



# OR WHAT THE SUBSEA SECTOR FORGOT THAT IT KNEW

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- 1984 to 1986:

WHAT WAS THE INDUSTRY LOOKING AT?

WHAT WERE THE INFLUENCES?

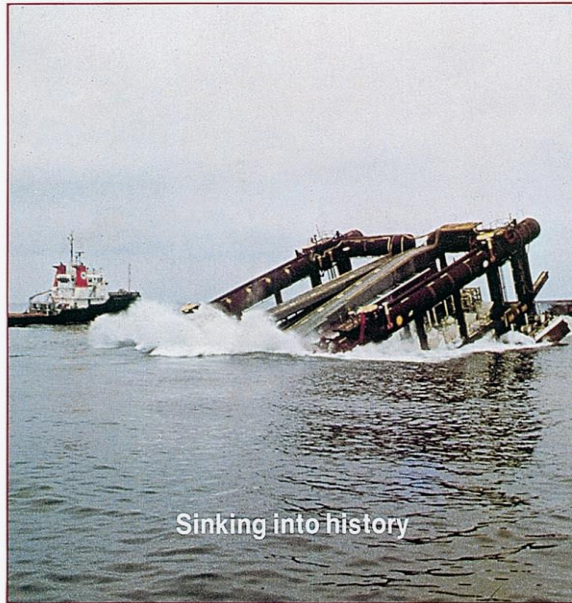
WHAT DID OPERATORS THINK THEY NEEDED?

WHAT DID THEY THINK THE FUTURE LOOKED LIKE?

# **Offshore engineer**

incorporating **Northern Offshore**

JUNE 1982



Sinking into history

- **Beatrice's royal date**
- **Divers and manipulators**
- **Houston's OTC jamboree**

- MANY R&D/CONCEPTUAL DESIGN PROJECTS:

- CLUSTOIL
- DIMOS
- DISPS
- EDIPS
- POSEIDON
- SAS
- SKULD
- UPS

- **TARGET WATER DEPTH:**

- **1,500 FEET**

- **400M**

- **3,000M?**

- TECHNOLOGY TOPICS
  - MULTIPHASE FLOW + METERS AND PUMPS
  - TFL?
  - WELL TESTING TECHNOLOGIES?
  - MONITORING – ACOUSTICS?
  - ALTERNATIVE ENERGY SOURCES

- LIFE OF FIELD – is it new?
- LIFE-CYCLE COSTS?
- DEVELOPMENT vs OPERATIONS
  - Budget limits vs long-term operational needs
  - Who decides?

- WELL TESTING

- Petrojarl



- SWOPS



- Can the industry afford it? Can it afford not to do it?



- TFL –
  - through flowline
  - extra flowline to handle tools
- TFL servicing can be used in subsea wells to perform various well-servicing operations, including: setting and retrieving flow control devices such as plugs (downhole and wellhead), static chokes, gaslift valves and inserting subsurface safety valves; gathering bottomhole pressure and temperature information via the use of temporary downhole gauges; acidizing, bailing, drifting, fishing, perforating, sandwashing, wax cutting, well killing, etc.
- TFL servicing involves shutting in the target well and then pumping the required tools through a flowline/service line from the host facility to the subsea completion and thence downhole. Once the tools are pumped into position, the required functions are actuated by means of application of differential pressure to shear a pin, shift a sleeve, etc. Upon completion of the required task the TFL toolstring is pumped back to the host facility through the flowline/service line. (API RP 17A/C)
- too expensive?
- 1985 – Statoil: valveless tree

- BP Pompano (1997)



- Acoustic telemetry – Hamilton Bros Argyll/Duncan complex (Agip)
- Catalogue engineering
- Reeled flowline bundles
- FRP drilling riser
- MPM









Roxar  
subsea  
Multiphase  
meter

Roxar  
subsea  
Wetgas  
meter

ROV  
KEY  
SECTOR

SERVOIR PERFORMANCE

ROXAR  
Subsea Performance