

Introduction to Subsea Control System – Part 5



Chess Subsea Engineering
Innovative solutions

Advanced Module Intro

The Field Subsea Control System Architecture

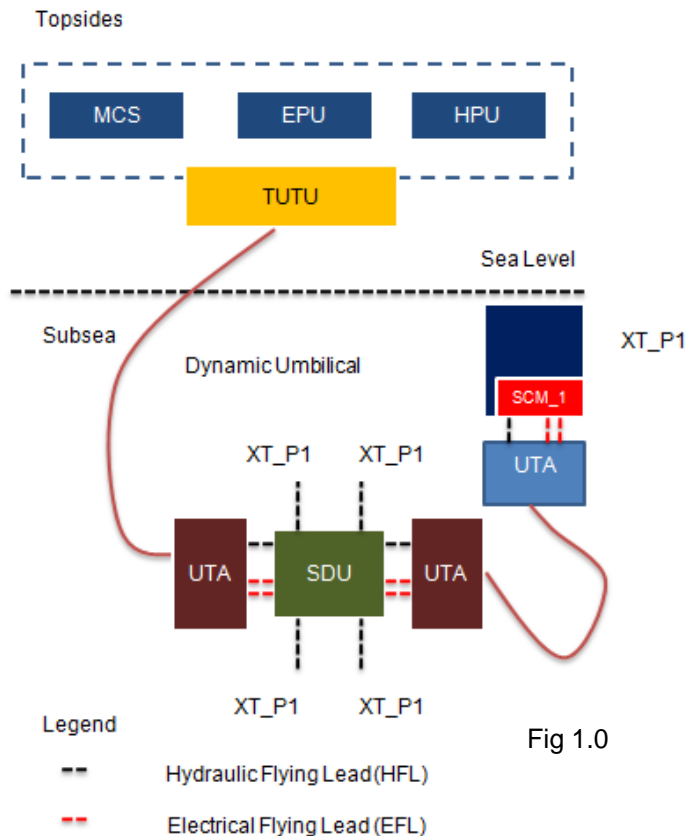
Subsea Control System (SCS) is made up of the electrical power unit (EPU), hydraulic power unit (HPU) and the master control station (MCS). An uninterrupted power supply (UPS) provides and maintains power for the complete SCS units in redundant configurations (see Fig. 1.0).

Each UPS unit is equipped with inverter, rectifier and a standard sized battery bank. The SCS provides a comprehensive power, control and monitoring starting from the surface interface to all the subsea installed equipment. Acquired data is displayed on the topside HMI, allowing for proper monitoring of the entire system. The MCS, located topside had a dual redundant operating system operating. The system is equipped with dual redundant programmable logic controllers to allow for the monitoring and control of the Electrical Power Unit (EPU) functions including the Emergency System Distribution (ESD).

Dynamic umbilical delivers power, control and chemical injection functions from the topside umbilical termination assembly (TUTU) and electrical junction boxes to a 6-port subsea distribution unit (SDU) on the seabed.

The umbilical contains 2-off Low Pressure lines plus a spare, 2-off High Pressures lines plus a spare, methanol injection and other chemical injection lines for flow assurance purposes. The topside tie-in is such that the dynamic umbilical runs down to an umbilical termination assembly (UTA) located at the seabed while hydraulic fluids and electrical flying leads tie-in the UTA to the SDU.

On the other end also, a hydraulic flying leads (HFL) in combination with a pair of EFLs in redundancy connects the SDU to each of the outgoing infield static umbilicals to the trees. Finally, the HFL at the end of the infield umbilical UTA is connected to the tree Multi Quick Connector (MQC) while the EFLs are directly connected to the SCM.



Introduction to Subsea Control System – Part 5



Chess Subsea Engineering
Innovative solutions

Advanced Module Intro

The Field Subsea Control System Architecture

The control philosophy in the field is Communication on Power (COP), closed loop electro-hydraulics (E-H) with the control fluid returning to the topside HPU during depressurization. This means that the same cable carries a combination of power and communication signals. The signal for control execution is multiplexed at the SCM SEM. The SEM is also responsible for power regulation and for energizing of the solenoid based DCVs responsible for the control of the LP / HP tree valves, downhole intelligent control including condition monitoring of downhole pressure and temperature (DHPT) valves.

