



**PETRÓLEO BRASILEIRO S.A. [PETROBRAS]  
REFINARIA ALBERTO PASQUALINI**

Location: Southern Brazil

Engineer: Filsan EquipamentosFeed

Start-Up: April 1994

Market: Petroleum

Capacity: 45 M<sup>3</sup>/H (285,000 GPD)

Source: City Water & Recycled Process Water

Feed Quality: 130 TDS

Membrane: Dow/Filmtec BW30-8040

**Project Highlights:** Hydropro, Inc. designed and manufactured a two train, two pass Reverse Osmosis system for use at Petróleo Brasileiro in Brazil. The system is located in the southern portion of Brazil near the border of Uruguay. Working with Filsan Equipamentos E Sistemas (Hydropro's Brazilian representative) we filled Petrobras' need for high purity oil-refinery process water.

The first pass of the Reverse Osmosis System consists of two trains each with eleven (11) pressure vessels in a 6x3x2 array. The second pass is made up of two trains each containing six (6) pressure vessels in a 3x2x1 array. Each pressure vessel contains 6 spiral wound membrane elements. On the second pass, both trains are mounted on the same skid to conserve floor space.

The RO System is flexible in operation. It can operate with either both or just one train running. It can also run the second pass of the first train with the first pass of the second train and vice versa. Permeate quality is less than 3.0 micromhos.