

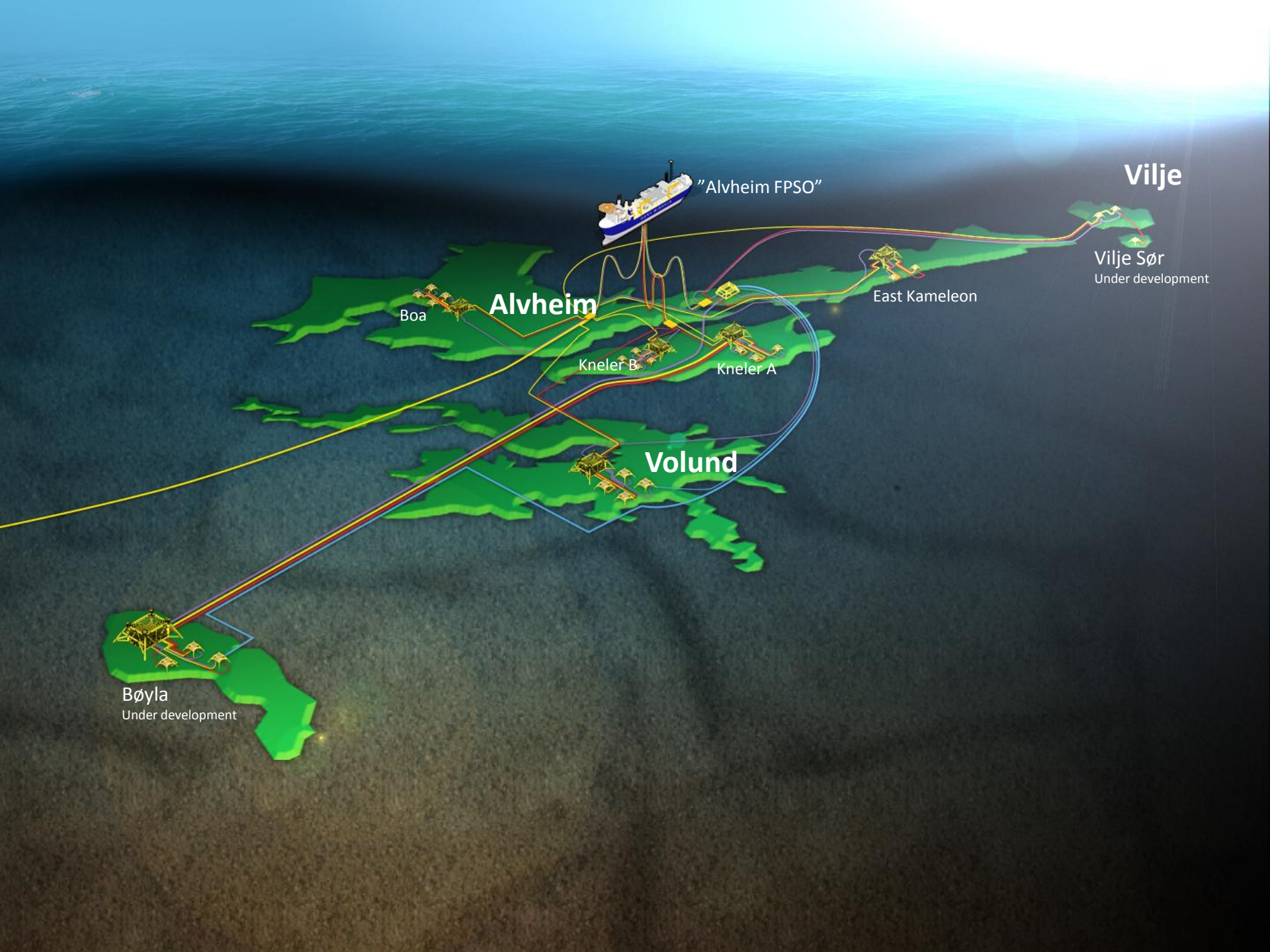
2014 NFOGM TEMADAG

Drift, vedlikehold og modifikasjoner av
fiskale/CO2 avgiftsbelagte målestasjoner.

Av Børge Olafsen, Måleteknisk ansvarlig Alvheim FPSO

AGENDA

- Alvheim FPSO oversikt
- Metering
 - Organisasjon
 - Olje eksport
 - Separator MPFM



Vilje

Vilje Sør
Under development

East Kameleon

Alvheim

Boa

Kneler B

Kneler A

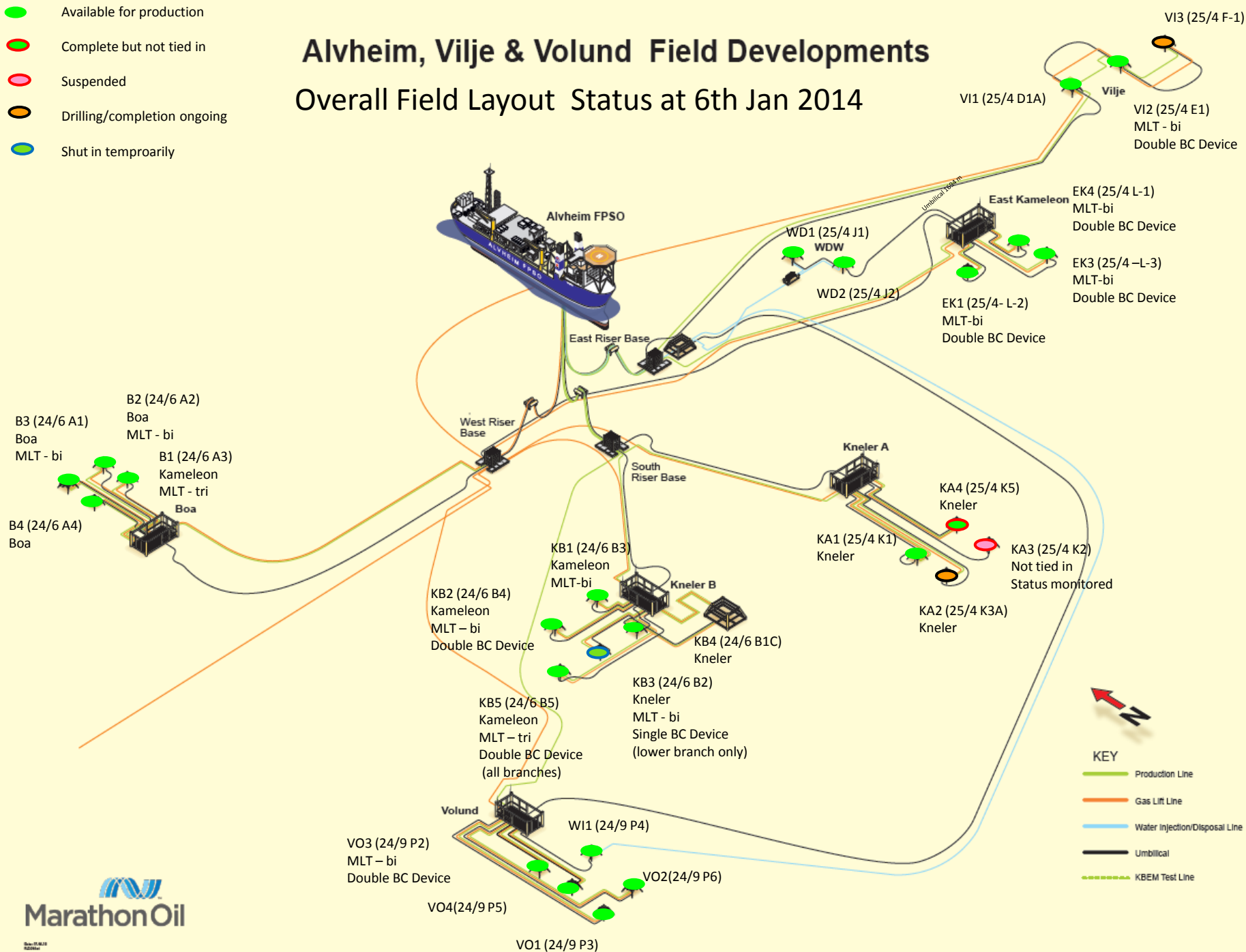
Volund

Bøyla
Under development

- Available for production
- Complete but not tied in
- Suspended
- Drilling/completion ongoing
- Shut in temporarily

