Blowout BP Gulf of Mexico
The Dutch Hurricane Proof Solution

Registered at Horizon Support and BP
#BPCC-29893

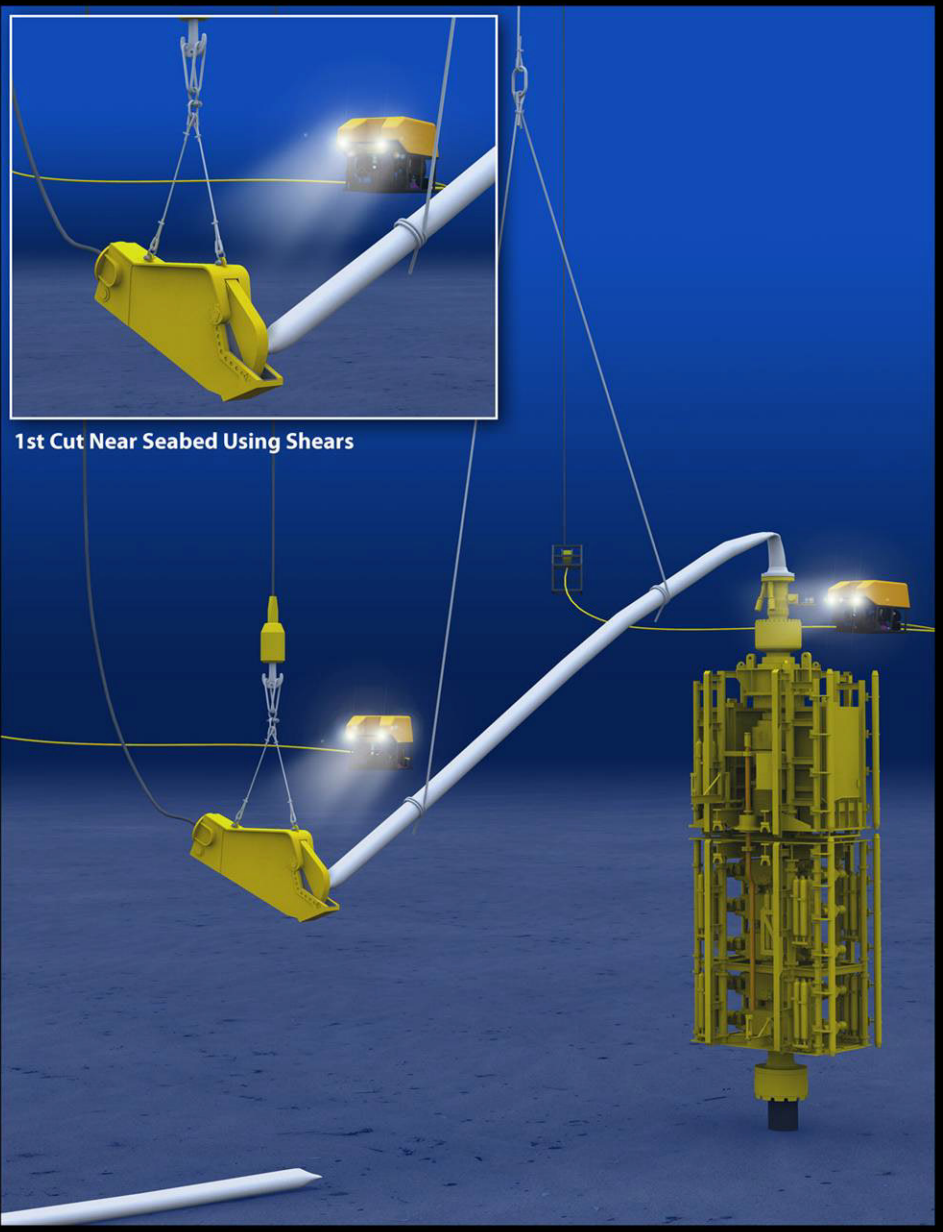
Well MC 252 #1

Dick Swart
05-07-2010
Presentation as a result of the KIVI (Royal Society of Dutch Engineers)
and
Mijnbouwkundige Vereeniging

