

The basis of all Expro landing string assemblies originates with the systems developed for the exploration and appraisal (E&A) applications more than 25 years ago. Providing equipment for standard 3", large bore up to 5", high pressure, deepwater drill stem testing (DST) and even electrical submersible pump (ESP) exploration and appraisal activity, these systems can cover any of our clients' needs.

DST strings are in riser systems used to allow well operations to be conducted safely during a DST from a semi-submersible rig or drillship in water depths up to 10,000 ft. They provide the ability to rapidly shut-in the well and disconnect should conditions require it.

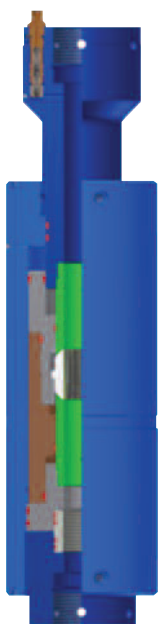
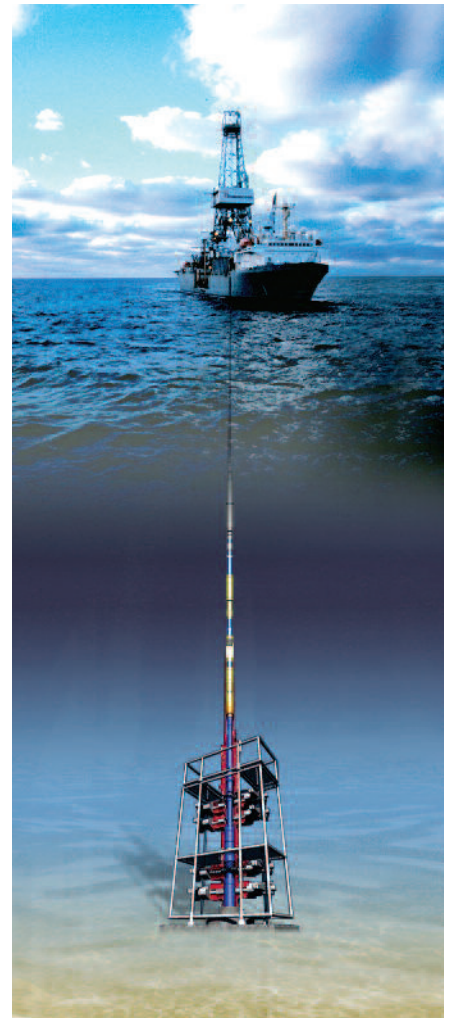
The subsea test tree (SSTT) provides the primary dual safety barrier to contain well pressure via two ball valves. In addition it provides a safe disconnect facility from the well in case of emergency. These valves can be configured to cut coil tubing and wireline while maintaining sealing integrity. The ball closure logic allows a single ball to cut the coil tubing and wireline leaving full redundancy for the other ball to seal. The tree ball valves support pressure applied from above allowing the string and latch seals to be pressure tested. The latch mechanism allows the string to be unlatched and re-

latched as conditions require. The short overall length of the test tree enable two sets of blowout preventor (BOP) rams to be closed below the test tree and the shear rams to be closed above the tree.

A secondary disconnect system allows well isolation even in the event of total umbilical loss.

The lubricator valve is located below the rig floor providing an increased lubricator section to allow the safe deployment of either wireline or coil tubing equipment. This ball valve features bi-directional sealing to allow pressure testing from above and well pressure control from below. Inherent within the valve is a unique pump through feature enabling well kill operations to be performed.

The retainer valve is located just above the BOP shear rams and is designed, in the event of a disconnect, to isolate the landing string contents and vent trapped pressure from between the retainer valve and the SSTT to the marine riser. It is operated by the latch control line and controlled by a series of mechanical and hydraulic interlocks. As the landing string is bled, the retainer valve allows riser fluid to enter, displacing hydrocarbons from within the string. Fail-as-is or fail-close options are available depending on the operating philosophy.



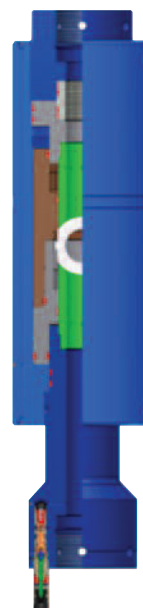
Lubricator Valve



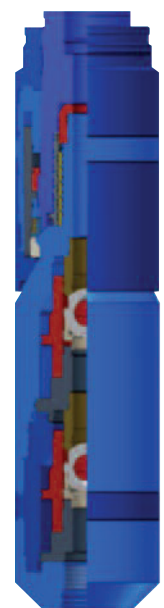
Accumulator Module



Riser control Module (RCM)



Retainer Valve



Subsea Test Tree (SSTT)