Alvheim, Vilje & Volund Field Developments

Overall Field Layout Status at 6th Jan 2014



ALVHEIM FPSO OVERSIKT

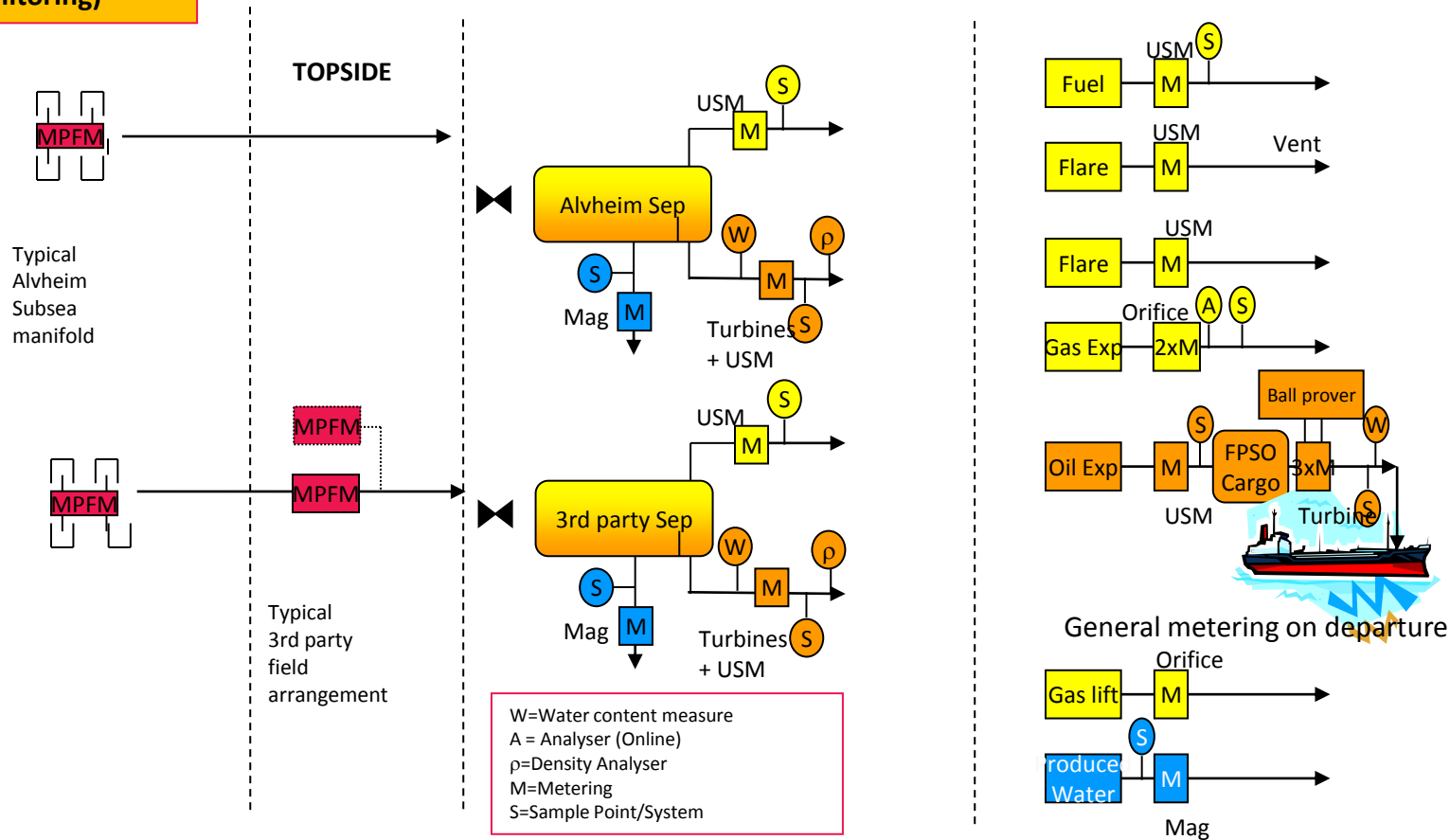
- Alvheim oppstart 8. Juni 2008:
 - Vilje oppstart August 2008
 - Volund oppstart April 2010
- Antall oljelaster levert pr. mars 2014:
 - Totale Laster: 315
 - Total del-laster: 653
- Total produksjon over Alvheim FPSO pr 31 desember 2013:
 - Olje: 246 millioner fat
 - Gass eksport: 3141 millioner Sm³
- Total produksjon over Alvheim FPSO i 2013:
 - Olje: 42.6 millioner fat (2012 = 49.4 millioner fat)
 - Gas eksport: 840 millioner Sm³ (2012 = 897 millioner Sm³)
- Maks produksjon = 156 000 boe/døgn, i dag er produksjonen 110 000 boe/døgn

ALVHEIM METERING AND ALLOCATION OVERVIEW

Well Test
Metering SUBS
(Reservoir^{EA}
monitoring)