SCM Mounted on SCMMB

The subsea control module (SCM) is a part of the subsea tree system, normally mounted on a SCMMB and responsible for the control and monitoring of subsea mounted equipment in a subsea production system (SPS). Interconnections of SCM with the tree system and other SPS components are shown in Fig. 2.0.

The SCM is retrievable and re-installable with the aid of a multi-purpose tool in conjunction with a work type remote operated vehicle (ROV). The installation operation is guidelines and requires the latch of the SCM to the SCMMB during operation using the ROV.

The SCM contains two redundant SEM, all purged and filled with inert nitrogen at 1 bar (14.5 psi) pressure. Two key functions of SCM are:

- delivery of LP / HP control function
- acquisition of subsea data and delivery of data to topside units.

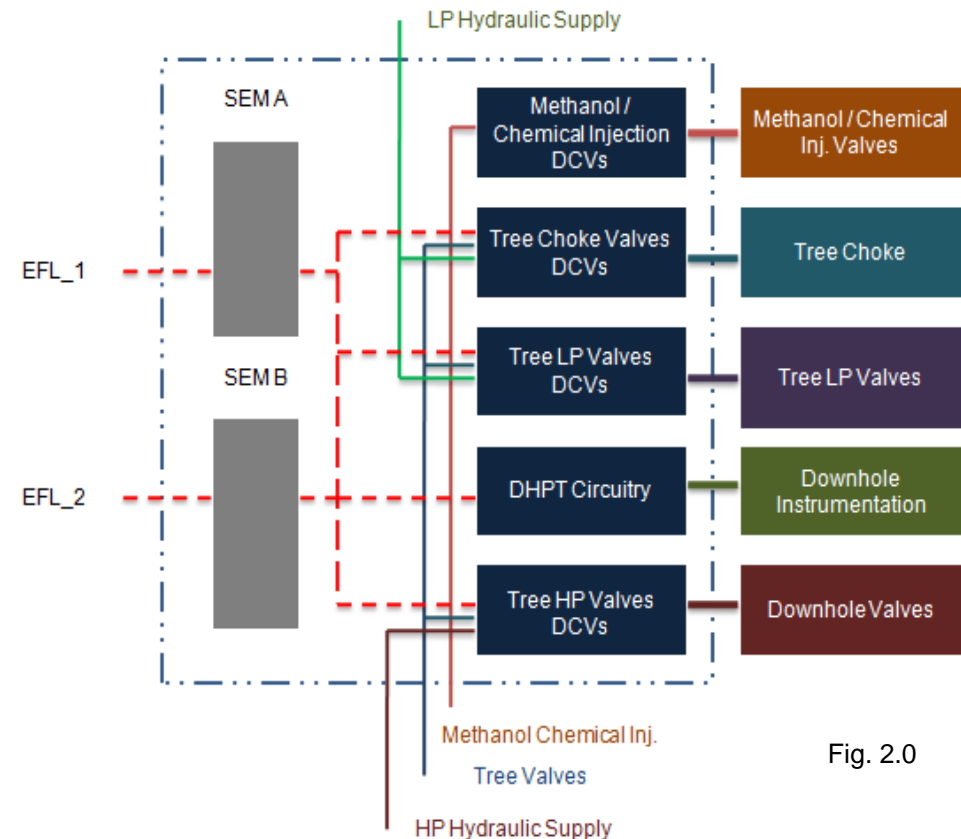


Fig. 2.0

For full advanced subsea control system training contact:

