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ONE HUNDRED ELEVENTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON ENERGY AND COMMERCE
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WASHINGTON, DC 20515–6115

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June 29, 2010

MEMORANDUM

TO: Subcommittee on Energy and Environment Members and Staff

FR: Subcommittee on Energy and Environment Democratic Staff

RE: Subcommittee Markup of H.R. 5626, the Blowout Prevention Act of 2010

On Thursday, July 1, 2010, at 9:30 a.m. in room 2123 of the Rayburn House Office Building, the Subcommittee on Energy and Environment will meet in open markup session to consider **H.R. 5626**, the "Blowout Prevention Act of 2010".

I. BACKGROUND

On April 20, 2010, at about 10:00 p.m., an explosion occurred on the Deepwater Horizon oil drilling rig, which was drilling a well in BP's Macondo Prospect, approximately 40 miles south of the Louisiana coast in the Gulf of Mexico. There were 126 people on the rig at the time of the explosion. Fifteen of those were injured and 11 died. The Coast Guard responded to the explosion and fire, which caused the rig to sink and resulted in the ongoing blowout.[1]

In the wake of this tragedy, serious questions have been raised about the causes of the explosion and the adequacy of industry practices and regulatory standards relating to oil and gas drilling. Ongoing investigations are being conducted by a Marine Board of Investigation (a joint effort under the Coast Guard and the Minerals Management Service (MMS)), a Presidential Commission, the U.S. Chemical Safety and Hazard Investigation Board, and several congressional committees, including the Committee on Energy and Commerce.[2] The President also ordered the Secretary of the Interior to review the

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[1] Deepwater Horizon Unified Command (online at www.deepwaterhorizonresponse.com/go/site/2931/) (accessed June 25, 2010).

[2] Unite States Coast Guard, *Deepwater Horizon Marine Board of Investigation* (May 12, 2010) (online at http://www.deepwaterinvestigation.com/posted/3043/Marine_Board_of_Investigation_Process.548795.pdf); The White House, *President Obama Announces Members of the BP Deepwater Horizon Oil Spill and Offshore Drilling Commission* (June 14, 2010) (online at http://www.whitehouse.gov/the-press-office/president-obama-announces-members-bp-deepwater-horizon-oil-spill-and-offshore-drill); Letter from John S. Bresland, Chairman, U.S. Chemical Safety and Hazard Investigation Board, to Rep. Henry A. Waxman and Rep. Bart Stupak (June 18, 2010) (online at http://www.csb.gov/assets/news/document/Response_to__Rep_Waxman_Stupak_-

accident and propose additional precautions and technologies that should be required to improve the safety of offshore oil and gas drilling; the findings of this review were published on May 27, 2010, in a document usually referred to as the Department of the Interior (DOI) "30-day Report."[3]

The Committee on Energy and Commerce's Subcommittee on Oversight and Investigations have held three hearings on the explosion and blowout.[4] The Subcommittee's investigation has revealed that BP made numerous key decisions that increased the risk of a well control problem, while neglecting additional safety precautions prior to the Deepwater Horizon disaster. BP chose a well design that had only two barriers to prevent flow of dangerous gases instead of using a design that had multiple barriers; BP ignored the advice of its contractor, Halliburton, and chose a casing centralization approach for the well that was predicted to fail; BP failed to conduct a key test to evaluate the sufficiency of the cementing job; BP failed to fully circulate well fluids to facilitate better cementing and condition the drilling fluids, and BP did not install a key piece of equipment at the wellhead prior to the explosion. Several of these steps, though considered to be industry best practices, are not mandated under current law. All of these decisions appear to have saved time and money for BP, but increased risks.

A. Well Control Issues

Perhaps the most critical safety issue with regard to oil and gas drilling is the maintenance of "well control" – i.e. control over conditions in the well bore, where high pressures threaten to drive oil and gas toward the surface from subsurface formations. If these pressurized hydrocarbons cannot be controlled, they may reach the surface and cause a fire or explosion. On the Deepwater Horizon, an uncontrolled influx of gas into the well is believed to have caused an uncontrolled "blowout" and the ensuing explosion.