Allocation metering on reception

Fiscal / CO2 metering
on departure



WELL

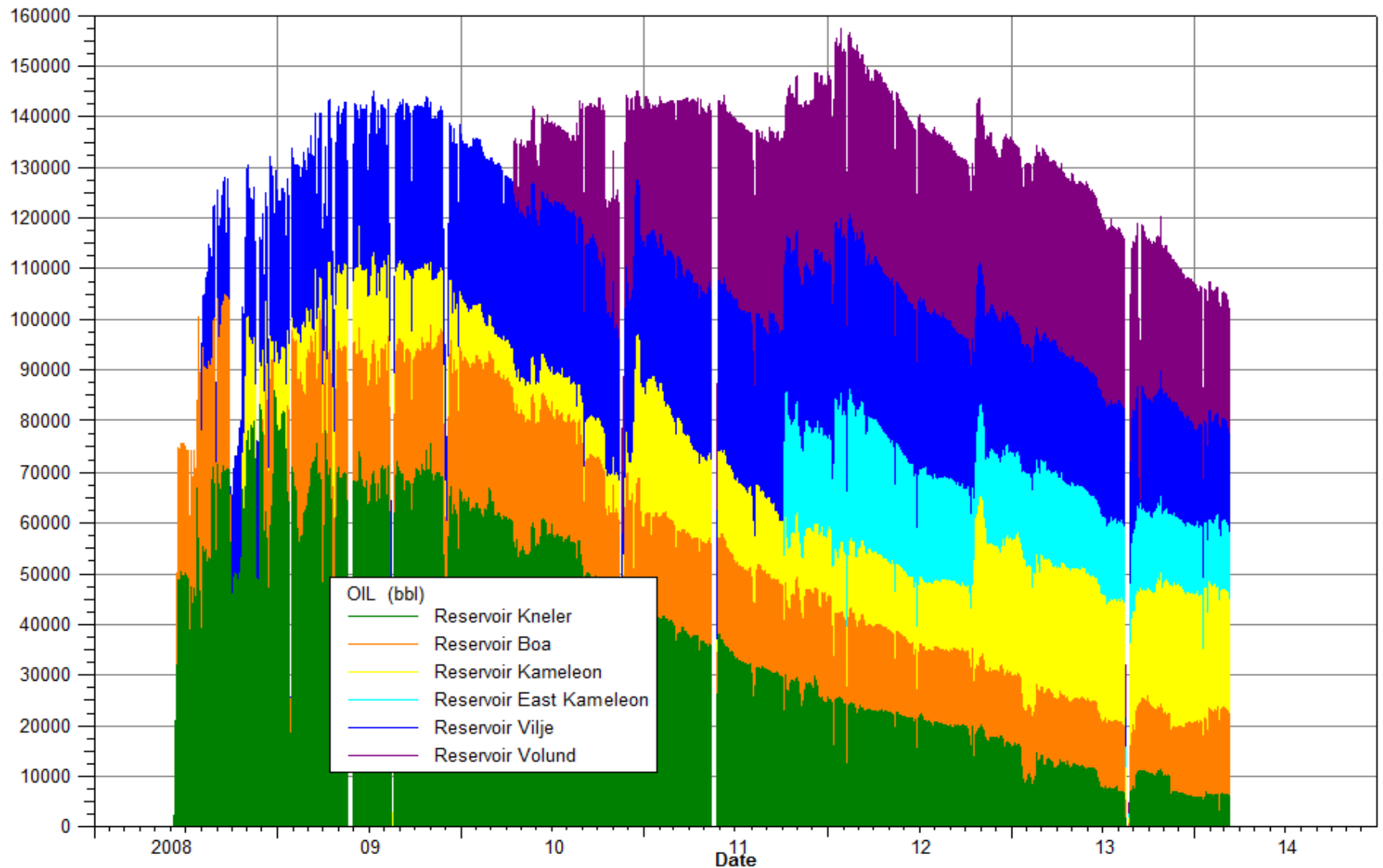
SUB
GROUP

GROUP

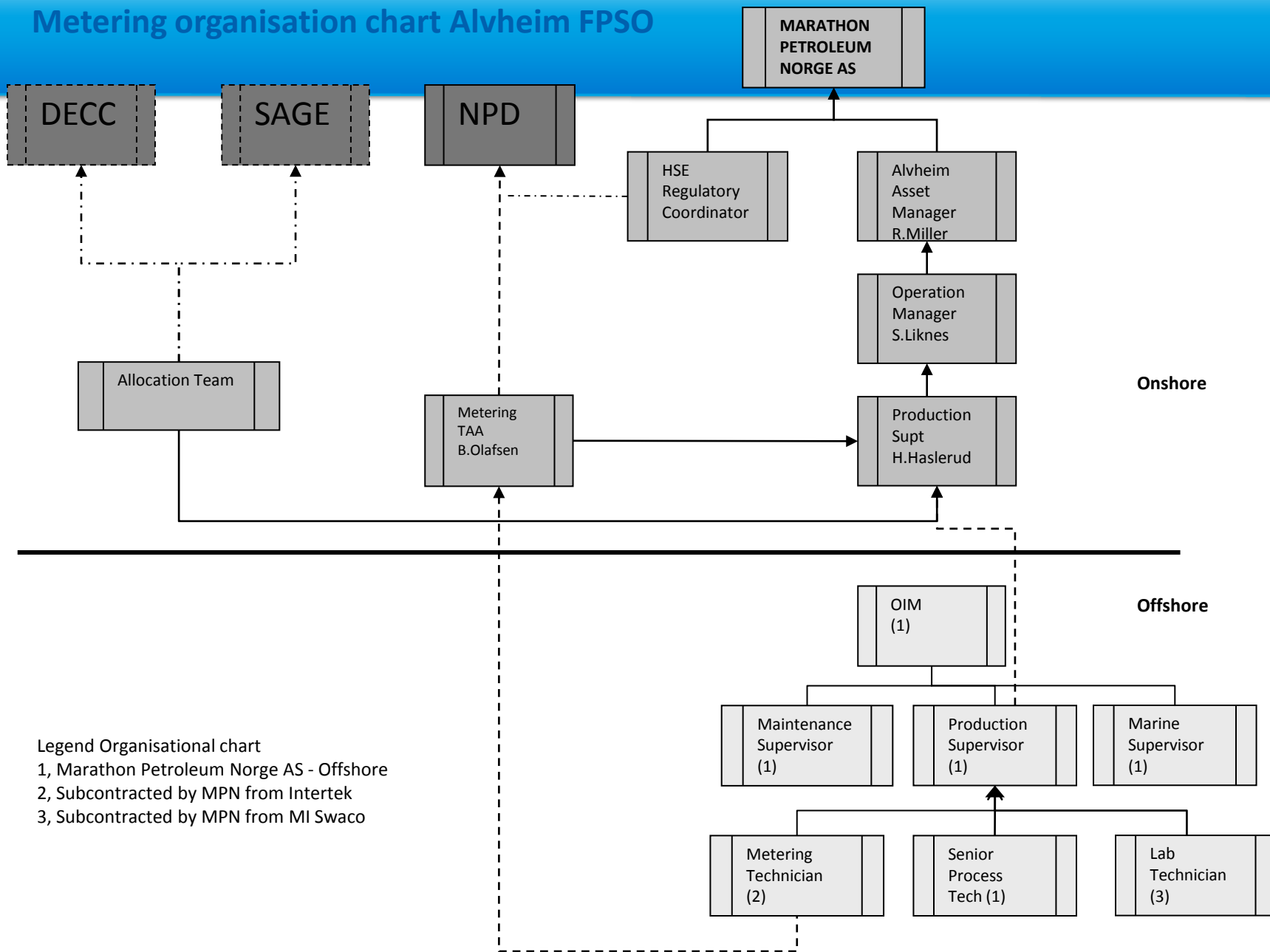
FACILITY

Bidrag fra hvert reservoir

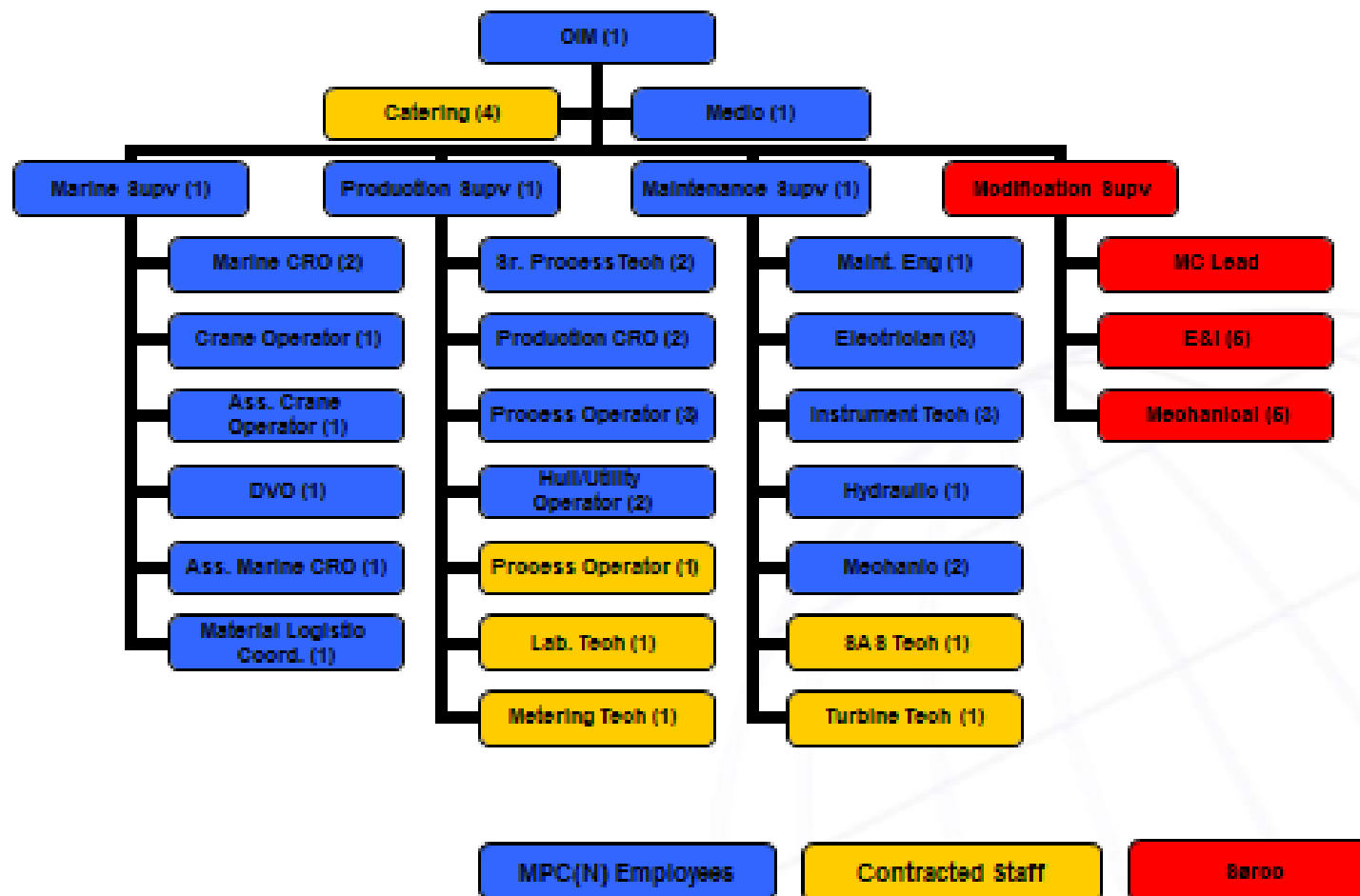
FPSO oil production per reservoir



Metering organisation chart Alvheim FPSO



Offshore Organisation

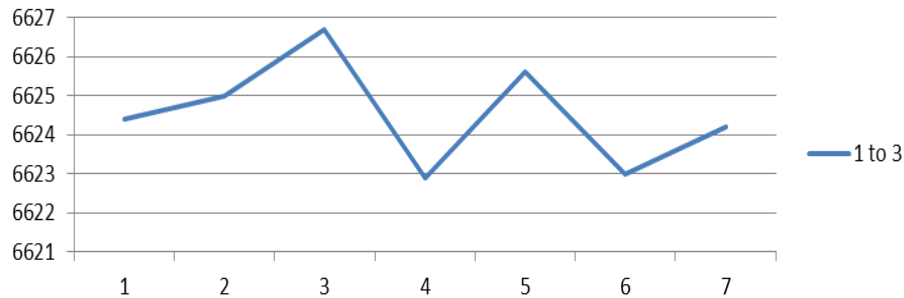


Organisasjon

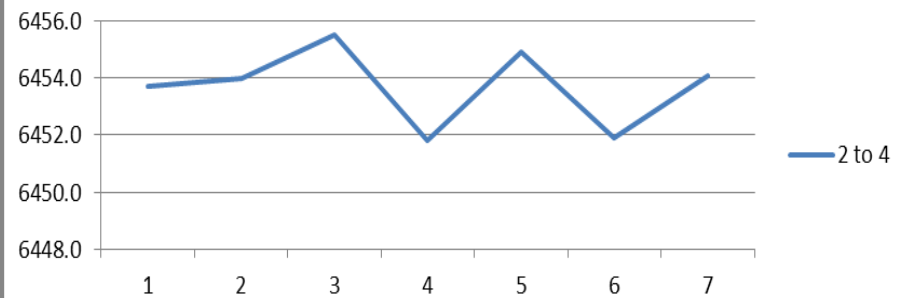
- 3 Måleteknikere i fast rotasjon - innleid fra Intertek Westlab
- Måleteknikere offshore er plassert i produksjonsavdelingen
- 3 Laboranter i fast rotasjon - innleid fra MI Swaco
- Vanskelig, men viktig å opprettholde kompetanse og erfaring i disse posisjoner
- Rapporterer til produksjonssjef offshore samt direkte til måleansvarlig
- Andre stillinger i organisasjonen som er relatert til måling er prosess-operatører samt marine avdeling
- Vanskelig i praksis, men viktig at alle har forståelse for måling og utstyr forbundet med dette

