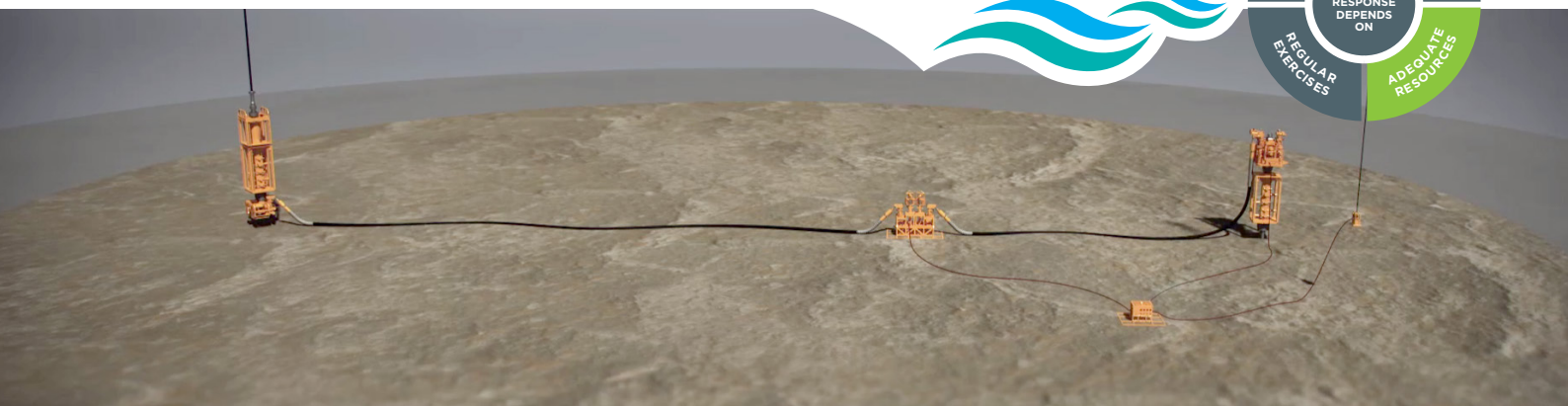
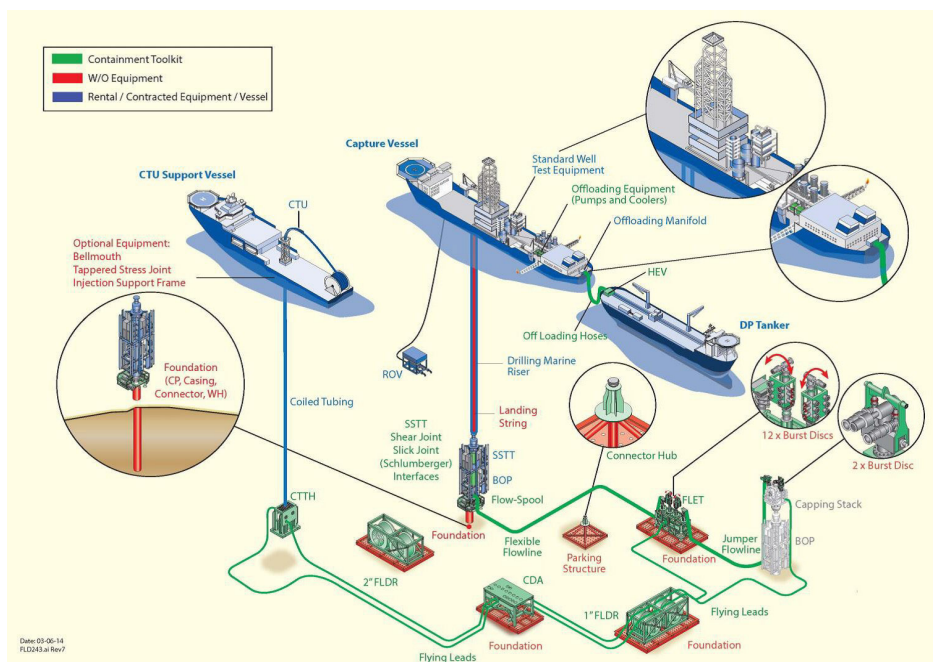


Containment Toolkit



Oil Spill Response Ltd's (OSRL) and the Subsea Well Response Project (SWRP) collaborated to provide subscribers with a containment toolkit and subsea well containment guidelines to enhance the industry's capability to respond to a subsea well incident. The containment toolkit and guidelines supplement OSRL's Subsea Well Intervention Service (SWIS) capping stack systems and Subsea Incident Response Toolkits (SIRT).



How it works

If well shut-in is not sufficient using capping, the Containment Toolkit can be deployed that, when combined with standard industry hardware, can create a containment system designed to flow hydrocarbons from a wellhead to the surface in a safe and controlled way, ready for storage or disposal.

From the capping stack, hydrocarbons are directed through the flowline end termination (FLET) via a flexible jumper. From the FLET, the flow continues through a flexible flowline and the flow-spool assembly into a standard well testing riser and up to a mobile offshore drilling unit (MODU). Well hydrocarbons are processed in the standard surface well testing equipment and part of this (transfer and incinerator pumps + coolers) is included within the containment toolkit, stabilised and then offloaded to a tanker positioned at a safe distance from an incident well.

