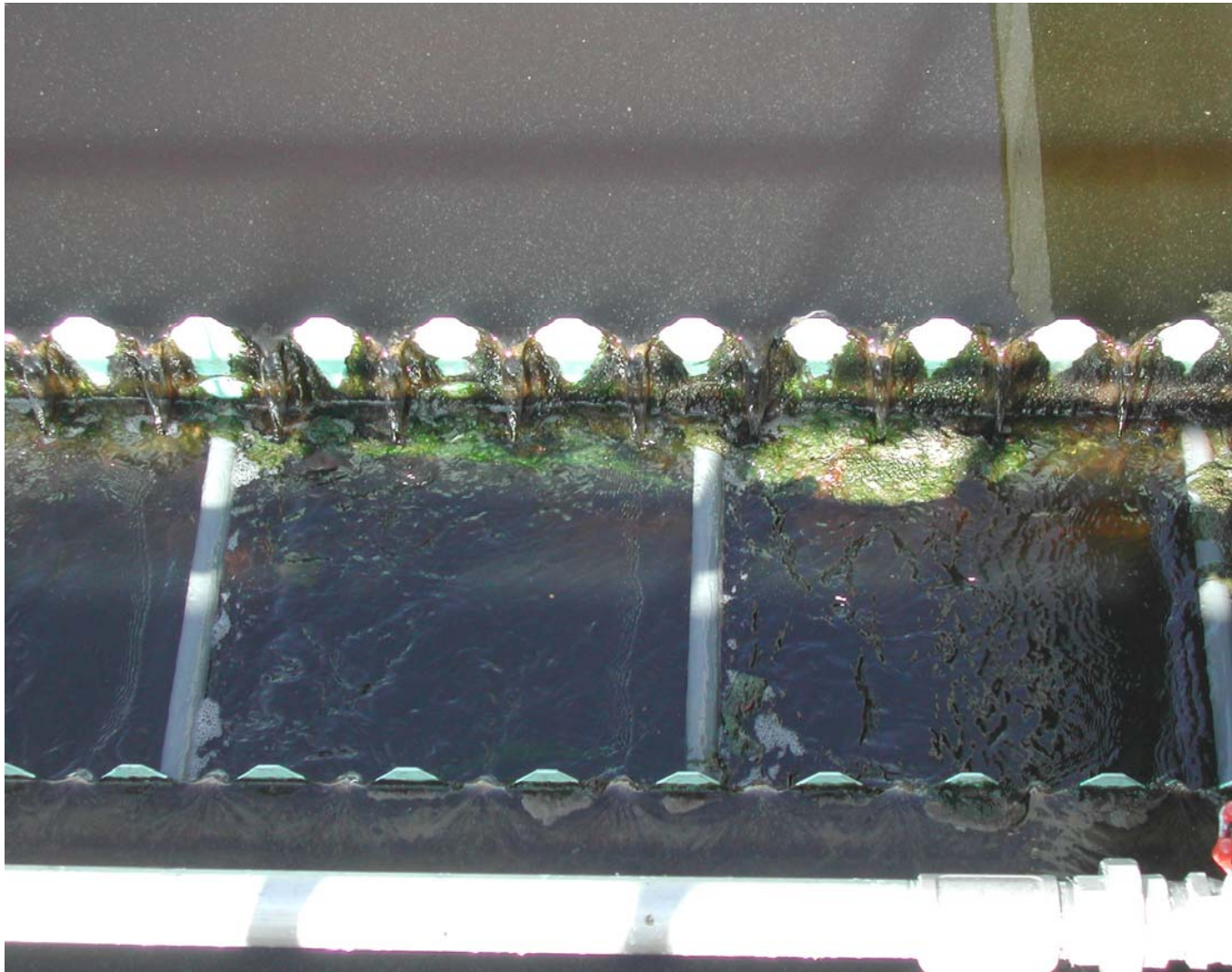
The scraper travels back toward the beginning of the secondary stage, where the water entered. Here the scrapings are being pushed into a circular collector where they are removed. The water spraying onto the goo keeps it from getting crusty.



The water leaves through a weir. Water can flow in to either side of the weir.



A close up of the weir.



As the wastewater leaves secondary treatment aluminum sulfate is dripped into the water as a coagulant. Only 8 gallons of this aluminum sulfate is used per day to treat 15mgd of wastewater. It is dripped in through the little blue tank on the side, which is computer controlled.