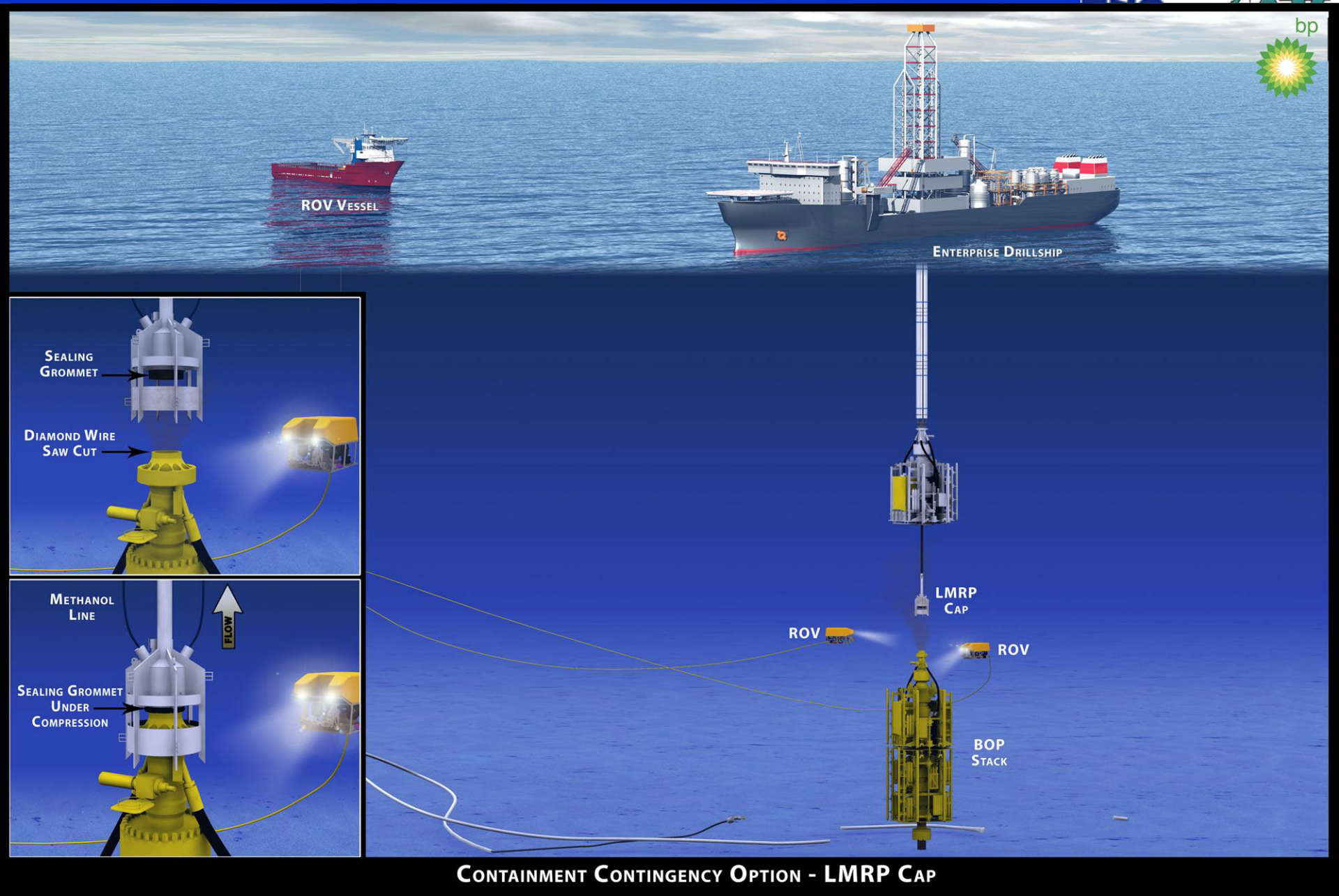
Meeting at Delft University on 2 July 2010

Hurricane proof Dutch solution team

- Dick Swart
  - International drilling expert / teamleader
- Willem Heijnen
  - International production technology expert
- Ruud van der Hoorn
  - Centre for Advanced Technical Solutions
- Wouter Schiferli
  - TNO Oil & Gas division
  - Flow & pressure calculations
- Arie Vliegenthart
  - Swellable packer expert

