

# POWER ENGINEERING

## FIELD NOTES

### Pitbull pump helps HL&P use bay water without harming fish

Houston Lighting & Power Co. (HL&P) recently faced and overcame problems transferring trash and fish from filter screens that sift objects from its cooling water, drawn from Galveston Bay.

Five of HL&P's power plants are located on the bay, using local water for cooling, but the water contains trash and debris of all types along with a variety of fish and other live organisms. The water must pass through large, traveling filter screens to enter the pump station. The screens become covered with trash and fish, automatically activating pumps to backwash the buildup off the screens and down a trough into a sump.

HL&P needed a way to transfer the trash and fish downstream from the plants with minimal impact on marine life. Standard centrifugal vertical pumps could handle the water, but not the trash or fish.

Mary Cannon, HL&P project engineer, discovered the Pitbull pump while working to solve the trash/fish dilemma. She instituted a test project under the direction of Bill Baker, HL&P staff environmental specialist, and through Texas A&M University's marine biology department in Galveston.

The test, conducted at HL&P's P.H. Robinson plant in Bacliff, Texas, in July 1993, involved pumping a wide variety of organisms through the prototype pump and studying the survival rates. The results were positive.

Both Canon and Baker agreed that the Pitbull's patented design presents industrial pumping with alternative pumping technology. "I've never seen, or heard of, a pump that could pump trash—real trash like sticks, rags, cans and

seaweed—and not cause serious damage to the fish at the same time," Baker said. "The Pitbull not only did it, but did it without the usual maintenance problems."

Pitbull attributes its low maintenance record to simplicity of design, as the pump has no diaphragms, seals or impellers and uses two check valves as its only moving parts.

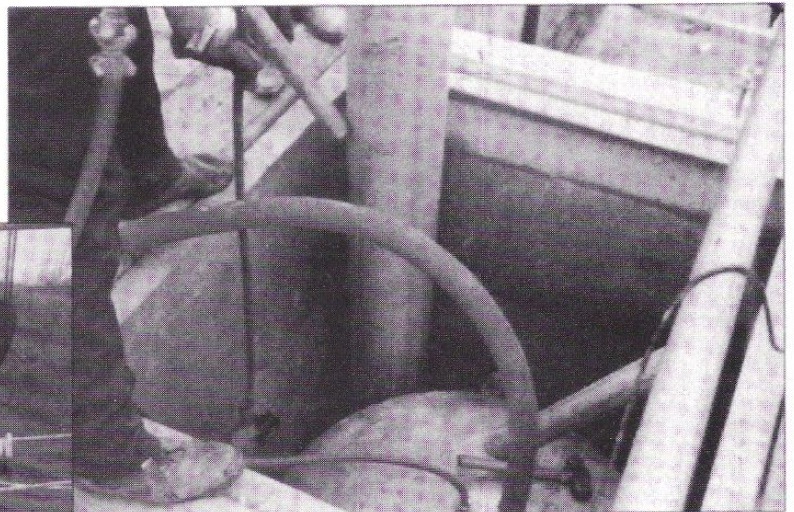
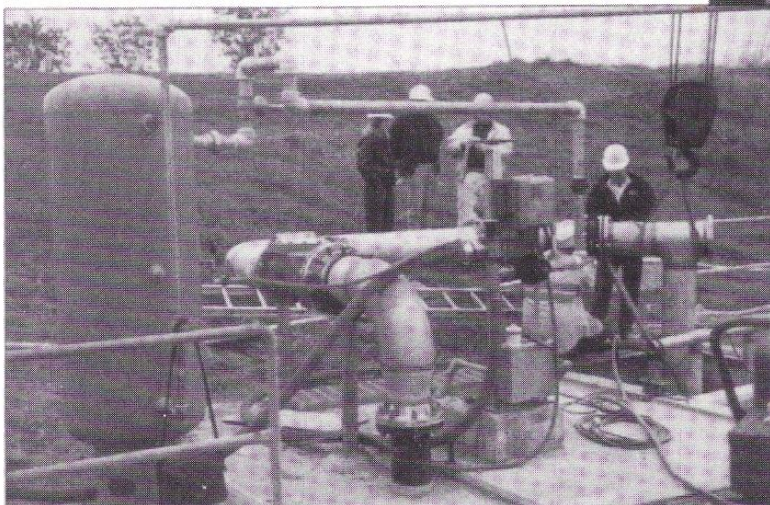
A summary report on the findings, written by Dr. Eduardo Guevara, and presented to the environmental department of HL&P states, "The results of the preliminary tests reported in this study indicate that the prototype Airlift pump (Pitbull) has excellent potential to prevent substantial losses of marine organisms."

Cannon said, "It will help us solve our fish problems, which makes the Environmental Department happy, but at the same time, it will also help us solve our trash problems, which makes the plant personnel happy."

HL&P installed its first Pitbull pump at its Webster power plant, and plans to evaluate installation of the pumps at other locations in and around the bay.

"We are constantly working to obtain a more harmonious relationship with the environment," said Baker. "At the same time, we have practical considerations that never leave us."

The pumping principle of the pump is based on the concept of a compressed air "piston" pushing directly on the surface of the liquid being pumped. Liquid is directed into a chamber, pressurized and discharged into the downstream pipe. An air/liquid interface is maintained throughout the process, eliminating the need for a diaphragm or bladder, and the pump cycles automatically, stopping when no liquid is present. The size of pumpable solid objects is limited by piping size.



(Above) The Pitbull pump installed at Webster power plant.

(Left) The first HL&P fish pump site at Webster power plant allows the utility to pump local cooling water from Galveston Bay without harming marine life.