Rørnormal kalibreringsresultater

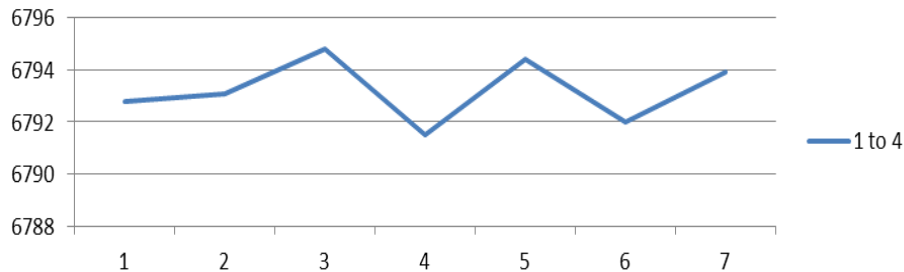
1 to 3



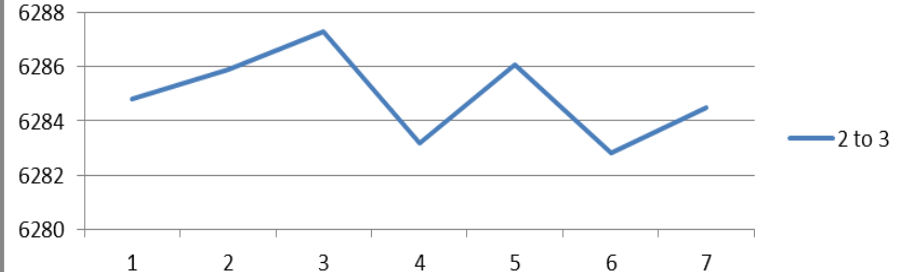
2 to 4



1 to 4



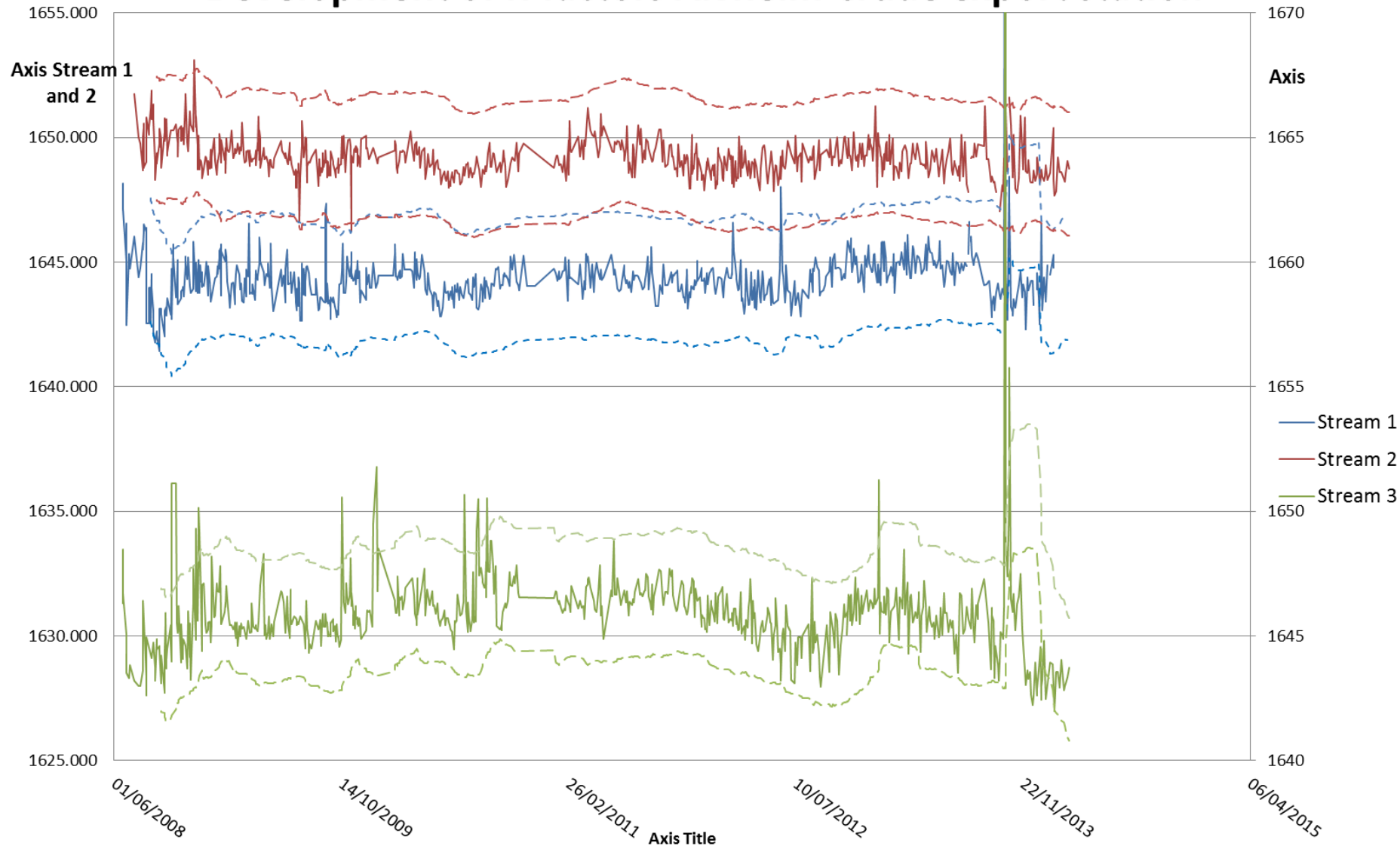
2 to 3





Olje eksport K-Factor utvikling siden oppstart juni 2008

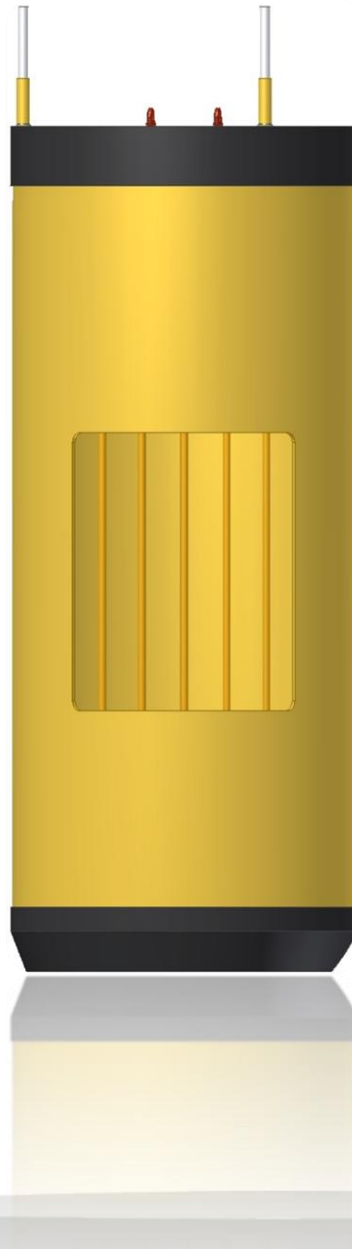
Development of K-factors Alvheim Crude export station



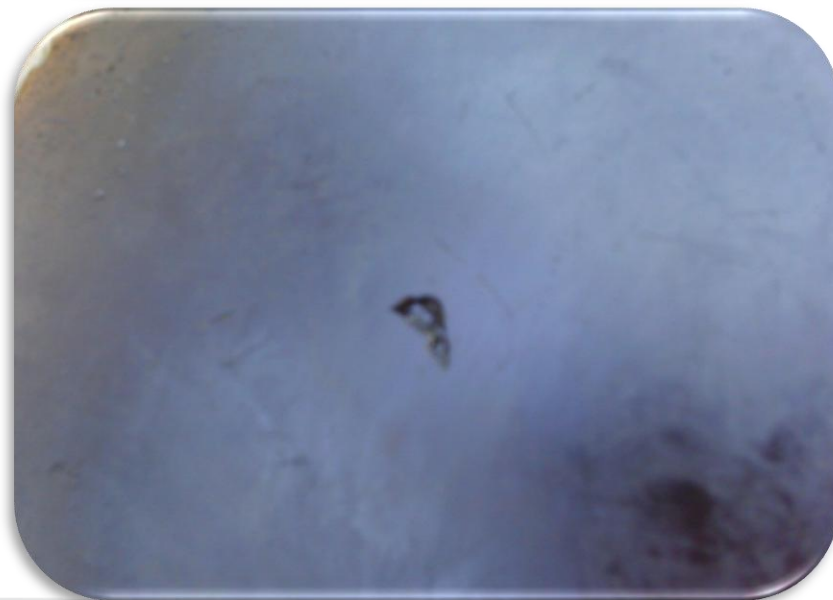
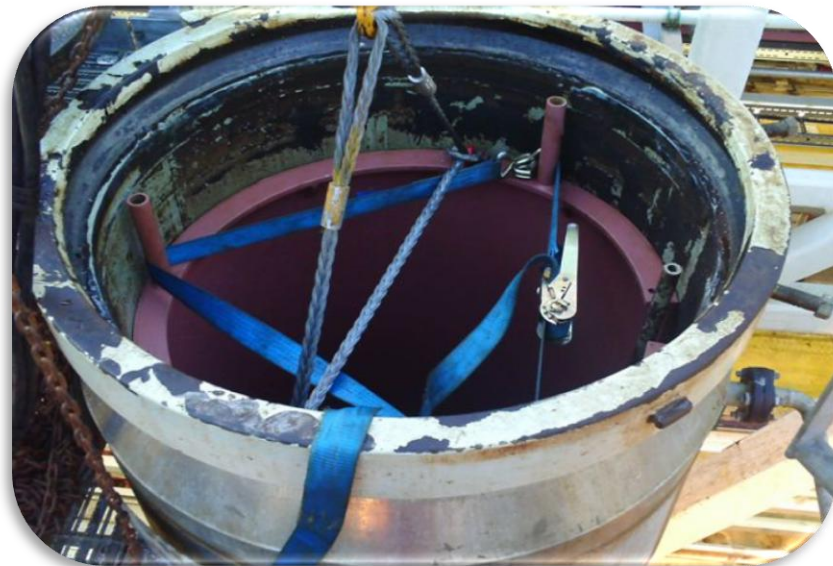




