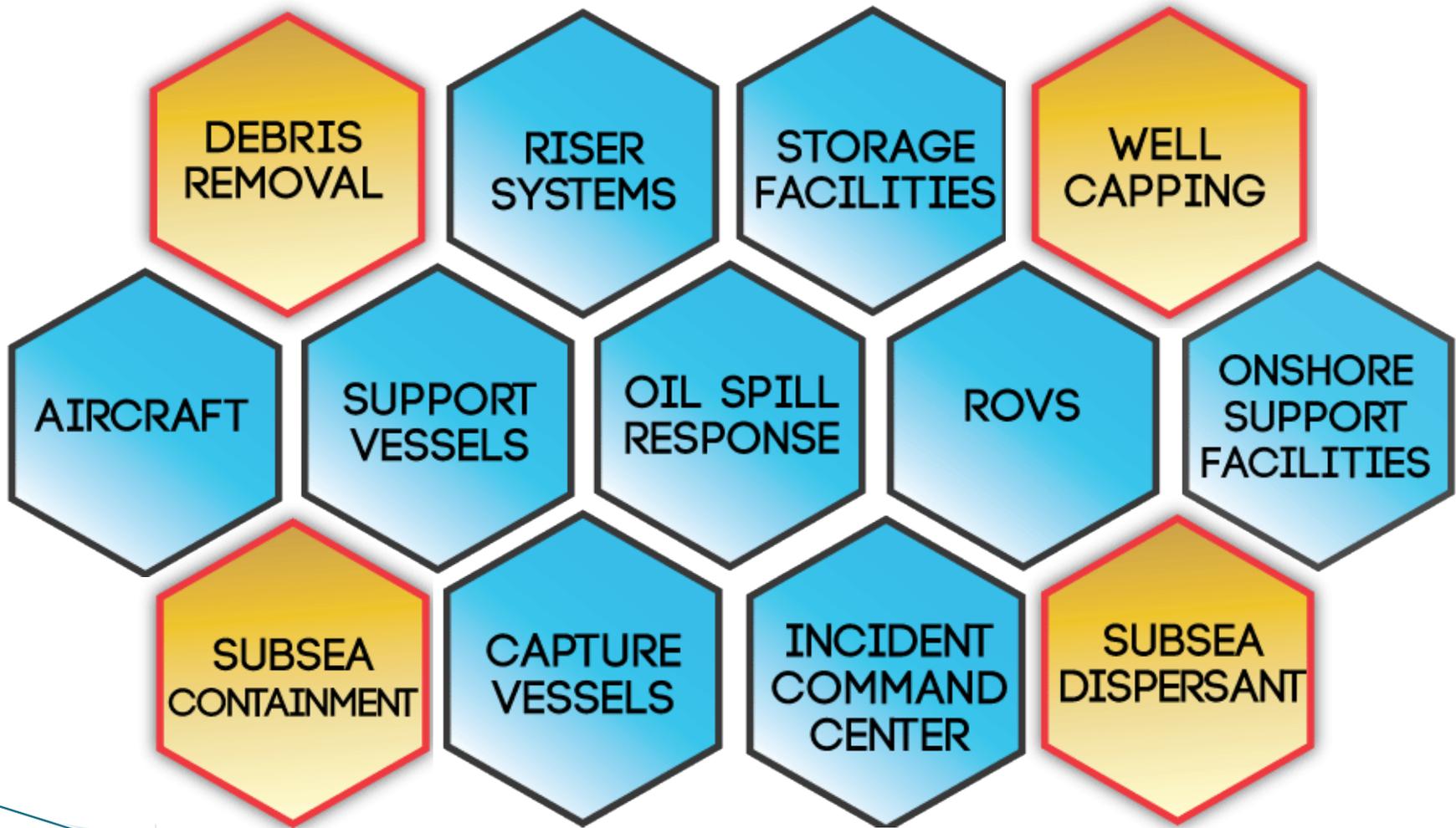


# The Solution for Subsea Containment Requirements

*Global Initiative*

Wild Well Control, Inc.

