EXCO

WWB "Water Wash Batch" in Crude Oil"

EXCO FLOW ™

WWB EXCO Flow

- This technology was developed due to a very persistent problem in the PEMEX system
- The salt content in the crude oil is very high at the arrival of each refinery (150-400 lb/1000 bbl).
- With the sedimentation times it is very difficult to reach the values of lb/1000 bbls to be able to process it in the desalination plants.
- In addition to the formation of emulsion with congenital water and wash water in desalination plants.
- All these problems cause corrosion, fouling, high pressure in heaters, and loss of operating efficiency
- It also presents problems of formation of salts of ammonium chloride and of iron, which lead to serious problems of fouling and corrosion in Hydrosulfates plants, FCC, cookers, and heaters.

Tests on the Mayan crude arrival pipeline

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- Feasibility tests were carried out:
  - Asphaltenes: 4-8% unstable
  - Paraffins: 13 -15%
  - Water and sediment: 0.5-3% (sediment 0.1-1%)
  - Salt: 150 – 400 lb/1000 bbls
  - Acidity: 3.6-4.3
  - Emulsion: Very consistent (contains agglomerates and Dispersants added in Wells).

TV-2005 and TV-2006 tanks

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- The following tests were carried out in these Mayan crude receptor tanks:

	TV-2005	TV-2006
% Asphaltenes	12.96	11.86
% Paraffins	9.75	10.92
% Water and sediment	T:0.5, M:1.2 F:24	T:0.2, M:0.5 F:26
Sal PTB	267-280	189-242
Acidity	3.89	3.42
Emulsion	Very persistent	Very persistent

  - The draining of the tank is deficient due to accumulation of sediment and the very persistent raw-water emulsion in the tanks

EXCO FLOW Treatment

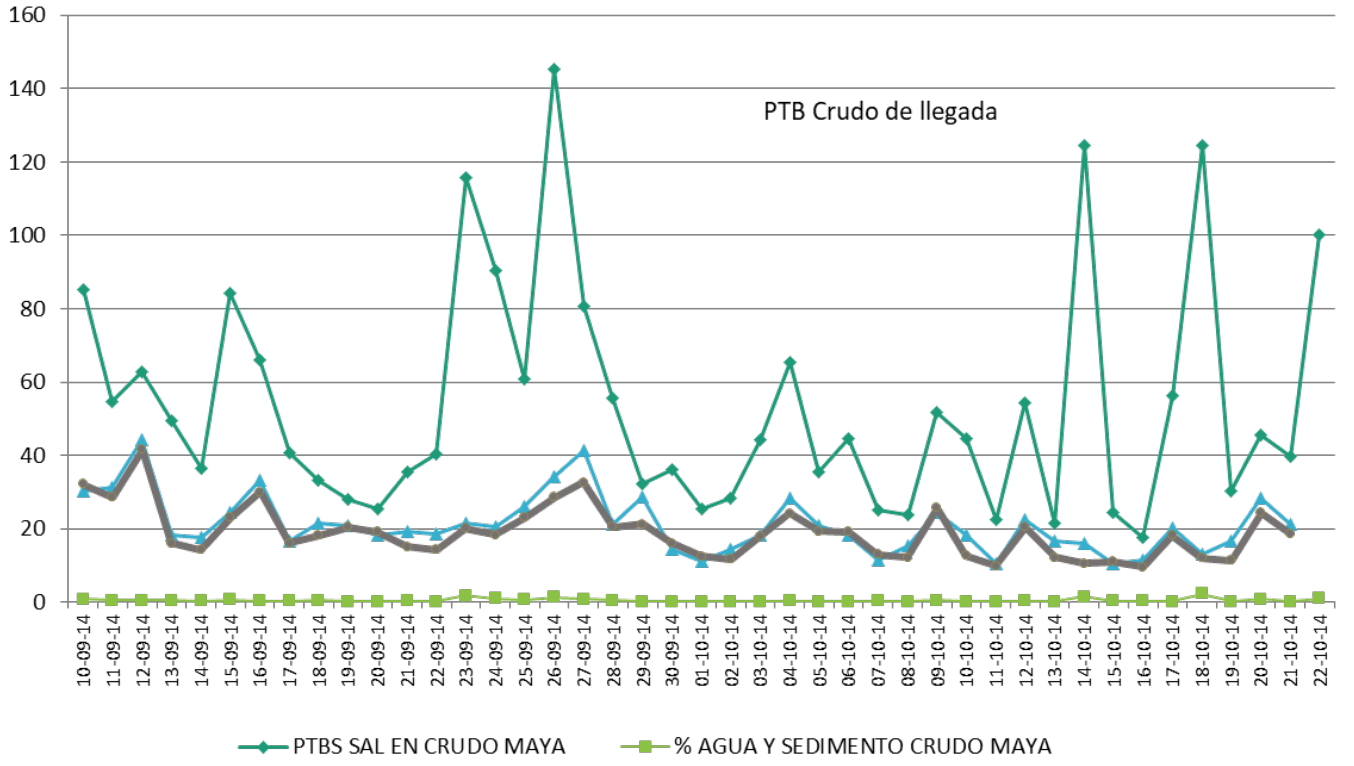
- Based on the above data, the raw finish line was additive and then the tank was drained and the following data were obtained

	Rest		
PTB Salt	7 hrs	11 hrs	18 hrs
74	26	11.6	9.2
68	22	10.2	9.5
90	22.3	13.7	11.4

According to the data, it can solve the problem of emission and wash the crude up to 74.9% of salt removal in 7 hrs.