Rørnormal reparasjon



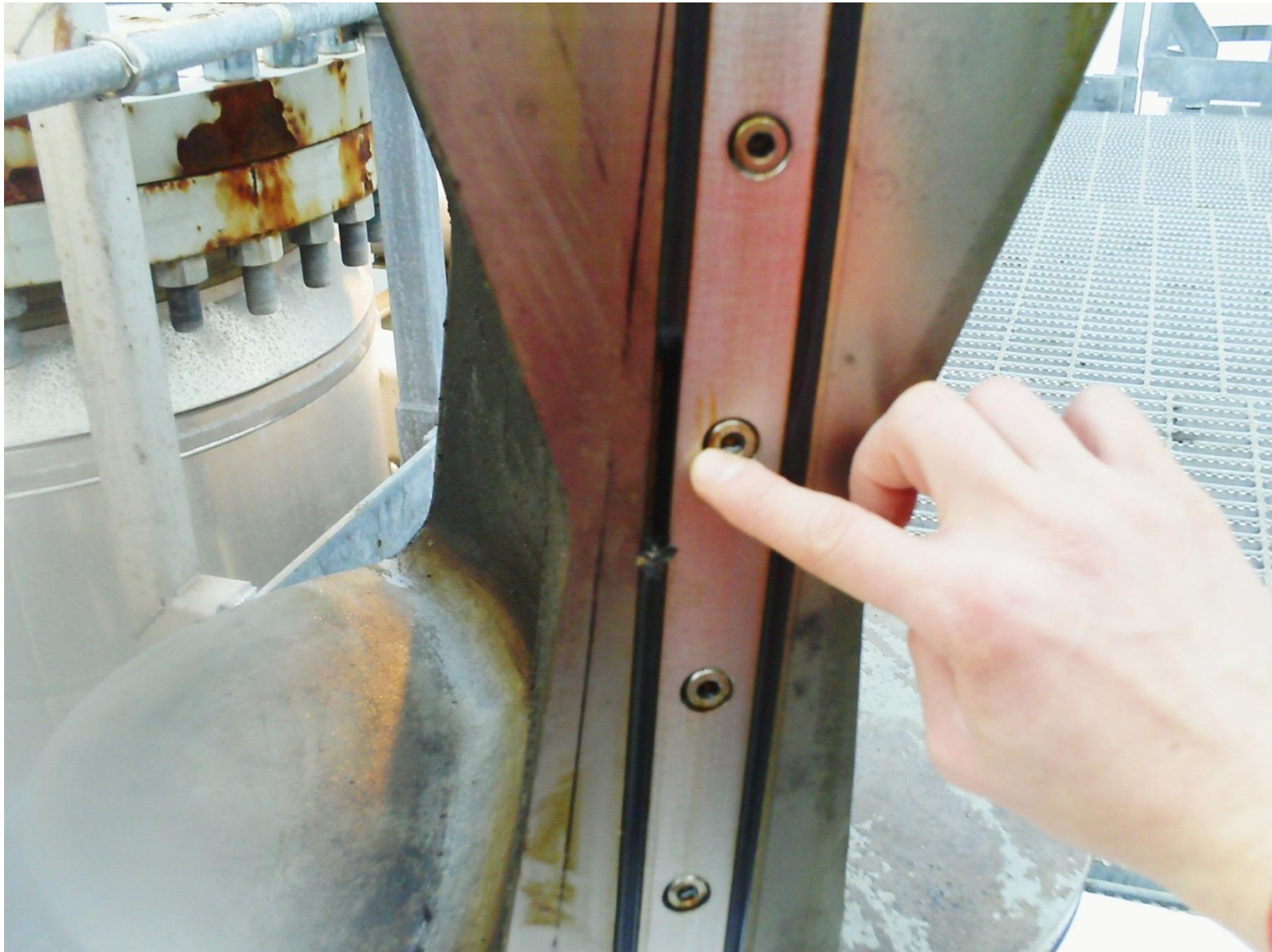
Rørnormal reparasjon



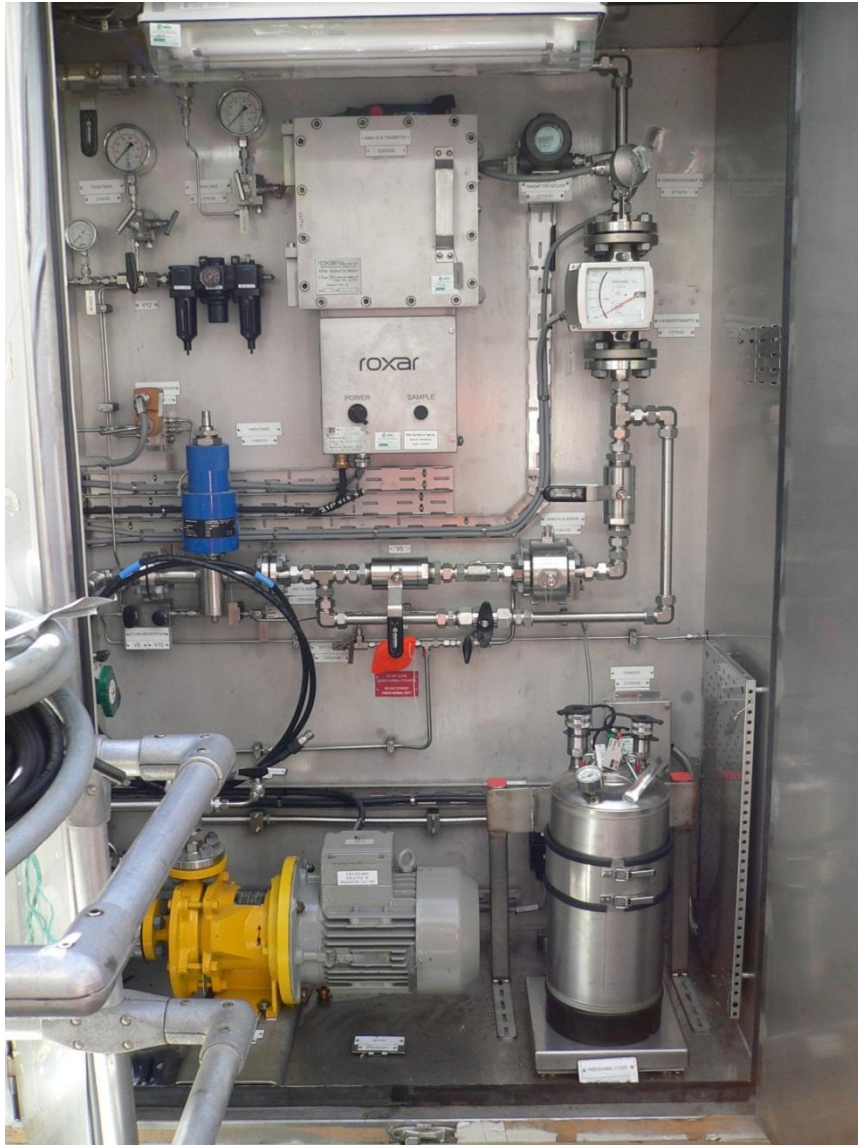
4-veis ventilreparasjon



4-veis ventil reparasjon



Oil export sampling



- Sampling-kabinett inkl. utstyr, her kan flere ting gå galt...
 - Sampling loop pumpe. Stopper denne har man et problem.
 - Grab-Sampler. Stopper denne har man problem.
 - Sampling receiver.
 - Online vannkutt meter i loop kan være gunstig for overvåking. Backup i tilfelle grab sampler svikter. Svikter pumpe er den ikke til mye hjelp.
 - Sampling kanne er nå byttet til Promix.

Gammel type mikseunit lokalisert i sveisesjappe

the Winning Solution

OLS 5

The OLS 5 Mixer is suitable for 1 and 2 l cans it is provided with a heating system. The control panel is equipped with a high precision programmable thermoregulator for the heating system (which can be disconnected if not required) and operating alarms.



OLS 20

The OLS 20 Mixer is designed for standard 18 l containers, which are generally used in all automatic samplers. As with the OLS 5 mixer it is equipped with a high precision programmable thermoregulator for the heating system (which can be disconnected if not required) and operating alarms.