# Response Components



**– Plus Many More Components**

# WILD WELL CONTROL

## System Components



# Global Subsea Well Containment System

## A Total Capping Solution Consisting of –

- Dedicated Equipment & Facilities
  - Subsea Capping Assembly & Ancillary Equipment
  - Subsea Dispersant Injection System
  - Special Debris Removal Equipment
  - Emergency Response Center
- Ancillary Equipment & Facilities
  - Specialized Marine Firefighting / Well Control Equipment
  - Equipment Storage and Maintenance Facility
- Response Preparedness
  - Emergency Drills
  - Logistical Planning
- Incorporation of Subsea Containment Management System<sup>©</sup>
  - Bridging Document into Operators Response System
- Experienced Well Control Personnel

***This is a Containment SYSTEM – not multiple resources and components to be coordinated at the time of an emergency.***



# Subsea Containment Management System<sup>©</sup>

## Includes Comprehensive and Detailed Procedures –

- ▶ Executive Summary
- ▶ Cross Reference to Government Regulations
- ▶ Well Intervention – Including Detailed Procedures, Check Lists, Resource Requirements, Decision Matrices
  - Rig Management
  - Riser Severing/Debris Removal
  - BOP Access
  - Dispersant Injection
  - Diversion Cap
  - Capping
- ▶ On Site Support Systems
- ▶ Appendices

Also addresses Subsea and Surface BOP (TLP and SPAR)  
Deepwater Scenarios



# Subsea Capping Assembly

- 18.3/4" 15K Single CIW, Type TL BOP, with ST Locks, with Blind/Shear rams installed
- 18.3/4" 15K Double CIW, Type TL BOP, with ST Locks, with Blind/Shear rams installed
- 18.3/4" 15K Drilling Cross, with –
  - Double Valves, 3.1/16" 15K
  - Subsea Choke Assembly, 3.1/16" 15K
  - Vertical Connectors (2)
  - Temp and Pressure Sensors
  - Transducers
- Subsea Hydraulic Power Unit, 50GPM, API 17H ROV Hot Stabs
- Modularized in deployment/transport frames
- Connectors
  - 18.3/4" HC Connectors (2)
  - 18.3/4" H-4 Connector



# 18 3/4" 15K Double CIW, Type TL BOP



# 18 3/4" 15K Single CIW, Type TL BOP

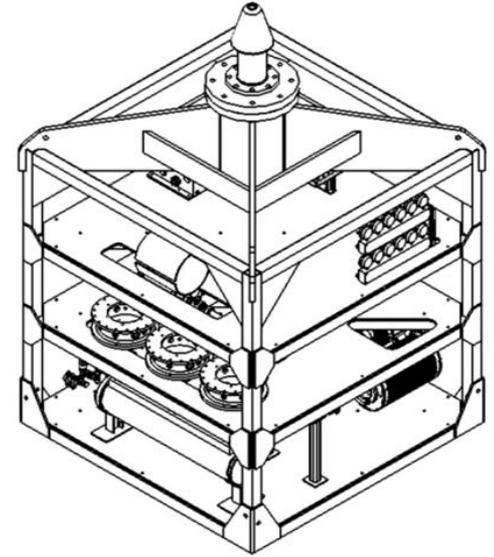


# Drilling Spool



# Proposed Subsea HPU

- ▶ Oceanering Design
- ▶ Capability of operating –
  - Genesis Shears
  - 25 / 50 GPM Seawater Injection System @ 5,000 psi
  - Additional multipurpose outputs for subsea tooling
- ▶ Technical Specifications –
  - 72" X 72" X 120" Footprint
  - Triple 110 HP Electrical to hydraulic HPUs
  - Single 96 GPM / 4,000 psi hydraulic output
  - 4X 25 GPM / 3,000 psi hydraulic output
  - 30 Gallon hydraulic reservoir with optional 60 Gallon hydraulic expansion
  - Electrical control system to monitor ground fault, health, pressure, depth, video, lighting, fluid level
  - Topside electrical step up transformer system to 3,000 VAC
  - 50 GPM @ 5,000 psi – Seawater / Water Glycol / Methanol Injection System
  - 2.5 GPM @ 12,500 psi – Methanol Injection Circuit