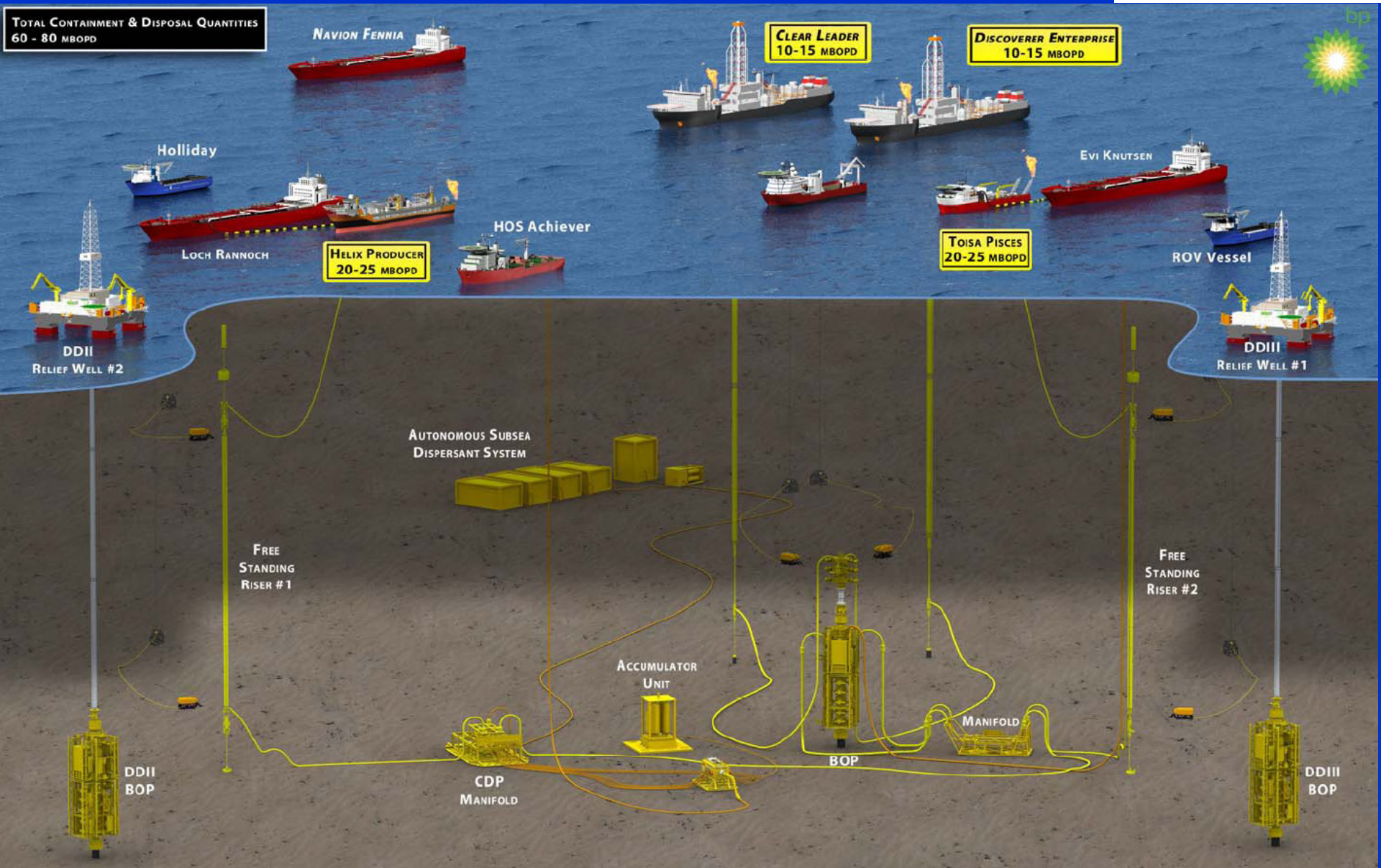


Riser Removal From LMRP



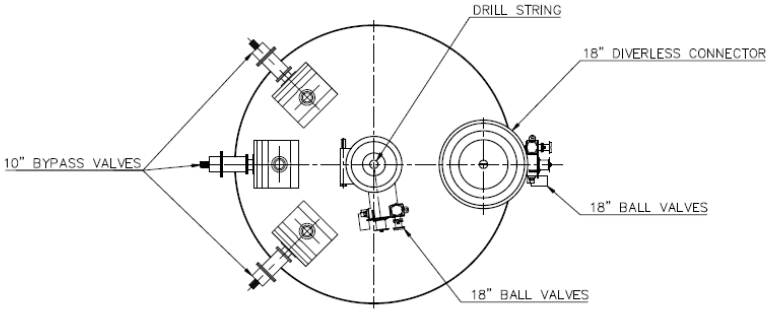
Containment Contingency Option - LMRP Cap

Ongoing containment activities

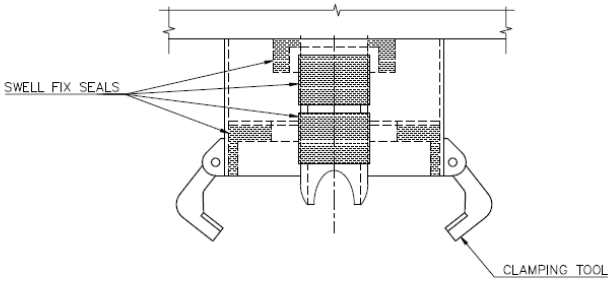


Hurricane Proof Dutch solution (Short term 4-8 weeks)

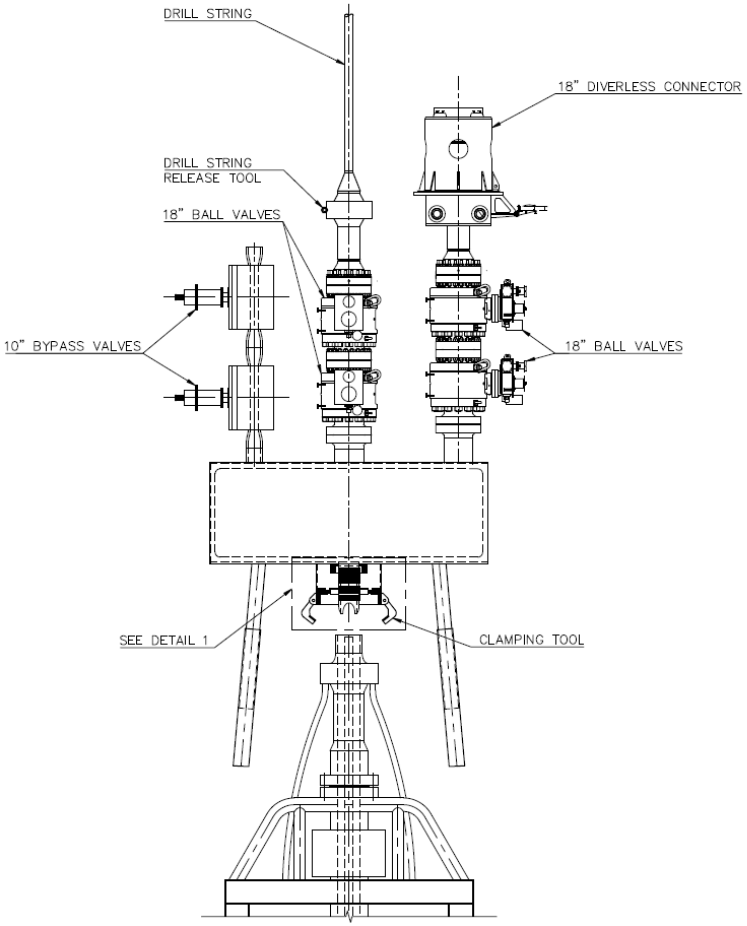
- Stop drilling the relief wells immediately, because cratering possibilities
- Oil& Gas tight connection to Horizon BOP stack
  - LMRP cap riser stump or flange connection
  - Swellable seals or flange connection or combination
- Tie in to nearby infrastructure
  - Connection to eg NaKika pipe line (@ ca. 5miles)
  - Flow MC 252 well 80,000bbl/day