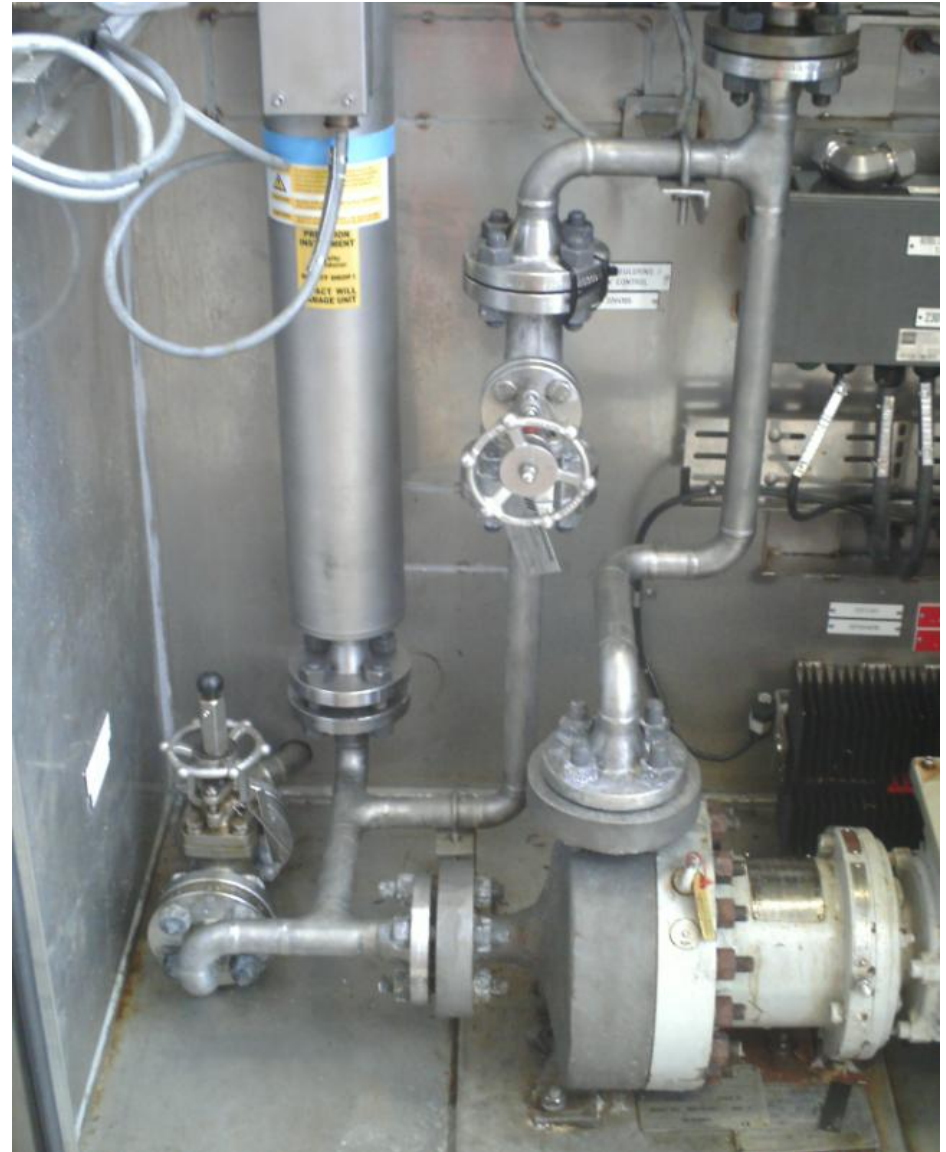
PRODUCT ADVANTAGES

Forced circulation OLS Mixers provide the following advantages for automatic sample homogenization:

- 1 Closed system circulation** avoids sample contact with the atmosphere thus preventing loss of light hydrocarbons and consequent density changes.
- 2 High precision thermoregulated system** for viscous samples allows the fluid mass to achieve thermal homogeneity and maintains the preset temperature values.
- 3 Fully automatic system** permits the operator to work on other laboratory tasks after setting the operation parameters for the mixer and starting the homogenization procedure.
- 4 Reproducible samples** improve the accuracy and precision of the results.
- 5** The design criteria for the OLS 20, OLS 20V, and the OLS 5 Mixers incorporate **international standards specifications**. The OLS Mixers comply with the ISO 3171, ASTM D4177, IP Part VI-2, and API 8-2 Standards.



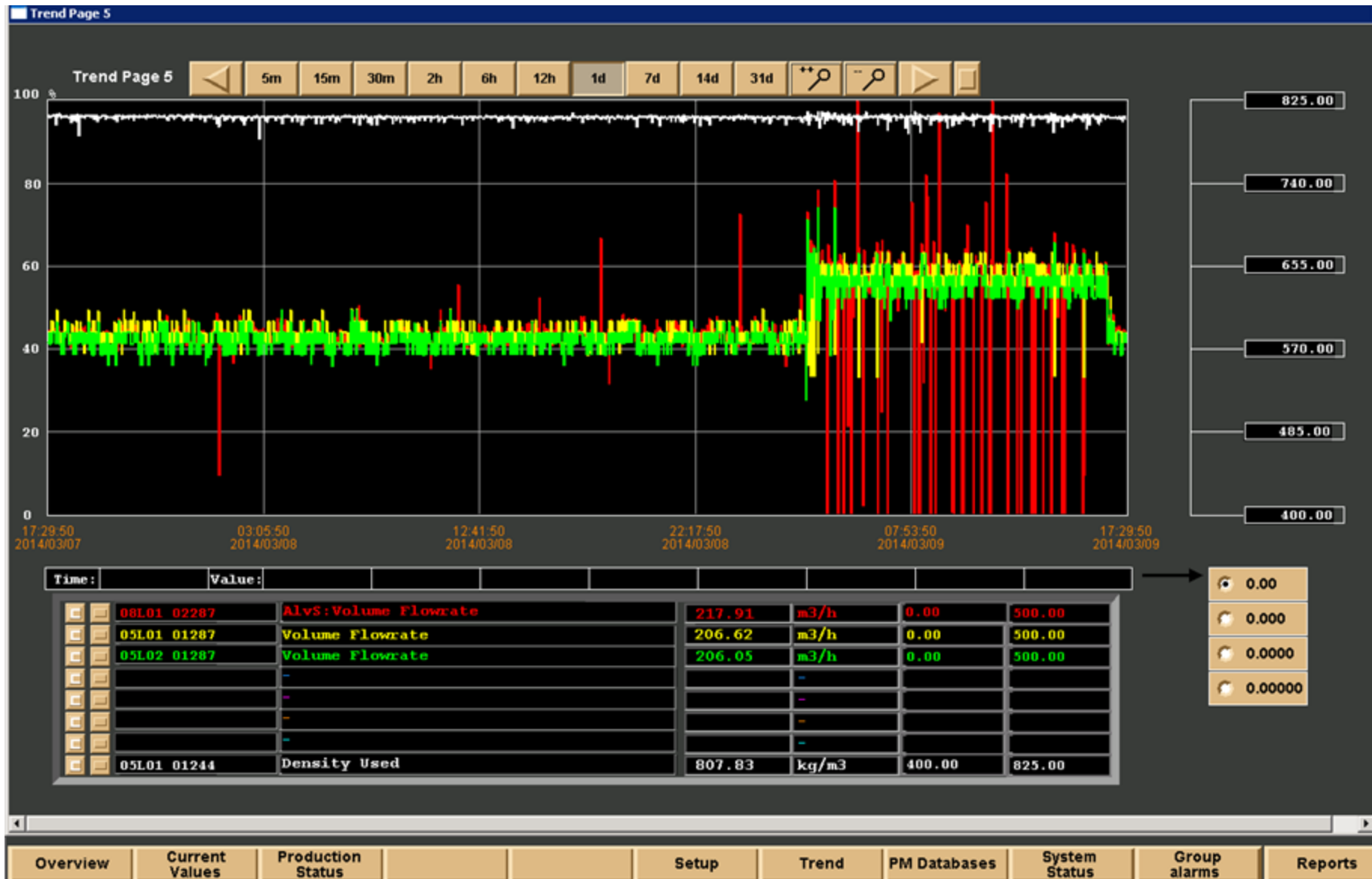
Densitometer fast loop. Ombygging av flow retning



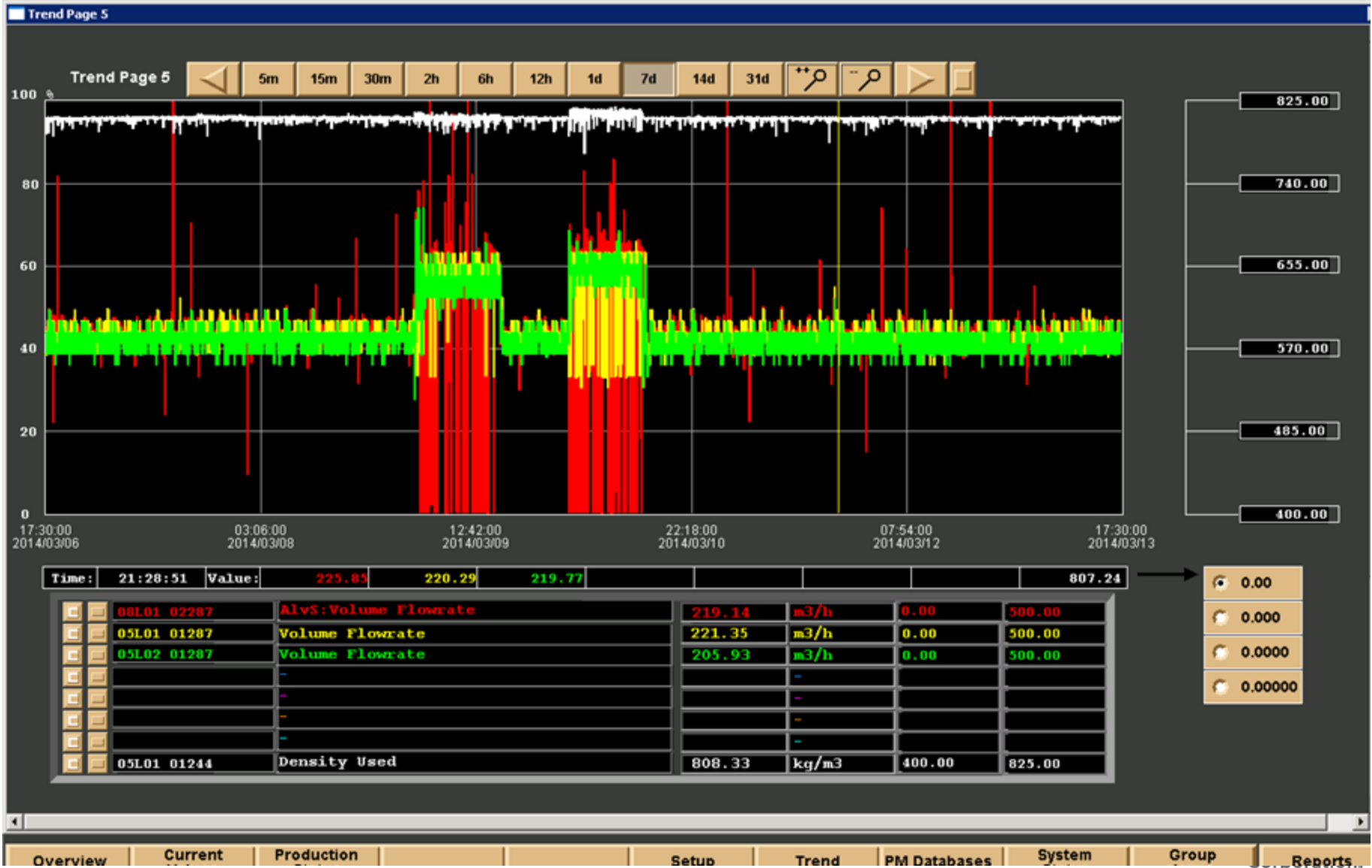
Div. problemer med separator oljemåling USM/Turbin



