

## Discussion Group P11: Subsea Pumps and Drivers

### Leaders:

- Bob Heyl (Chevron retiree)
- Pierre-Jean Bibet (TOTAL)
- Thom Eldridge (Shell)
- Nils Solvik (Framo)
- Ron Adams (Sulzer)
- Roland Maurischat (Leistritz)
- Nicky Necker (EagleBurgmann)
- John Byeseda (Cameron)
- David Harrold (FMCTI)

### Suggested Topics:

- Applications:
  - What does the future of subsea seabed pumping look like?
  - How to decide what technology to use for an application – separation and pumping, multiphase boosting, single-phase boosting?
  - What is the most critical operating condition for a subsea multiphase pump seal?
  - How do these pumps handle sand?
  - How long are the step-outs that are now in operation?
  - MPPs in series – the way to go for the new DeepSea challenges?
  - Redundancy Philosophy: “Wet storage” or “Dry Storage”?
- Pumps and Motors:
  - What pressure differentials can they generate?
  - What size motors are being used today subsea?
  - What is GVF (Gas Volume Fraction) and what range of GFVs can these pumps handle?
  - Industry standards
  - Expectation and limits of shaft power available – both, motor and electric power supply
  - Mechanical seals – use and function
  - Issues with HP/HT applications
  - How does viscosity affect different subsea pumps?
  - Which mechanical seal arrangement and API 682 Flush plan is used for subsea pumps?
  - Mechanical seal materials?
- Qualification Testing:
  - What are the issues in qualification of boosting and pumping systems?
  - What kind of qualification test is carried out by seal manufacturers?
- Monitoring and Control:
  - Can we develop a ‘normal’ proximity probe for subsea applications?
  - How are pumps controlled?
  - Interfaces – can we standardize the interfaces (not the pumps themselves) between pump and subsea system (mechanical, electrical, hydraulic, control system)?