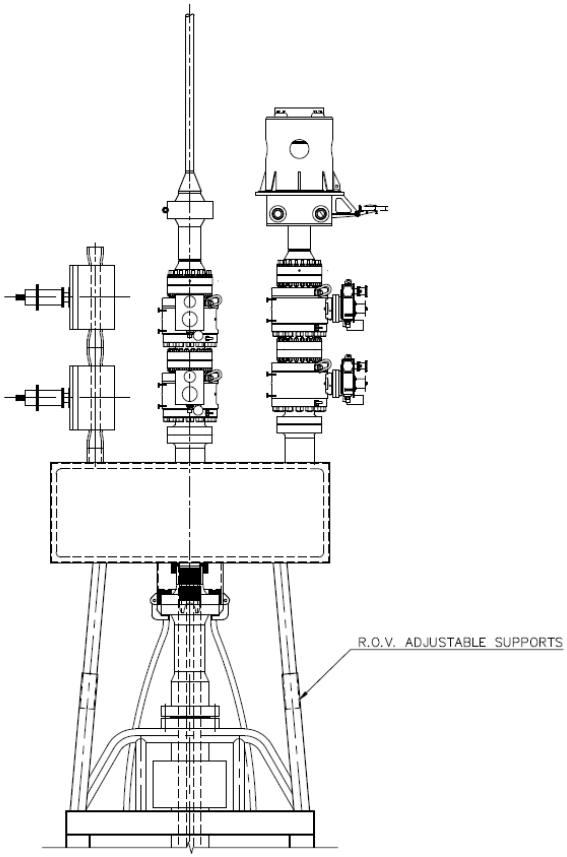
ELEVATION A–A



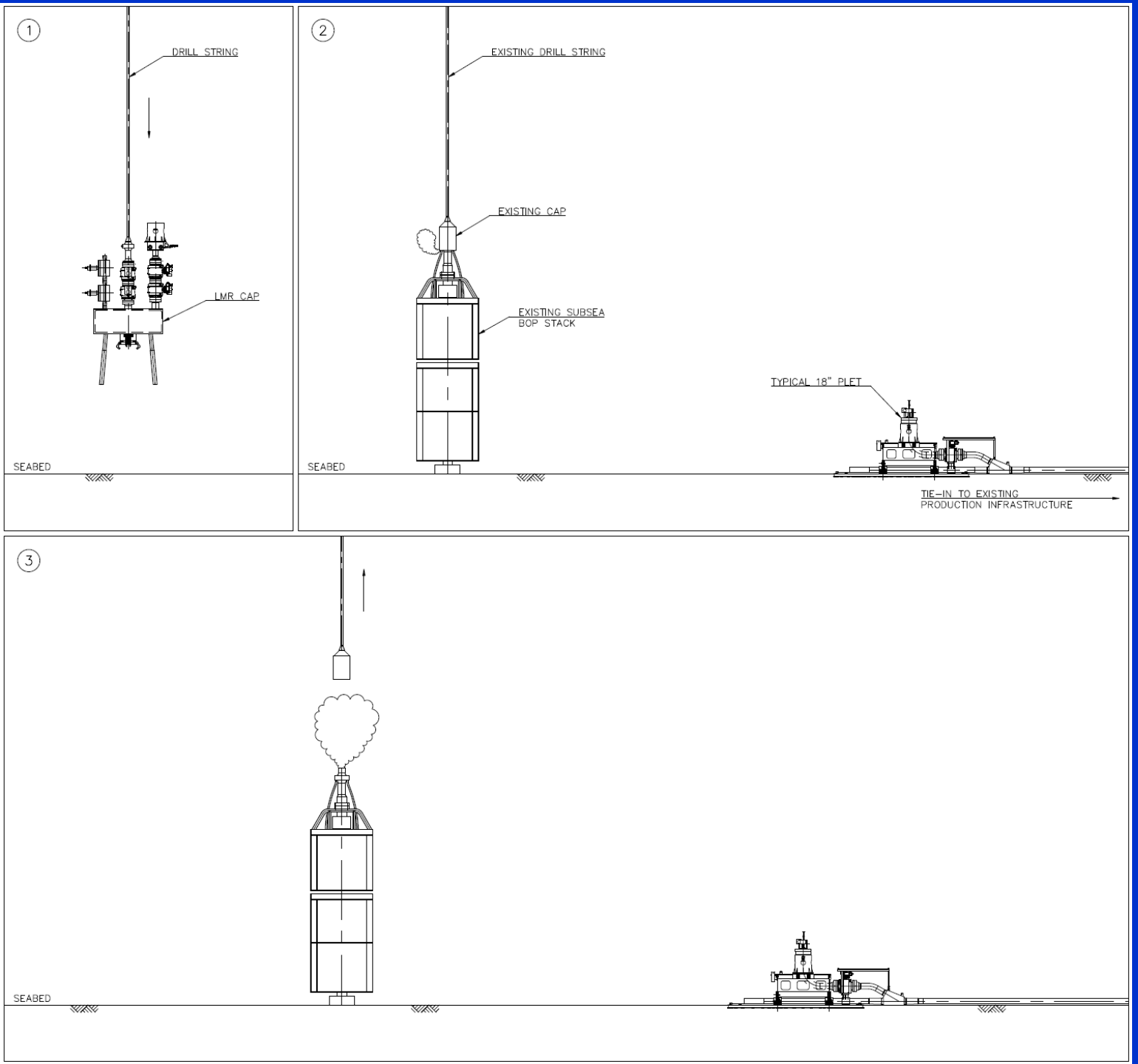
DETAIL 1
SCALE 1:15



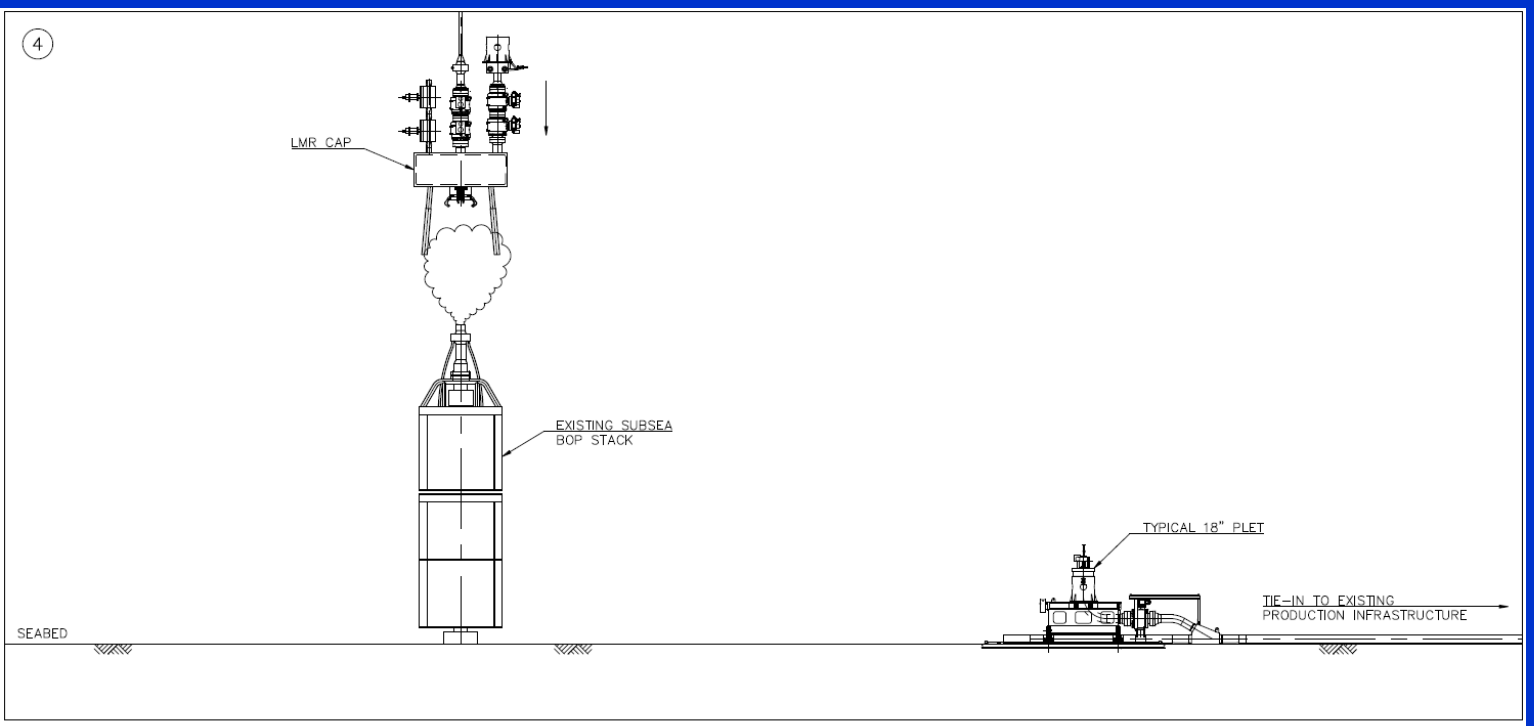