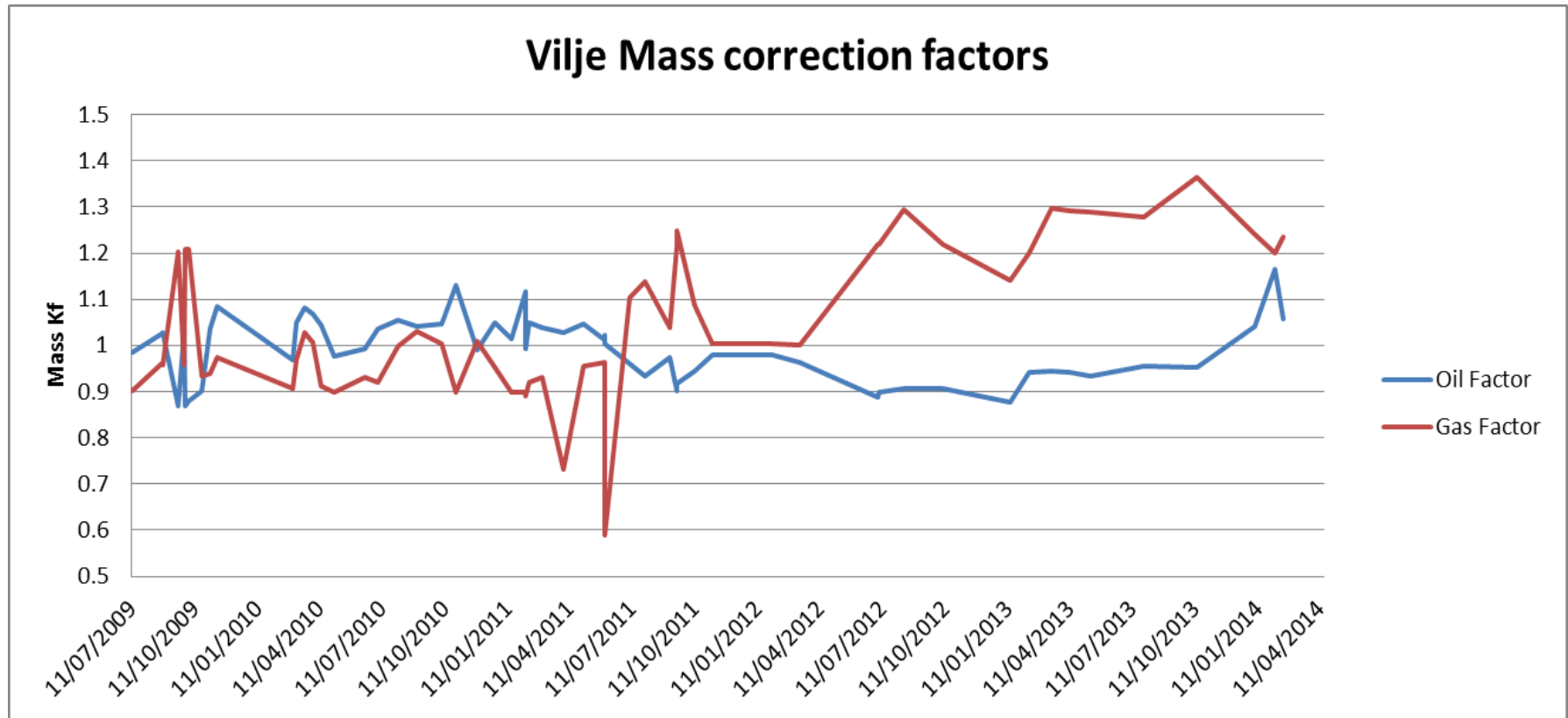
Div. problemer med separator oljemåling USM/Turbin



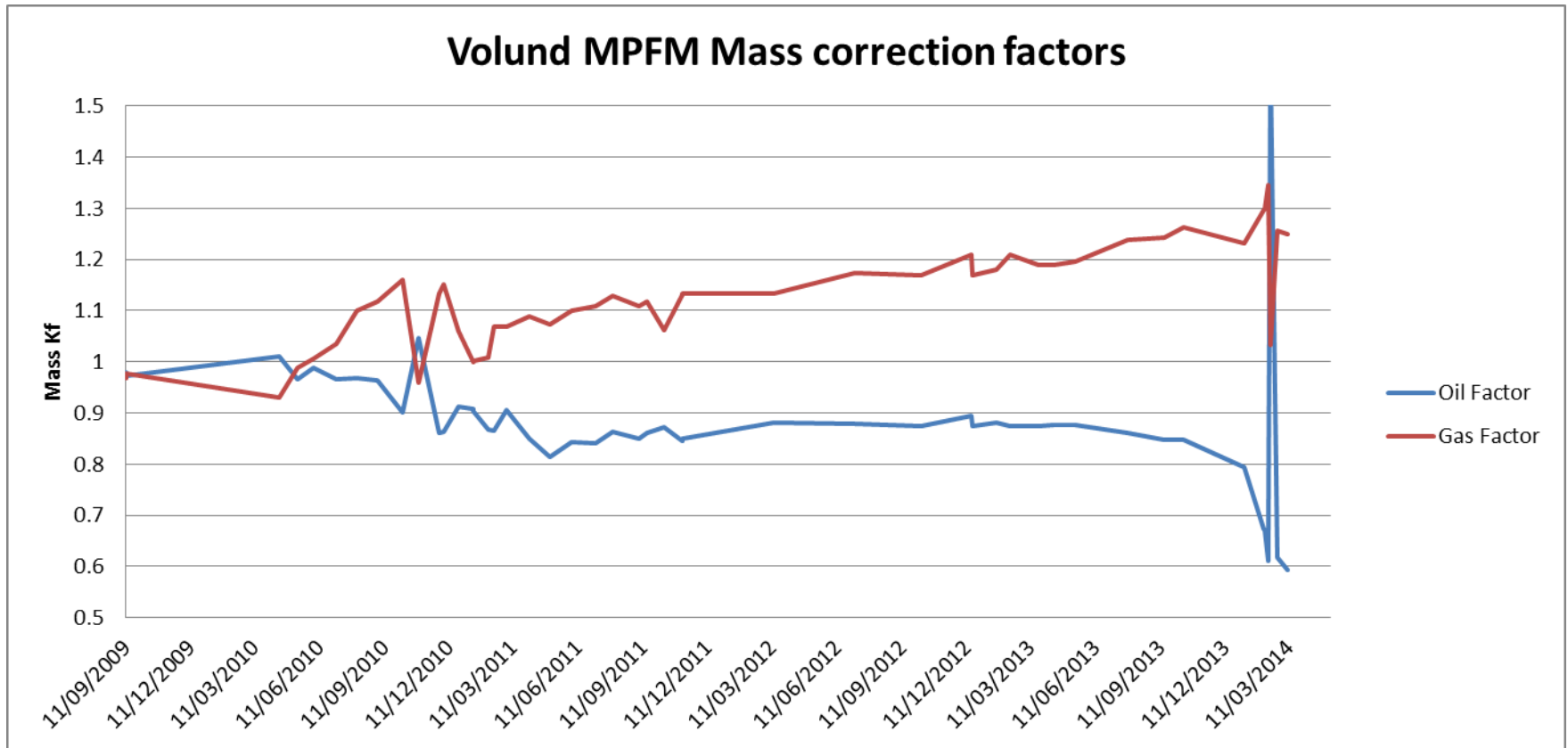
Div. problemer med separator oljemåling USM/Turbin