**OCEANEERING**

Deepwater Technical Solutions



# Proposed Subsea HPU

## Deepwater Technical Solutions Subsea HPU – Specifications



### Vessel Electrical Requirements

- 480 VAC – 3Phase
- 250 A Supply

### System Horsepower

- 225 HP

### Nominal Operating Pressure

- 3,000 psi

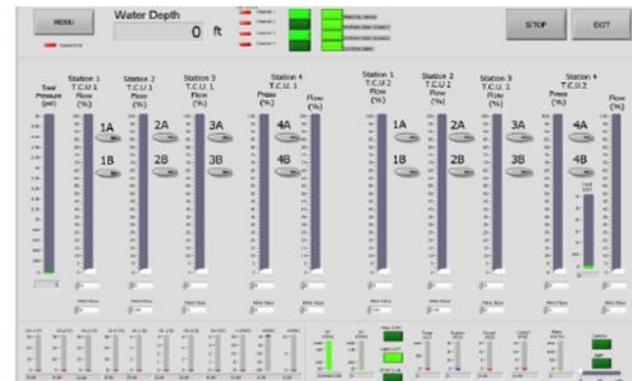
### Hydraulic Capability (GPM – Gallons per Minute)

- 8X Flow controlled 0 to 25 GPM (bi-directional)
- 2X Pressure and flow control 0 to 25 GPM (bi-directional)
- 6X 3 GPM (bi-directional)

### Depth Limitation

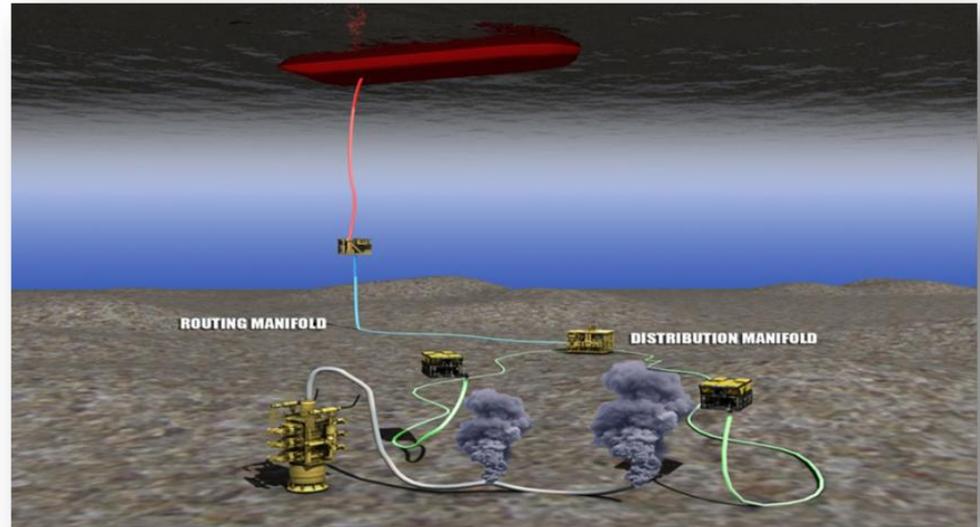
- 10,000 fsw (3,000 meter)

The Subsea HPU is a complete stand-alone package, powered via dedicated ROV umbilical. Unit contains a complete control system that proportionally adjusts the flow and pressure for each hydraulic output. The suite is perfectly suited to augment ROV systems performing large projects with high horsepower requirements. System is based on proven and existing ROV technology. System is capable of electrical controls expansion for additional survey equipment. System comes configured with a Launch and recovery A Frame, Umbilical Winch, 20 ft work van.