ELEVATION ON LMRP
PRIOR TO INSTALLATION

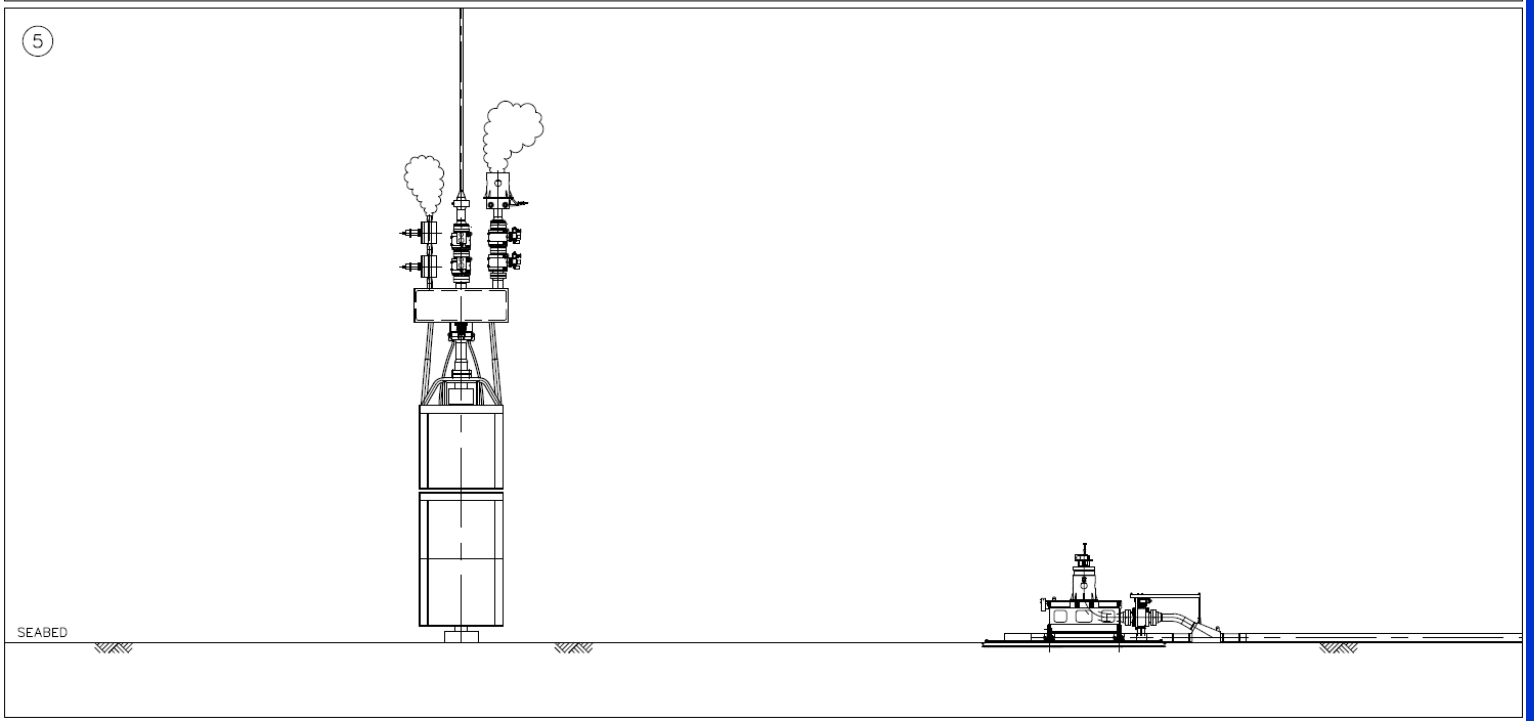


ELEVATION ON LMRP
CONNECTED AND LOCKED

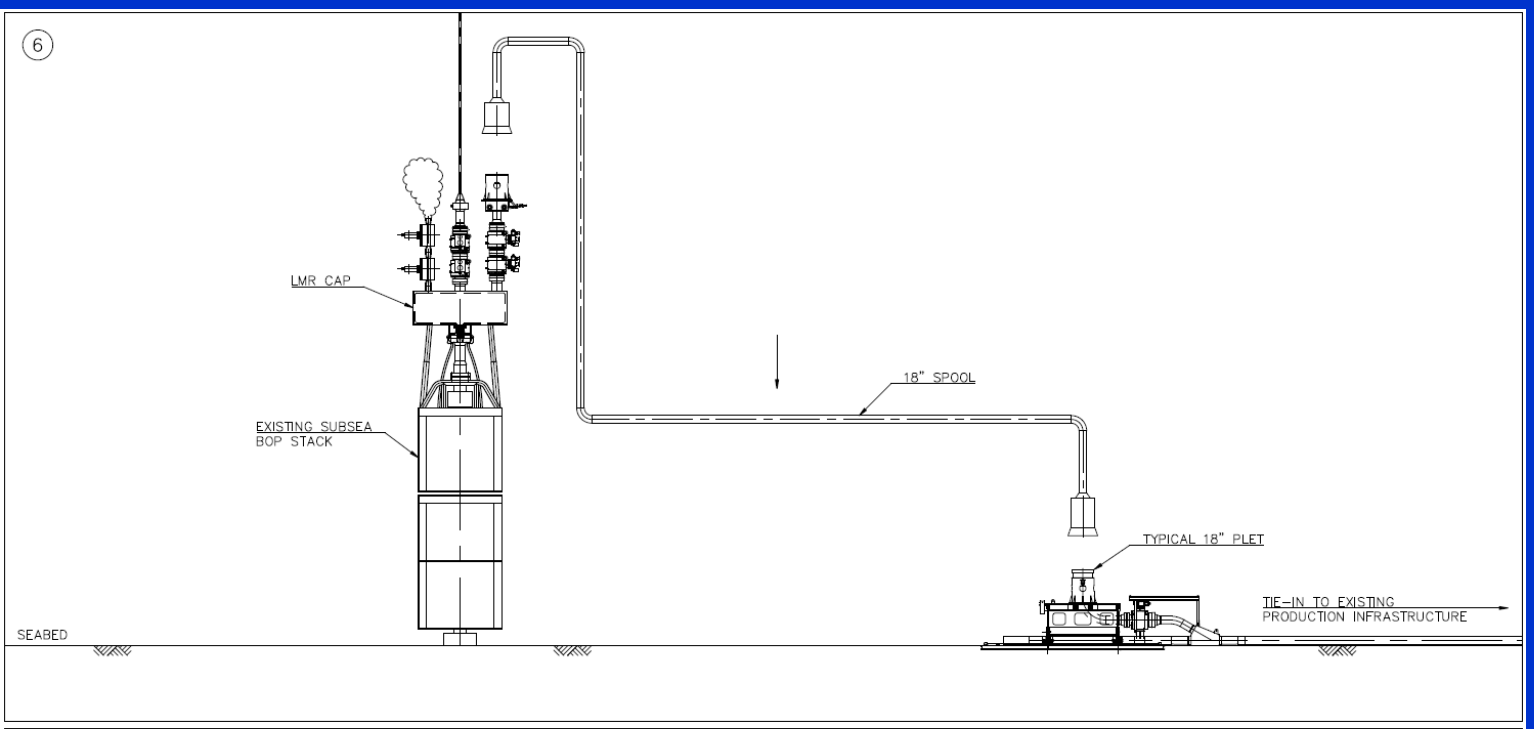

1
DRILL STRING
LMR CAP
SEABED
2
EXISTING DRILL STRING
EXISTING CAP
EXISTING SUBSEA
BOP STACK
SEABED
TYPICAL 18" PLET
TIE-IN TO EXISTING
PRODUCTION INFRASTRUCTURE
3
SEABED