Topside MPFM calibration factor trends for Vilje

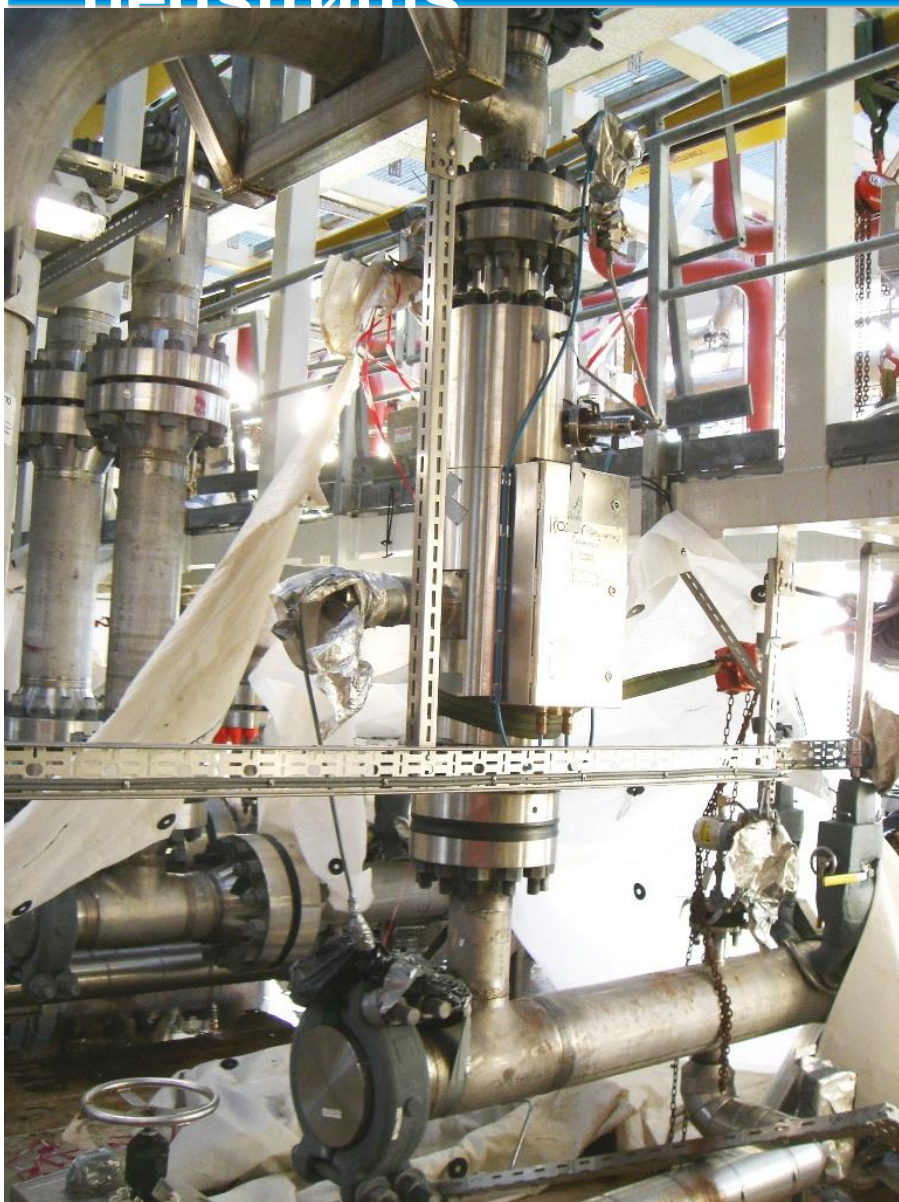


Topside MPFM calibration factor trends for Volund



- **KONKLUSJON:** Uten regelmessig kalibrering mot separator hadde dette blitt veldig feil. Pr i dag kjøres kalibrering hver mnd. Evt. ved behov etter monitorering avslører avvik i systemet.

MPFM installasjon. Blinded T-oppstrøms og nedstrøms

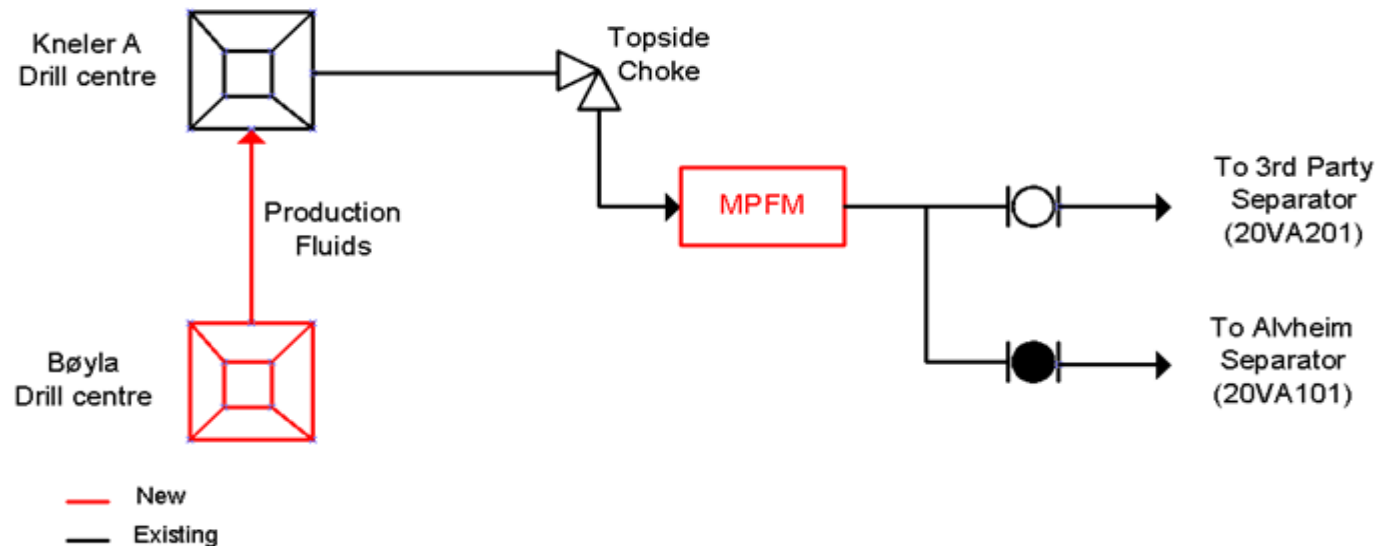


Nytt Bøyla MPFM blir installert i ledig slot



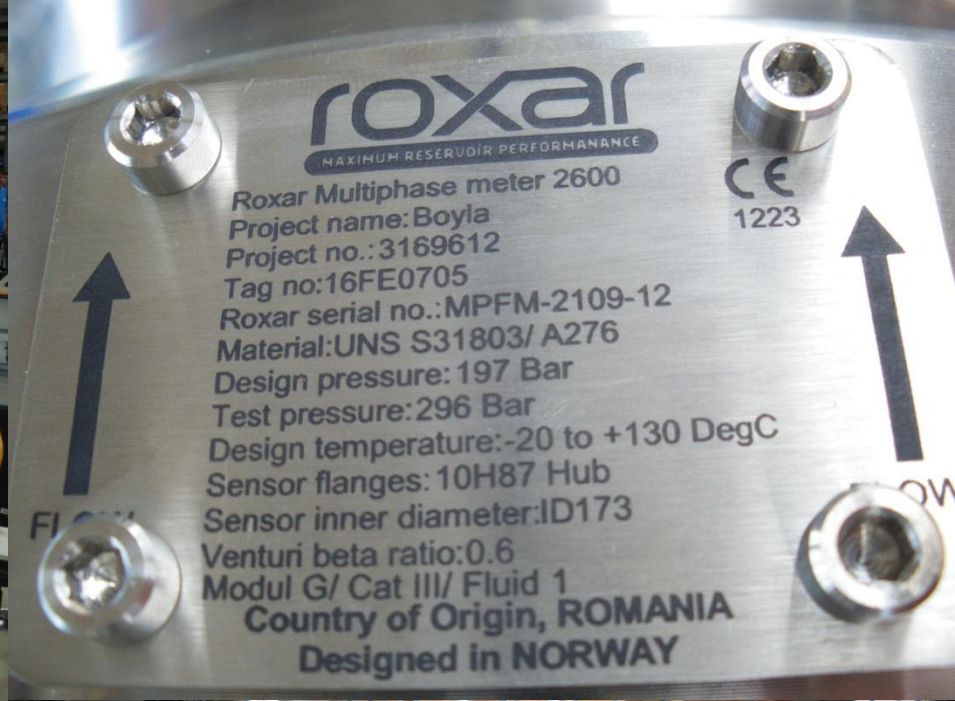
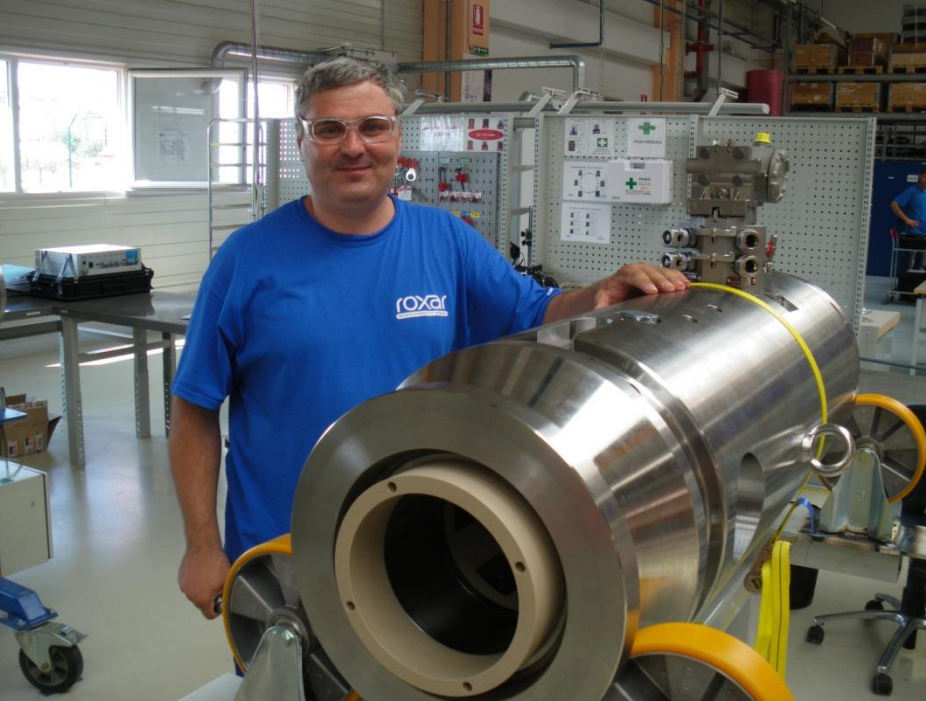
Additional Bøyla MPFM to be installed topside

Kneler A-Bøyla Flowline Schematic



■ Bøyla Challenges:

- Topside MPFM PVT definition
 - TopSide MPFM will most likely use a 50/50 blended PVT in FMC computer and same in Roxar Bøyla topside MPFM.



METERING – 2013 Utførte Modifikasjoner

- NORSK ANALYSE: installering ny Siemens Microsam GC A Sep 2013
- Installasjon og oppstart av Proanalysis ARGUS olje i vann analysator, Sep 2013

Vilje til å vinne