



**Wild
Well Control**

Project Memo - #9

| | | | |
|------------------|---|-------------------|---|
| Operator: | BP GoM Deepwater Exploration | Well Name: | Macondo – MC252#1 |
| Date: | 24 Apr 2010 | Time: | 1600 hrs |
| To: | Mark Mazzella John Shaughnessy | From: | K. Girlinghouse, M. Cargol, D. Barnett, D. Moody |
| CC: | Joe Dean Thompson, Freddy Gebhardt Dicky Robichaux, Chris Murphy, Roland Gomez | | |
| Subject: | Macondo – Drill String Capping Options | | |

Summary:

Four proposed options for interface of Macondo drill string and containment of flow within same.

1. Option 1-ROV deployed internal plug/pump in assembly

Summary: Oceaneering is designing an ROV deployable internal pipe plug.

a. Benefits:

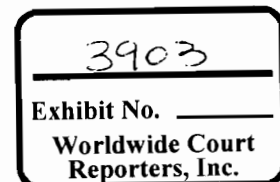
- i. 1.5 days mobilization
- ii. Based on proven technology
- iii. Potential to stop flow from DP completely
- iv. Facilitates pump-in operations

b. Detractors:

- i. Tool designed for maximum 6,000psi
- ii. Potential for increased pressure in DP resulting in possible upstream failures
- iii. Requires removal of tool joint (OI chop saw)

c. Mitigating Actions:

- i. Install pressure gauge



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2. Option 2-Deployment of Buoyant Capping Stack

Summary: WWCI is assembling a Capping Tree to be deployed on a crane and installed on the 6-5/8" drill string by ROV. Stack will be neutrally buoyant so as to ease installation and prevent damage to drill string.

a. Benefits:

- i. 1.5 days mobilization
- ii. Off shelf technology
- iii. Potential to stop flow from DP completely
- iv. Facilitates pump-in and monitoring operations
- v. 10,000 psi
- vi. Requires NO modification of drill string (i.e. goes on over tool joint)

b. Detractors:

- i. Weight of tool may cause damage to drill string and hinder installation
- ii. Requirement for IWOCS to function
- iii. Potential for increased pressure in DP resulting in possible upstream failures

c. Mitigating Actions:

- i. IWOCS and stab plate sourced from OI
- ii. Sourcing 12 ton buoyancy modules from Floatation Technologies

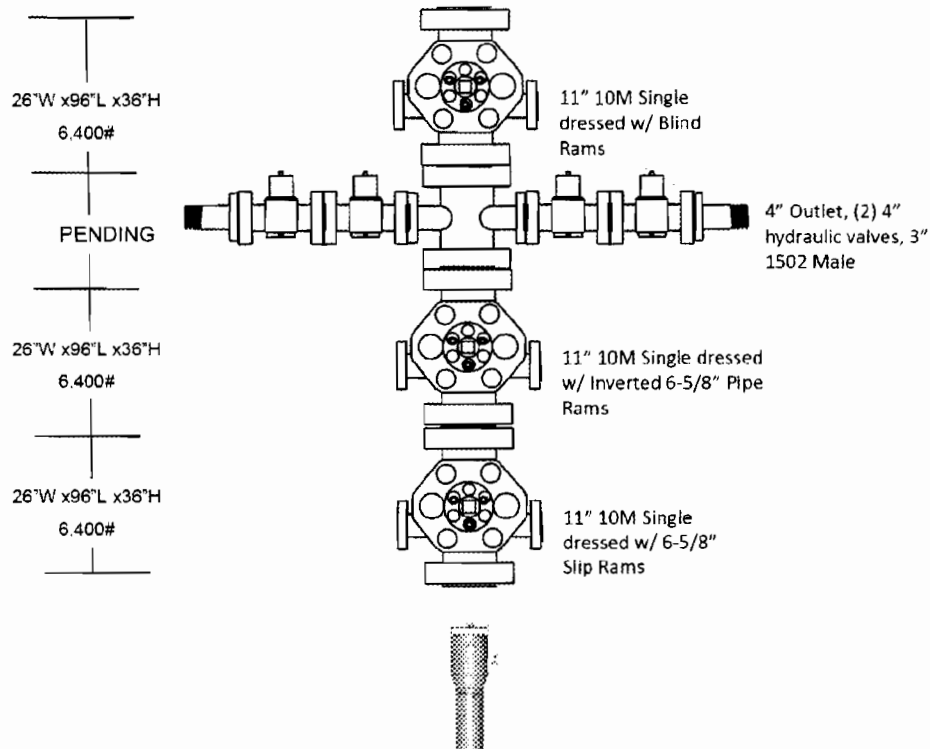


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11" 10M Capping Stack

CONTROLS

- (2) Per Ram Block: $3 \times 2 = 6$
- (2) Per Valve ganged on each side: $2 \times 2 = 4$





Option 4-TIW valve and crossover/pump-in

Summary: ROV screw in buoyed TIW valve and pump-in sub in 6-5/8" box. Sealing product would then be pumped in through dedicated port to ensure seal.

d. Benefits:

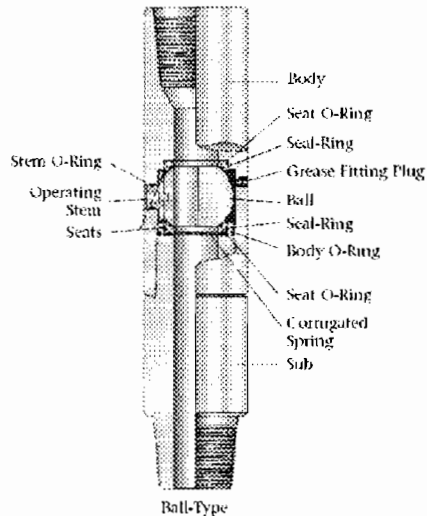
- i. Quick delivery (off the shelf)
- ii. Proven technology and equipment
- iii. 10,000 psi

e. Detractors

- i. Heavy weight requires buoyancy
- ii. Connection is difficult for ROV to install (threaded connection)
- iii. Torque required to seal is 40,000 ft/lbs... ROV is capable of 100 ft/lbs
- iv.

f. Mitigating Actions:

- i. Buoyancy on TIW valve assembly
- ii. Pump Seal Tite in valve to 'plug' leaks in connection







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Option 4-Slip on Wellhead

Summary: Pending

g. Benefits:

i. a

h. Detractors:

i. a

i. Mitigating Actions:

i. a