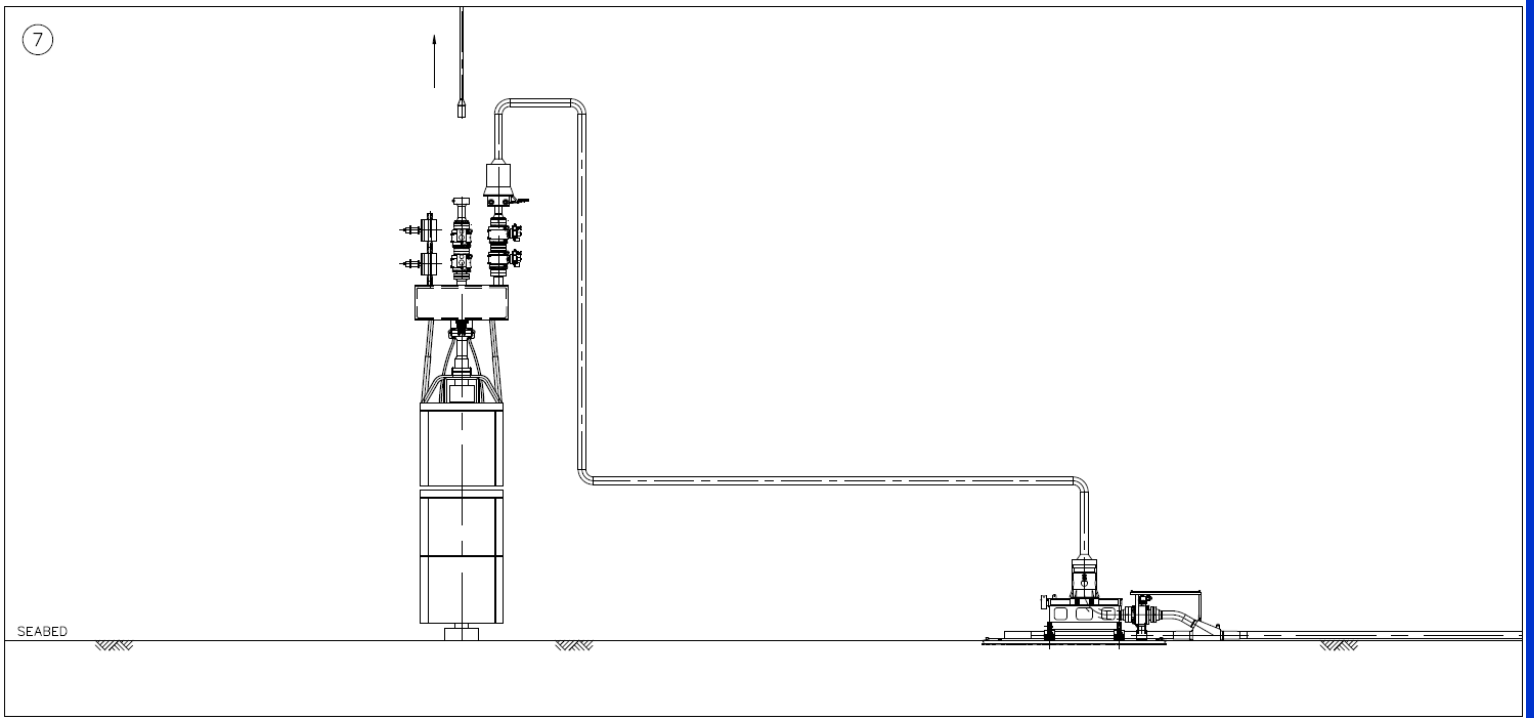
STEP 1


4
LMR CAP
EXISTING SUBSEA
BOP STACK
TYPICAL 18" PLET
TIE-IN TO EXISTING
PRODUCTION INFRASTRUCTURE
SEABED


5
SEABED

STEP 2


6
LMR CAP
EXISTING SUBSEA
BOP STACK
18" SPOOL
TYPICAL 18" PLET
TIE-IN TO EXISTING
PRODUCTION INFRASTRUCTURE
SEABED


7
SEABED

STEP 3

Hurricane Proof Dutch solution (Long term6-12 month)

- Drill reservoir production wells
  - 4 highly inclined wells in circle around flowing well
  - Reduce pressure on the reservoir
    - Production from reservoir through 4 wells via newly to be installed subsea infrastructure
  - Stop flow in uncontrollable well after a certain production period by
    - Killing well with relief well(s)
  - Plug and abandon well MC 252 and recover Horizon BOP stack

