



Case Study

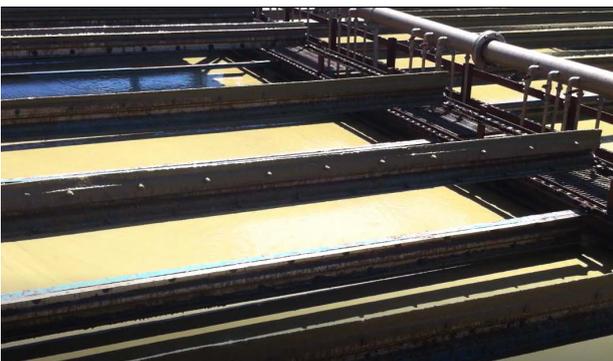
**Promarina PTO Caimito (Panama).**



Year construction	2017
N° of units	2
DAF model	FPAC100
Material	AISI316
Pack lamelar	No
Water type	Saline effluent
Application	Clarification
Unitary flow	100 m <sup>3</sup> /h
TSS in / out	6000 / 100 ppm (>95%)
O&G in / out	1900 / 100 ppm (>95%)

As part of the company commitment with the environment PROMARINA built an Effluent Treatment Plant (ETP) with coarse and fine screening in perforated trommels and clarification by coarse bubble flotation of the wastewater with high content in salts, oil and grease before being discharges to the sea.

and grease at the first separation tank, this to replace existing equipment with lower efficiency, new coagulation and flocculation with chemical dosing followed by 2 DAF units FPAC100 working as high efficiency clarification treatment.



SIGMADAF was contracted by PROMARINA for the design-supply of the equipment to be installed at the existing ETP including pre-flotation for separation of oil

### Pre-Flotation

This treatment step is done using the existing tanks with the SIGMADAF equipment to generate air bubbles, including recirculation pump, pressurization, aeration and distribution. The solids and grease separated in this tank are taken back to the factory production as they do not contain chemicals.



The floated solids are collected at the tank surface by a chain scrapper which sweep the scum towards an outlet hopper to thicken up to 4 – 5% DS content before flowing to the sludge treatment. The solids that sediment in the tank are extracted through a screw installed at the tank bottom connected to an automatic purge valve. The sludge separated in the DAF is calculated as 300 m<sup>3</sup>/day further dewatered in a centrifuge decanter.

### Physico-Chemical Treatment

After pre-flotation the wastewater flows into a buffer tank for flow equalization and then pumped to the physico-chemical treatment. This is done dosing acid for pH adjustment, a coagulant (ferric chloride) and a polyelectrolyte with the in-line SIGMADAF PLUG-FLOW tube flocculators PFL-100 for continuous mixing of the chemicals with the wastewater along the tube length to enhance the formation of larger flocs before the flotation process. The tube diameter and length are selected to achieve sufficient water-chemical contact time and the speed for gentle floc formation. Each DAF has his own tube flocculator.



SIGMADAF scope of supply included the DAF equipment, wastewater lifting pumps pipes and valves, sludge pump, sludge decanter, the chemicals preparation and dosing, mixers, instrumentation for level, flow, pH, pneumatic panel, electrical switch panel (MCC) and control panel with PLC, cabling, transportation, spare parts, supervision on site during erection-installation, start-up and training, as a turn-key complete scope.

### High Efficiency DAF FPAC-100

The SIGMADAF FPAC equipment is plug-flow flotation tank with reduced height designed to treat wastewater with high suspended solids at high mass loading rates. To enhance the solids separation process by flotation, air is introduced in fine air-bubbles with size of 30 – 50 microns, which adhere to the suspended solids and the flocs formed in the physico-chemical step and make them to float.



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