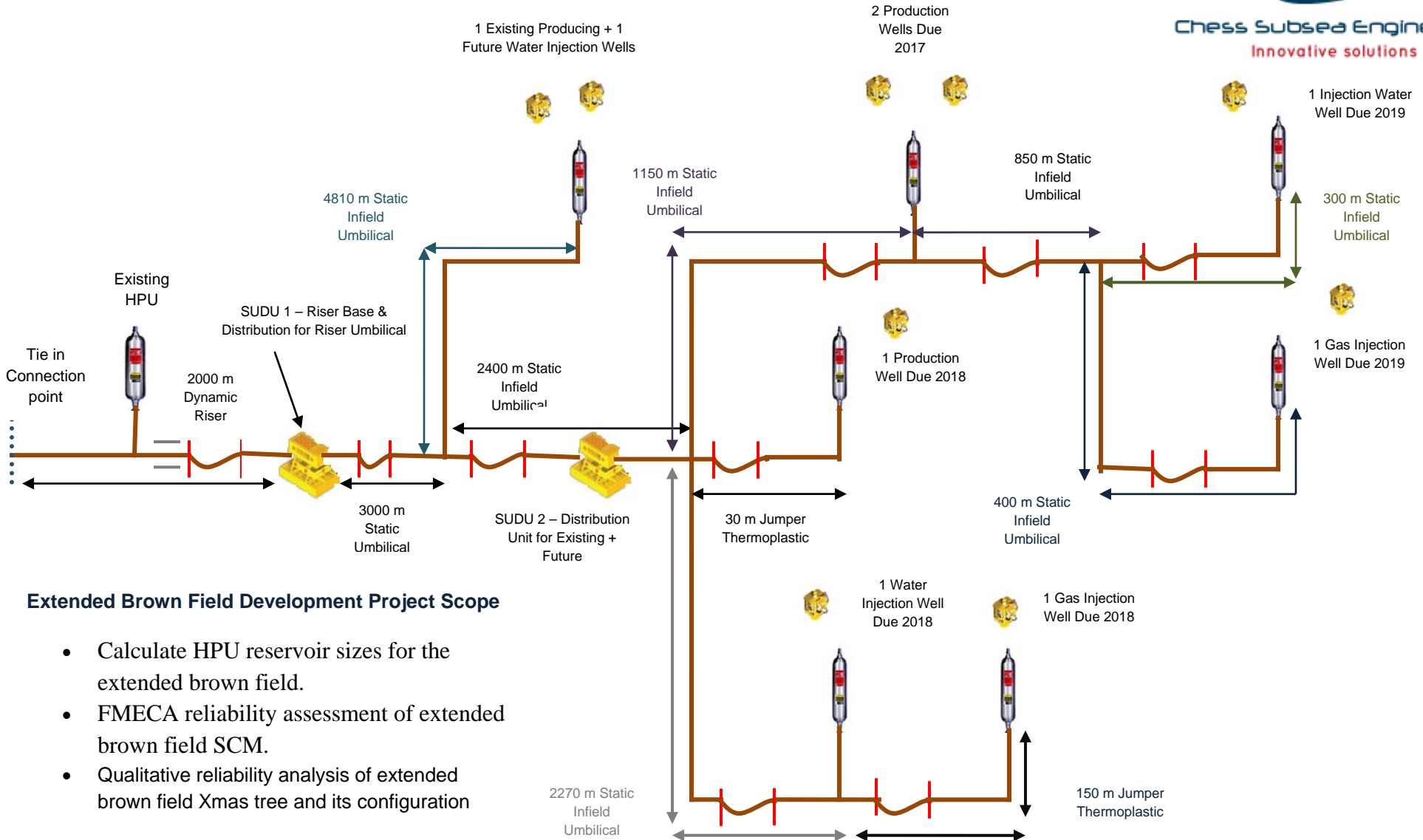
Name: Engr. Oseghale Lucas Okohue

Email: Oseghaleokohue@chesssubseaengineering.com

Extended Brown Field Development Architecture



Chess Subsea Engineering
Innovative solutions



Extended Brown Field Development Project Scope

- Calculate HPU reservoir sizes for the extended brown field.
- FMECA reliability assessment of extended brown field SCM.
- Qualitative reliability analysis of extended brown field Xmas tree and its configuration

Chess Subsea Engineering (UK) Limited is registered in England (registration number 9616564) and having its registered office at London, Erith, Kent, DZDA18, United Kingdom.

Tel: +447903310642, +447419706555, +2348139340494. Email: info@chesssubseaengineering.com