

# Mator News

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Provider of innovative consultancy services in **gas/oil/ water separation technology** and **condition based maintenance technology** for the oil and gas industry.

## Mator Process Consultancy

bringing world-wide offshore experience into your modification projects

### Main areas of specialities:

- ◆ Front end and conceptual studies
- ◆ Independent assessment of gas/oil/water separation problems
- ◆ Design of separation equipment
- ◆ 3<sup>rd</sup> party verifications
- ◆ Optimisation and troubleshooting of gas, oil and water production
- ◆ Debottlenecking studies
- ◆ Environmental studies
- ◆ Establish system for operational support of separation processes
- ◆ Project management

### Equipment:

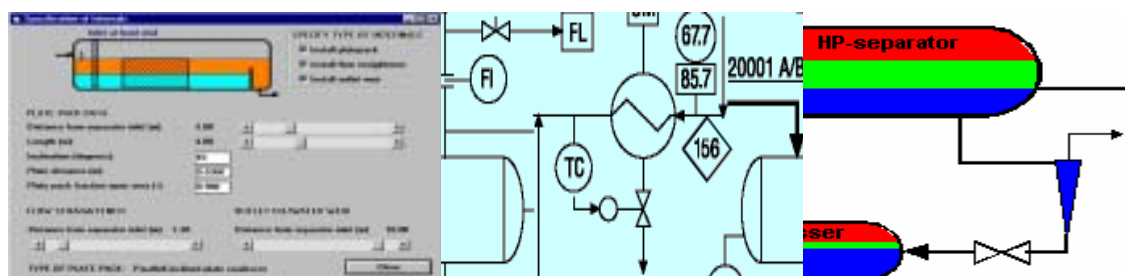
- ◆ Two- and three-phase separators
- ◆ Electrostatic coalescers
- ◆ Freewater knockout drums
- ◆ Produced water hydrocyclones
- ◆ Produced water degassing drums
- ◆ Produced water flotation cells
- ◆ Scrubbers
- ◆ Glycol contactors / absorbers
- ◆ Glycol regeneration systems
- ◆ Centrifuges
- ◆ Choke valves

Mator has world wide experience within independent offshore **troubleshooting** and **optimisation** for gas, oil and water production topside facilities. Mator has through this work provided valuable insight and hands-on experience from different process design and operation of a wide range of separation equipment. Mator has also been involved with numbers of studies and 3<sup>rd</sup> party verifications and is through this **Process Consultancy** service combining the theoretical and computational work with the extensive field experience.

Mator in co-operation with other specialist companies also provides services including the following tools:

- ◆ HYSYS for simulation and modelling
- ◆ CFD for improved flow understanding

With focus on increasing requirements for improved production capacity and quality together with stricter environmental demands, we believe that in combining Process Consultancy with offshore troubleshooting we will make a stronger partner for the oil companies.



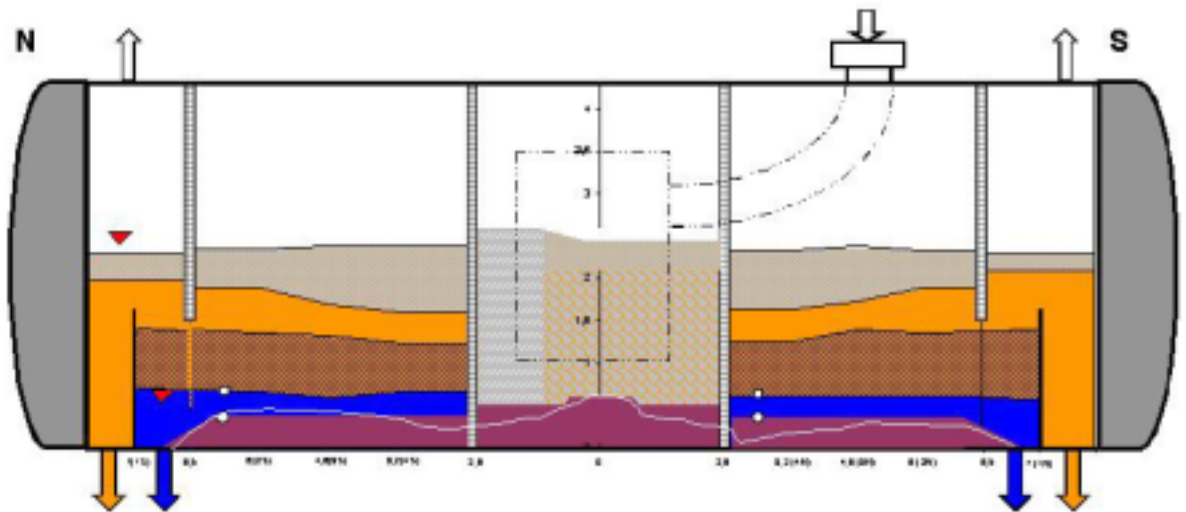
## ConocoPhillips Ekofisk troubleshooting HP separator

The Ekofisk 2/4 J platform has since start-up in 1998 experienced separation problems. In 2001 all the internals in the HP separator was replaced resulting in increased oil production. The gas capacity, however, decreased and a worsening of the oil quality was observed. In order to fulfil required water in oil content of 2%, the gas capacity was limited to 6 – 6.5 MSm<sup>3</sup>/d, and far from the design capacity of 16 MSm<sup>3</sup>/d. Great effort has been put into troubleshooting the situation, by numbers of offshore and onshore studies focusing on optimisation the current operation and use of production chemicals, separability conditions, retention time and flow pattern, formation of foam and emulsion as function of separator levels, rates and chemicals, slugging, and inlet flow regimes.

The cause for the capacity limitation is complex, however, the new inlet cyclones are emphasized to be of main importance due to one or more of the following reasons:

- ◆ Gas blow-by in the liquid phase
- ◆ Gas slugging
- ◆ Location (static pressure height, liquid outlet)
- ◆ Skewed distribution of the ten cyclones

Present design methods for inlet cyclones do not take sufficient into consideration fluid conditions, emulsion viscosity, interfacial tension, optimisation between inlet momentum, g-force and shear at liquid outlet, slugging, and upstream pipe geometry and flow regime.



Recent Mator projects:

- ◆ **ConocoPhillips Ekofisk 2/4 J:** troubleshooting HP-separator
- ◆ **Statoil Staffjord C:** start-up after modifications together with antifoam testing
- ◆ **ChevronTexaco UK Strathspey:** sand production determination
- ◆ **Norsk Hydro Troll B:** produced water optimisation
- ◆ **Norsk Hydro Grane:** process separation seminar focusing on heavy oil production

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