To maintain flow assurance, hydrate inhibitor can be supplied via a coiled tubing spread installed on a marine vessel to a coiled tubing termination head (CTTH) and onward to the chemical distribution assembly (CDA). The hydrate inhibitor can be delivered to the FLET and capping stack via the CDA.

The containment toolkit is stored in strategic locations to facilitate timely response around the world. Three sets of non-airfreightable flexible subsea jumpers and flowlines are stored in the UK, Brazil and Singapore ready for onward transportation. All other containment toolkit components are both sea and air-freightable and stored response ready in the UK, Norway and USA.

Containment Toolkit

The equipment in the containment toolkit is designed to supplement standard industry well test hardware to create a containment system. It consists of equipment that can control wellbore fluids from the well up through the water column to a surface vessel. The toolkit comprises of long-lead equipment not readily available in the current industry and minimises response times by allowing a responding well operator to draw on existing resources.

The Containment Toolkit: key facts

- Usable with a wide range of Mobile Offshore Drilling Units (MODUs) as capture vessels
- Compatible with standard available well test equipment
- Stored in strategic locations around the world to facilitate timely response

Subsea Well Containment Toolbox specification

Water depth	Up to 3,000m
H2S content	0 to 500ppmV
Design temperature (operation)	-1°C to 130°C
CO2 content	0 to 10 mol %
Max temperature	130°C (operation)
Design operating life	2 x 6 month deployments
Design temperature (storage)	-20°C to 40°C
Transportability	Air (Boeing 747-400 ERF; excluding flexible flowlines), land and sea
Containment toolkit storage life	20 years



Flowline end termination (FLET)

ROV-operated subsea manifold designed to sit between the Capping Stack and flowspool assembly and provides overpressure protection and access for chemical injection
Size: 6.2m x 2.5m x 3m
Weight = 32 tonnes



Flow spool with subsea test tree latch

Assembly that connects the flexible flowline to a standard well testing riser and interfaces with standard wellhead foundation and MODU BOP equipment.
Size: 4.3m x 3.7m x 3.8m,
Weight = 43.5 tonnes



Diverless subsea connectors

Standard ROV operated subsea hardware used to connect flexible flowlines to a capping stack, FLET, flow spool assembly and burst disk trees.
Size: 1.6m x 1.2m x 1.9m
Weight = 3.3 tonnes



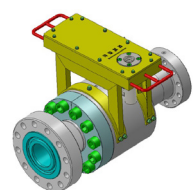
Chemical distribution assembly (CDA)

Hardware for distribution of hydrate inhibitor to the FLET and/or to the capping stack.
Size: 2.5m x 2m x 2.3m
Weight = 6 tonnes



Coiled tubing termination head (CTTH)

The CTTH is suspended from the coiled tubing to de-couple the dynamic section of the coiled tubing riser from the static CDA.
Size: 1.5m x 1.1m x 1.8m
Weight = 3 tonnes



Swivels with ROV panel

Connection between each vertical connector and flowline/jumper.
Weight 0.9 tonnes



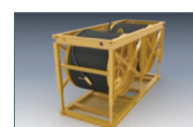
Hose end valves (HEV)

End valves on the marine offloading hoses for safe coupling to the offloading tanker.
Size = 1.5m x 1.8m x 1.1m
Weight = 2.5 tonnes



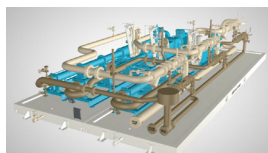
Flexible jumpers / flowlines

Connect pipe between the capping stack, FLET and the flow-spool assembly.
Inner diameter = 6"
Lengths = 250m, 850m, 1200m

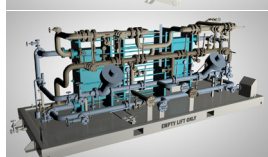


Deployment reels for flying leads

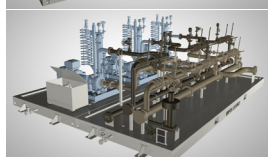
The 1" and 2" flying leads are coiled on deployment reels for safe subsea installation of flying leads between the CTTH, CDA, capping stack and the FLET, for hydrate inhibitor supply to the cap or FLET(s).
Size: 6.2m x 2.4m x 2.6m
Weight = 12 tonnes



Incineration Pump Packages - Pump both stabilised and unstabilised crude from the Low Pressure (LP) separator to the burner boom incinerator
Size: 2.4m x 9.1m x 2.4m
Weight: 24 tonnes



Transfer Pump Packages (Offloading) - Pump stabilised well fluids from the LP separator to the cargo-oil tanks on the offloading tanker.
Size: 2.4m x 6.1m x 2.4m
Weight: 12 tonnes



Offloading Cooler Packages - Downstream of the offloading transfer pumps cool the stabilised crude to ensure that the offloading temperature specification for the tankers is met.
Size: 2.4m x 6.1m x 2.4m
Weight: 7.7 tonnes



Marine Offloading Hoses)

Transfer captured incident well fluids from the capture vessel to an offloading tanker

All equipment specifications are approximate.

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