THE MACONDO RECOMMENDATIONS

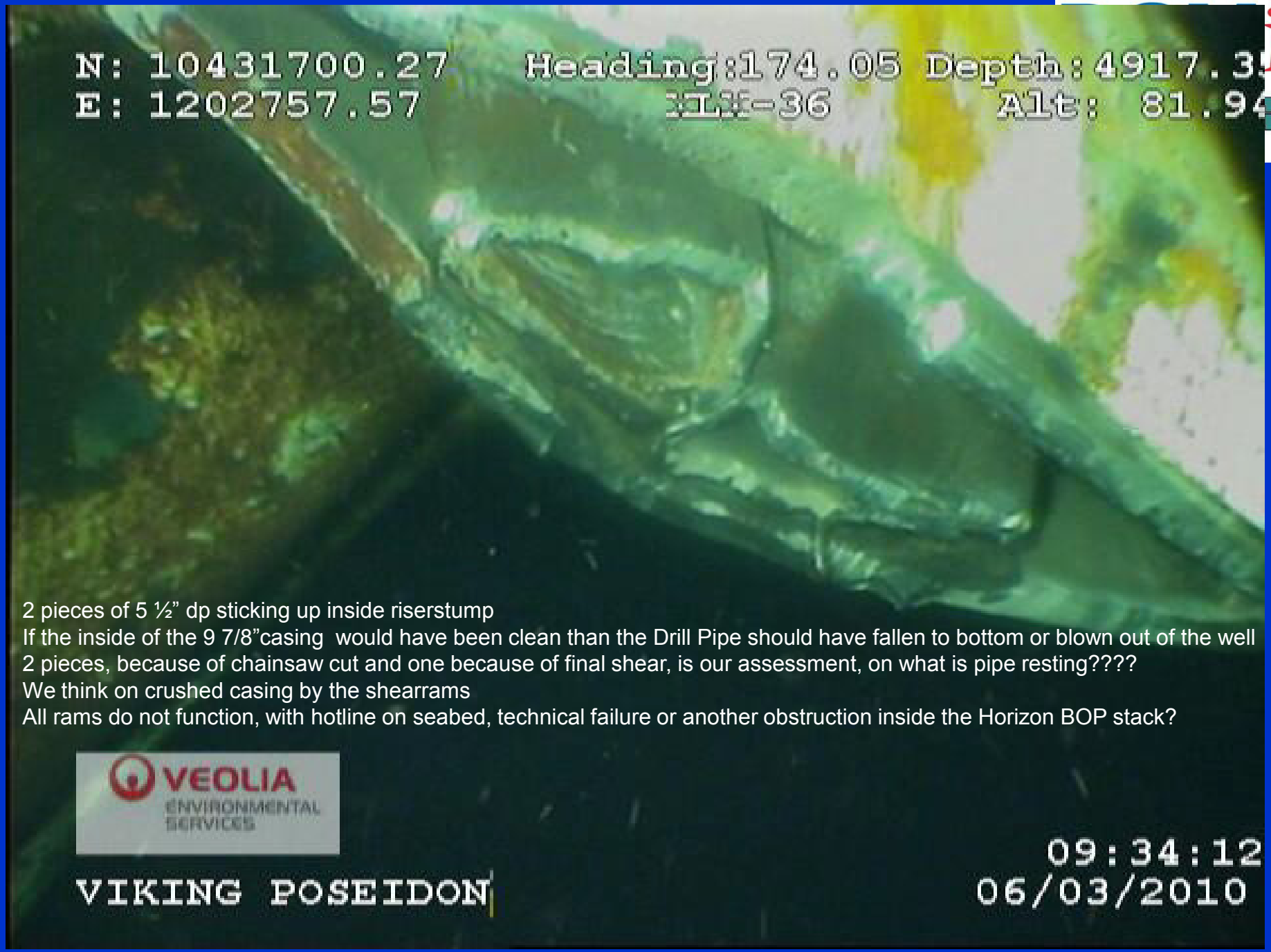
1. All sub-surface information on the target reservoir (and reservoir seals) and all executed drilling operations inclusive of all data (up to blow-out) is to be put on a public accessible database, so that for sub-surface solutions all relevant information becomes available: data such as all well logs, reservoir models, pressure data, cementing data, flow-rates and (expected) O/G ratio's. Currently lack of information leads possibly to assumptions and mis-interpretation on the actual 'status quo', hampering the judgement of our solution. Furthermore BP's interpretation of the pipe situation inside the Horizon BOP stack should be published
2. Experts teams are to be mobilised within, amongst, the Society of Petroleum Engineers (SPE) and the International Association of Drilling Contractors (IADC), exploiting the vast experience and knowledge available at these institutes and amongst its members, globally. MC 252 is not a local or BP problem but a global problem.
3. Prior to executing the killing of the well kill , a 'Killing the Well on Paper'-exercise is to be held in advance, in which all steps leading to such kill are published, and each step is to be risk assessed.
4. The realistic option exists that due to the prolonged, unrestricted, production of the 'Macondo'-well currently ongoing, a significant subsurface washed out-hole , has been formed, making any relief well killing-exercise extremely challenging. This together with the fact that unexpected pressure surges may crater the well around the casing shoes. In fact, it is questionable that the relief wells are a guarantee in killing the well from the top of the reservoir. Therefore drilling the relief wells should be stopped. A safety alert has been sent to BP and DOE.
5. Instead of (only) trying to kill the 'Macondo'-well by one or two relief wells (as currently planned), a 'full connection-solution' to a nearby pipeline ('Na Kita', approx. 6 miles from the Macondo location) should be worked out immediately. This is seen as a **Short Term Solution**, taking a maximum **2 month** to engineer, construct, lay and connect. TNO, Oil and Gas Division confirmed a minimum of 80,000bbl/day capacity

THE MACONDO RECOMMENDATIONS 2

6. Reservoir behaviour effects of the drilling of at least 4 additional wells to be positioned within the close area of the 'Macondo' well (within a about half a mile radius), is to be simulated with dedicated 3D/4D reservoir software and if this option seems effective, is to be initiated soon. This is seen as a **'Long Term Solution'**, taking at least 6-12 months to complete. It is expected that by drilling additional wells the reservoir pressure can be better controlled.
7. Drill 4 each new Producers around the Macondo well
8. The 4 producers should preferably be used to extract oil from the bottom of the (producing) reservoir instead, partly reducing the reservoir pressure and thereby the total flow out of the 'Macondo' well.
9. These 4 producers should produce into a new to be installed subsea production infrastructure
10. Kill well after a certain period of production via relief wells entering the reservoir from the bottom or use one or two from the 4 producers, and after having all data gathered
11. This all to have no chance of possibly having many decennia an uncontrollable MC 252 well
12. In fact, a thought-out plan is already available and submitted to BP, to the DOE and US Coast Guard, known as:
    'Safety alert: Stop drilling relief wells at next casing point BPCC-29893: Full containment of spill now

    renamed *The Dutch Hurricane Proof Solution*', by a dedicated Dutch Blow-out Team headed by Dick Swart, Professor Ruud van der Hoorn and Willem Heijnen. BP-log reference number: *BPCC-29893, sent in on 15t of June, with modifications on 18 June and 25 June 2010*.

For further questions on the *'The Dutch Hurricane Proof Solution*', please contact mr. Dick Swart, Team Leader: swart100@tiscali.nl . Telephone: +31-50-5251418 or Mobile: +31-6-51423227 .



2 pieces of 5 ½" dp sticking up inside riserstump
If the inside of the 9 7/8"casing would have been clean than the Drill Pipe should have fallen to bottom or blown out of the well
2 pieces, because of chainsaw cut and one because of final shear, is our assessment, on what is pipe resting????
We think on crushed casing by the shearrams
All rams do not function, with hotline on seabed, technical failure or another obstruction inside the Horizon BOP stack?