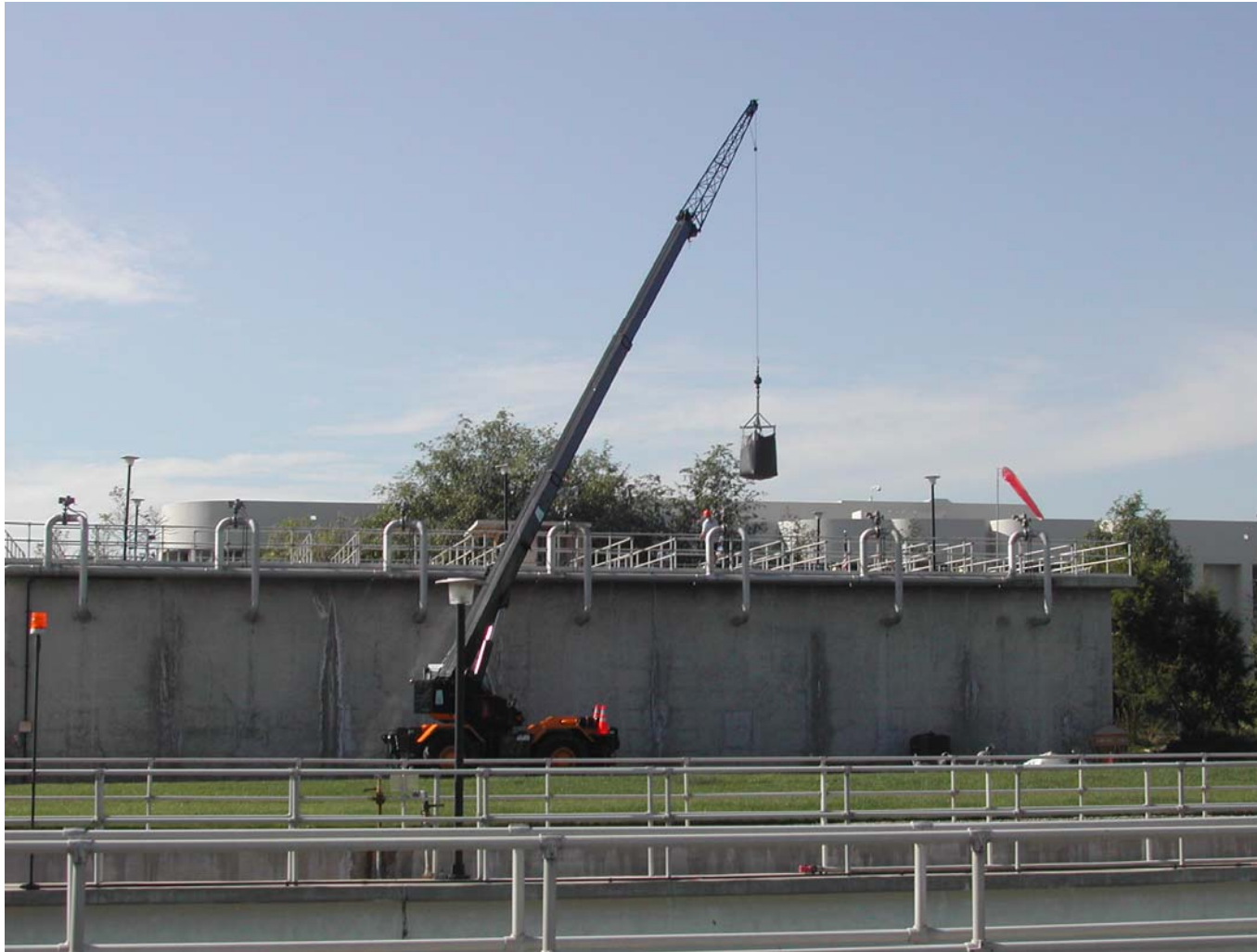


Tertiary Treatment

The white concrete tank has seven filters in it. The filters are anthracite coal and sand. They are backwashed approximately every 18 hours. Because the guy is working on the tanks with a crane, I couldn't go up there to get a good picture. They are fixing the filter because the tiles on the bottom, holding up the sand, got cracked.



They are replacing the old filter media with new!



The water is chlorinated in the tank that is closest to the brick building.



The chlorinated water spends its chlorine contact time in this baffled tank. There are only three sections to the baffle, this picture shows two, clearly, and the third is on the left side.



This is the water that came out of the end of the baffled chlorine contact tank. Very clear! This water is approved for recreation, meaning you could swim in it.



If needed, the water is adjusted for pH, using potassium hydroxide. The lab tests frequently to see if the pH needs to be adjusted.

The pink tank behind the potassium hydroxide tank is the surge tank. When a new pump is turned on to pump treated water out of the plant, this surge tank is used to make sure pressure doesn't get too high.



That is the pipe where all the treated water leaves. The water will go to irrigate Irvine's landscaping and farmlands as well as flushing toilets in large buildings and filling several man-made lakes.

