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Delivering Safe, Sustainable and Affordable Energy
Process live for Acid removal Membranes
2022

Edson Teixeira Júnior
Gas Processing Process Engineer

Jean-Damien ROLLIER
Digital Factory Manager
Advanced Technology
- Cidade de Paraty FPSO was Pioneer on 30” Membranes.

System Monitoring
- Numerous heterogeneous parameters
- Complex modeling

Main challenges to be addressed:
- Is the performance as expected?
- How is the integrity status of the membranes?
- How to Predict process analysis and prediction;
- How to optimize capex considering the membranes high cost
- Replacement X Deployment Strategy;
- How aging of the field impacts on the capacity.
Fleet View
- 4 Units monitored
- Current conditions
  - 10%-20% CO₂
  - Gas Flowrate 150-250 ksm³/h

Quick & easy access to system configuration and main parameters + trends
Health Indicators

- Ease troubleshooting to improve reactivity

Active and Historical Events

- Prediction of Remaining Usefull Life
- Full event detail at a glance
Extra tools Deployed on Process Live

- Scenarios Simulation
- Monthly Reports
- Live discussions / support
- Events Notification
Address Optimizations and do sense check on process variables and configuration impacts

- **Input variables:**
  - Inlet Temperature
  - Inlet Pressure
  - Feed flow rate
  - Feed composition
  - Number of membranes
  - Train Split Ratio

- **Simulation outputs:**
  - Total Network Capacity
  - Capacity Usage
  - Non-Permeate CO2 %
Monthly report main sections

- Executive Summary
  - Distribution on Quartile on the treated Gas KPI;
  - Predicted Remaining useful life (RUL);

- Operations Parameters
  - Feed Pressure;
  - Permeate Pressure;

- Acid Gas Membrane performance
  - CO₂ concentration split;
  - Relative Capacity;

- Expert Analysis and Recommendations
Easy access to Schlumberger team SME (via discussion channel or through call Request).

Historical exchanges stay accessible (improving follow-up and traceability).

Accelerate SBM learning curve on operating acid gas removal membranes (through continuous exchanges).
Notifications alert on “abnormalities detected” and or “failed communication”. Configuration ongoing on events to be reported on e-mail and at which frequency.
Flow split and process **parameters optimization** prior new membranes deployment.

➢ stay on-spec until next planned shutdown

Membrane **capacity management** over time as field ages.

➢ Data driven Membrane deployment continuous Strategy review
  - Capex better prediction
  - Optimize Shutdown planning

Ongoing improvement on the aging process model performance considering actual historical data.

➢ Dynamic model performance improvement

### Main use Cases

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<th>Year</th>
<th>Expected CO2% on Treated Gas</th>
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<tr>
<td></td>
<td>Number of extra Membranes</td>
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<tr>
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