Salt behavior in the MAYAN crude from arrival to the Minatitlán refinery

Laboratory evaluation with EXCO FLOW complex



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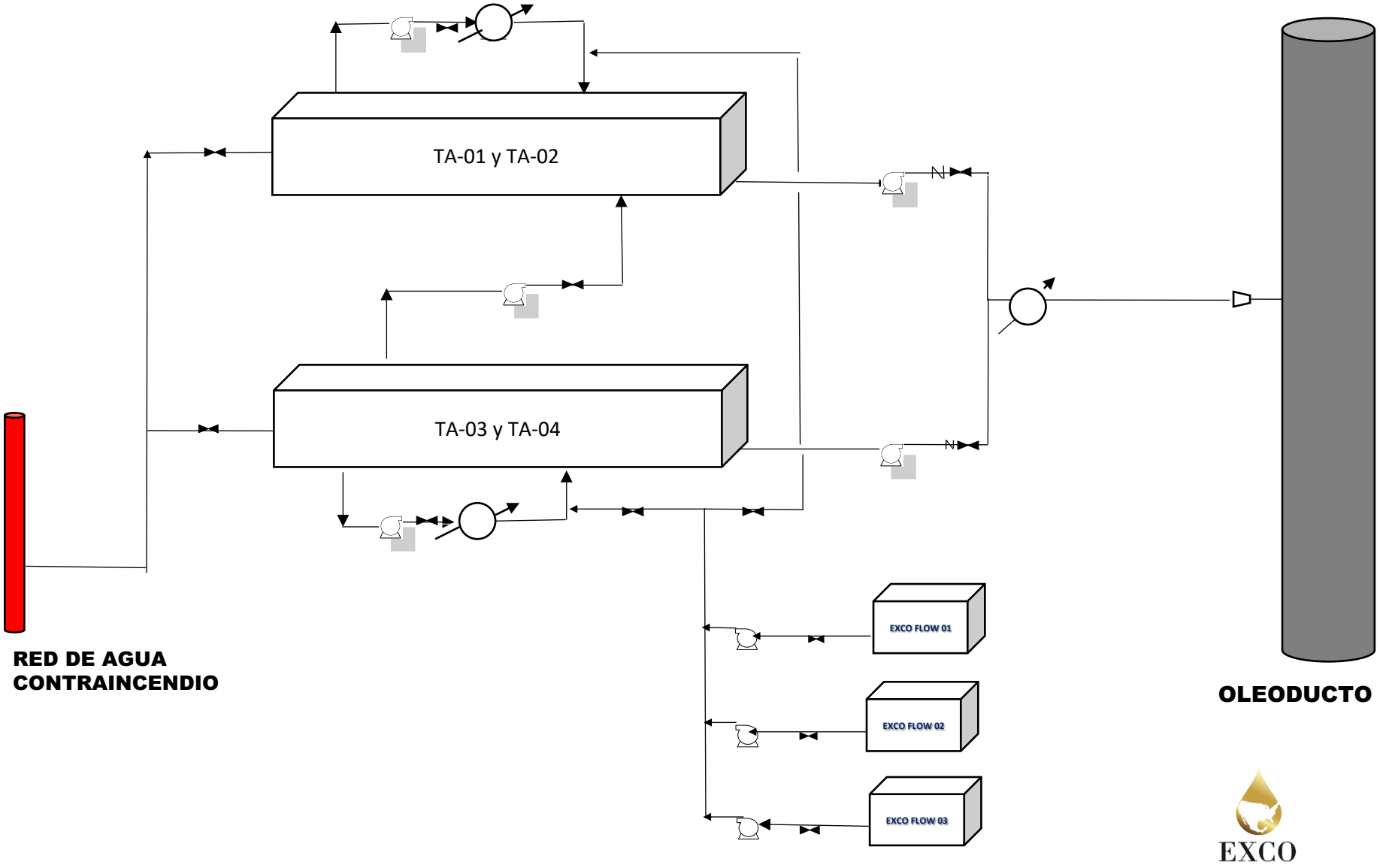
PTB con Crudo Aditivado y 7 hr De Reposo Remoción del 72.78% prom

WATER WASH BATCH PROCESS FLOW DIAGRAM



TECHNICAL PROPOSAL

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- Our proposal for evaluation is focused on improving operating conditions.
- We propose 8 days of treatment of crude washing "WWBatch System"
- All the results will always be monitored and endorsed by the operative staff.
- It is proposed to take initial samples of the crude arrival and storage tanks, to determine % of water and sediment and PTB with baseline.
- Afterwards we will take samples every hour and quantify the drained water in the tanks, to establish a balance between the congenital water, the washing water and that of the drained one.
- We'll issue daily reports and at the end of the treatment.
- All safety and environmental protection standards will be maintained

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PIPELINE INJECTION INSTALLATION TO ARRIVAL OF CRUDE OIL