# Subsea Dispersant Injection Package

- ▶ System Designed based on Lessons Learned in GOM incident
- ▶ DNV verification—middle level system
- ▶ Equipment
  - Applicators
  - Work vessel with 1 ¼” to 1 ½” coiled tubing down line
  - Minimum 21,000 gallons of approved dispersant in 500 bbls storage tanks
  - CT spread – HPU, pump (4–30 gpm), injector head, reel with down line
  - 1” chemical hose (Synflex 33 CP-16) from routing manifold to distribution manifold (approx. 1000+ ft), 17H Male Hot Stub on each end
  - Distribution manifold with 4 x 17-H Female Receptacles
  - Various length (100–200 ft) 1” applicator hose, JIC fitting one end, 17 H Male Hot Stub on other end



# Overview of Routing Manifold

Routing Manifold



Coil Tubing Connector

Swivel Joint

Cross-over Flange

# SIT (System Integration Test)

## Distribution Manifold



## Applicator with Hose



# Results of SIT (System Integration Test)



- Tested to 4500 psi and held for 15 minutes
- No leaks
- Another SIT to be conducted in Aberdeen

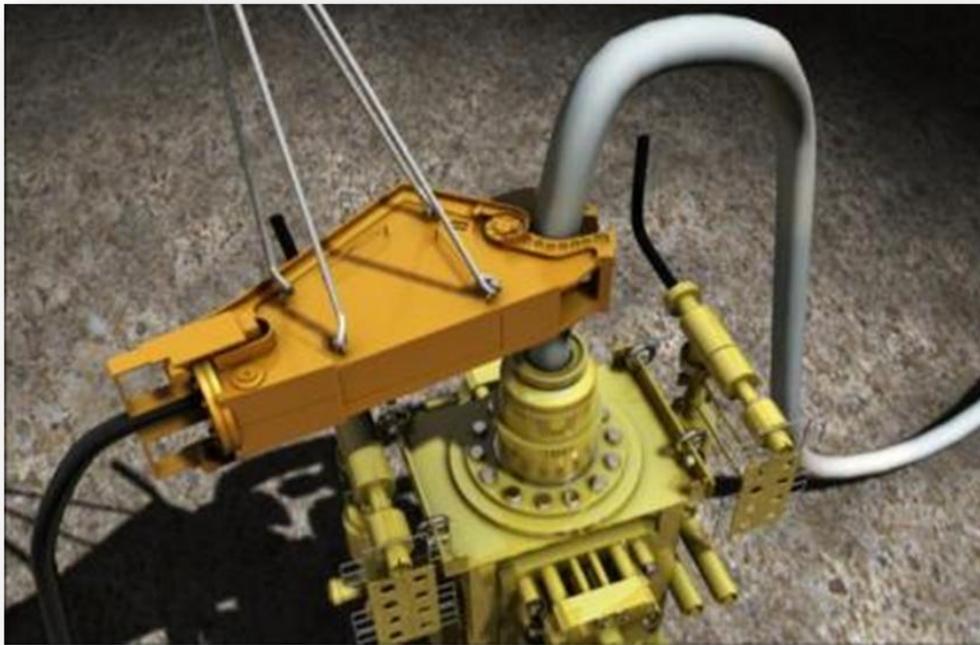
# Subsea Diversion Cap

- Diversion Cap (“Top Hat”) may be used initially to temporarily contain and divert the flow to the surface
- Includes injection ports for dispersant and methanol



# Subsea Debris Removal Equipment

## Hydraulic Shears



# Subsea Debris Removal Equipment



Model	Shear Weight (lbs)	Jaw Opening (Inches)	Jaw Depth (Inches)	Shear Force 5,000PSI	Shear Force 5,500PSI
GXP 660	13,300	32	32	1,475 tons	1,625 tons
GXP 2500	45,000	46	48	3,015 tons	3,317 tons

# Equipment Availability

## Dedicated Inventory – Based in Aberdeen, UK

- Interim Capping Assembly May 2011
- Subsea Capping Assembly/Ancillary Equipment Sep. 2011
- Subsea Dispersant Injection System July 2011
- Special Debris Removal Equipment July 2011
- Subsea Diversion Cap October 2011

# *The Solution for Subsea Containment Requirements Global Initiative*

- ▶ *For additional details, please contact*
- ▶ Mike Drieu, Wild Well Control
- ▶ Telephone : +1 281 784 4700
- ▶ E-mail: MDrieu@wildwell.com

