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deploy in May 2010.

The condition of the Macondo Well, and the Well's ability to maintain integrity if the Well were shut in by means of a second BOP or a capping stack, were unknown in May 2010. If the Well lost integrity, a shallow subsea broach would have presented significant risk to the environment and to the Response itself. To mitigate the risk presented by the capping options, the source control team at the Houston Incident Command Post ("ICP") needed to develop and validate a method of regulating pressure for the capping options.

The solutions to the risks presented by the capping options were not ready for deployment in May 2010. Given the identified risk of subsea broaching, in my opinion the correct solution was to be able to regulate pressure in a capping option, and without such an ability capping was not a viable option.

Enterprise BOP was still ongoing. A third-party inspection by West Engineering had identified necessary work to be completed on the *Enterprise* BOP stack that had not yet been completed on May 16, when the West representatives left to begin their inspection of the *DDII* BOP.[4]

The *DDII* BOP had previously undergone pressure testing and a third-party inspection by West Engineering in March 2010.[5] With such a recent inspection, only a few days of testing and maintenance of the BOP would reasonably be expected. However, during testing in May 2010, several leaks and other maintenance issues were found that required Transocean personnel to undertake repairs to the Transocean-owned and maintained *DDII* BOP.[6] This work took until May 29 to be

[2] Deposition of Richard Lynch at 231.
[3] IIG013-066363.
[4] BP-HZN-2179MDL07807382.
[5] BP-HZN-2179MDL04371343.
[6] BP-HZN-2179MDL06026132.

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completed.[7] Not until Transocean had its BOP ready could it have been deployed as part of a BOP-on-BOP solution. The scope of this work could not reasonably have been anticipated by BP or the Unified Area Command.

1.2 BOP-ON-BOP VENTING AND PRESSURE MANAGEMENT WAS NECESSARY TO MANAGE RISK

As part of the necessary and prudent work to identify and mitigate risks in developing capping solutions, the BOP-on-BOP solution called for the inclusion of a subsea choke connected to a vent manifold that would allow the venting of hydrocarbons.[8] The design, sourcing, installation, and testing of such a system is not an insignificant undertaking, and a Transocean engineer estimated on May 18 that a solution would take ten to fourteen days.[9] In my experience that is a reasonable, if

In contrast, a choke system allows what is called a "soft" shut in. Using a choke system, the well can be slowly shut in by incremental closure of the choke's orifice. This incremental approach allows an engineer controlling the process to ensure that pressures increase slowly while he monitors those pressure increases. This avoids the "water hammer" pressure surge. The shut in process can be stopped or reversed if the pressures approach an unsafe level. Providing an alternative flow path via the choke also protects the blind shear rams from potential erosion of sealing surfaces during closure. The capping stack that was ultimately used to shut in the Well did so over a period of approximately two hours by slowly closing its choke system while pressures were closely monitored.[10]

Second, in the event that the Well is shut in and ongoing monitoring indicates a need to reopen the Well, a choke system allows an engineer to reopen the choke

[7] *Id.*
[8] BP-HZN-2179MDL02405680.
[9] TRN-MDL-05012663.
[10] TREX 9577.

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