Current drilling technology uses a number of lines of defense to prevent the loss of well control: (1) the circulation of heavy drilling "mud" through the well, which helps to equalize pressure and prevent uncontrolled upward flow of hydrocarbons; (2) the use of cement and mechanical barriers in and around the steel casing (which lines the well and forms the conduit between the hydrocarbon reservoir and the surface) preventing the upward flow of oil and gas. In the event of complete loss of well control, exploration wells are equipped with a blowout preventer (BOP), which includes a series of devices intended to seal the wellhead as a last resort during a well control event threatening a blowout.

_BP_Transocean_June_18_2010.pdf) ; U.S. House Committee on Energy and Commerce, *Energy and Commerce Committee Investigates Deepwater Horizon Rig Oil Spill* (online at http://energycommerce.house.gov/index.php?option=com_content&view=article&id=1985:energy-a-commerce-committee-investigates-deepwater-horizon-rig-oil-spill&catid=122:media-advisories&Itemid=55) (accessed June 27, 2010).

[3] Department of the Interior, *Increased Safety Measures for Energy Development on the Outer Continental Shelf* (May 27, 2010) (online at http://www.doi.gov/deepwaterhorizon/loader.cfm?csModule=security/getfile&PageID=33598).

[4] Subcommittee on Oversight and Investigations, *Hearing on Inquiry into the Gulf Coast Oil Spill* (May 12, 2010); *Hearing on Local Impact of the Deepwater Horizon Oil Spill* (June 7, 2010); *Hearing on the Role of BP in the Deepwater Horizon Explosion and Oil Spill* (June 17, 2010).

The following diagrams provide an overview of some of these basic elements of an oil and gas well:

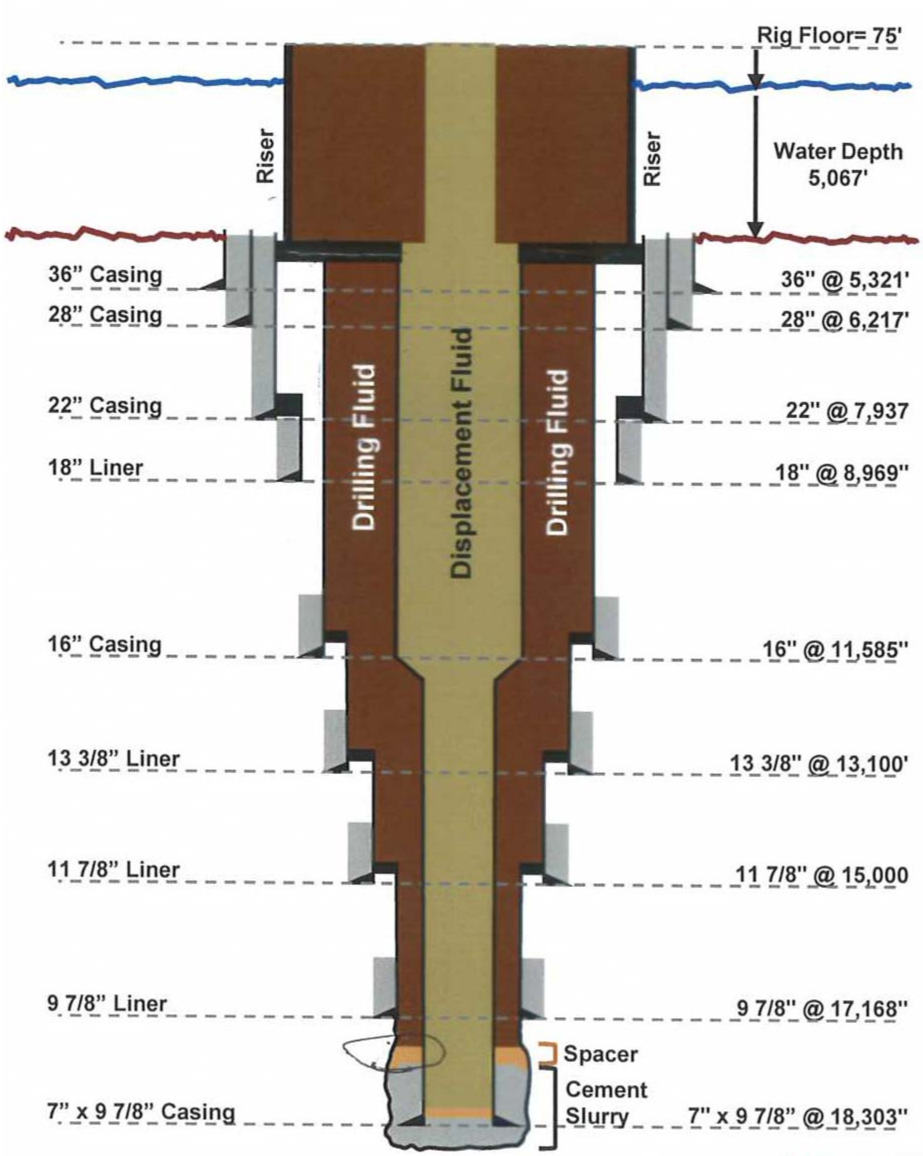

Diagram 1. Well Cementing of the Macondo Well[5]

[5] Halliburton, *Well Cementing*, at 24 (May 6, 2010).

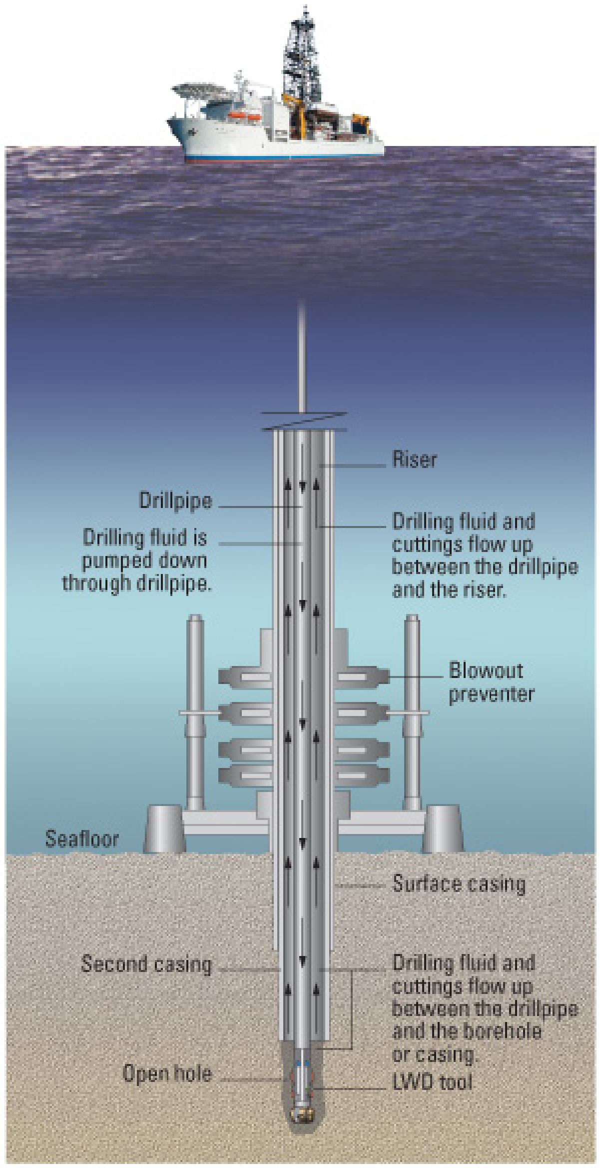

Diagram 2. Offshore Drilling Equipment.[6]

B. Blowout Preventers and Secondary Control Systems

A BOP is a piece of equipment installed at the wellhead and designed to prevent an uncontrolled release of hydrocarbons from a well. It consists of several independent systems that may be used to ensure well control, which may include:

- *Annular Preventers*, which seal the wellbore with a variable-width rubber aperture that can close on itself or around any pipe that may be strung through the wellbore;
- *Variable Bore Rams*, which seal around drill pipe with rubber-tipped steel blocks;

[6] Transocean, *Primer on Offshore Drilling Operations*, at 23 (undated).

- *Blind Shear Rams*, the well-control mechanism of last resort, designed to cut through drill pipe and seal the well during an emergency; and
- *"Casing"* or *"Super" Shear Rams*, which are designed to cut through casing or other obstructions that may be present in the wellbore, allowing blind shear rams to close and seal the well during an emergency.

The following is an illustration of some of the common components of a blowout preventer:

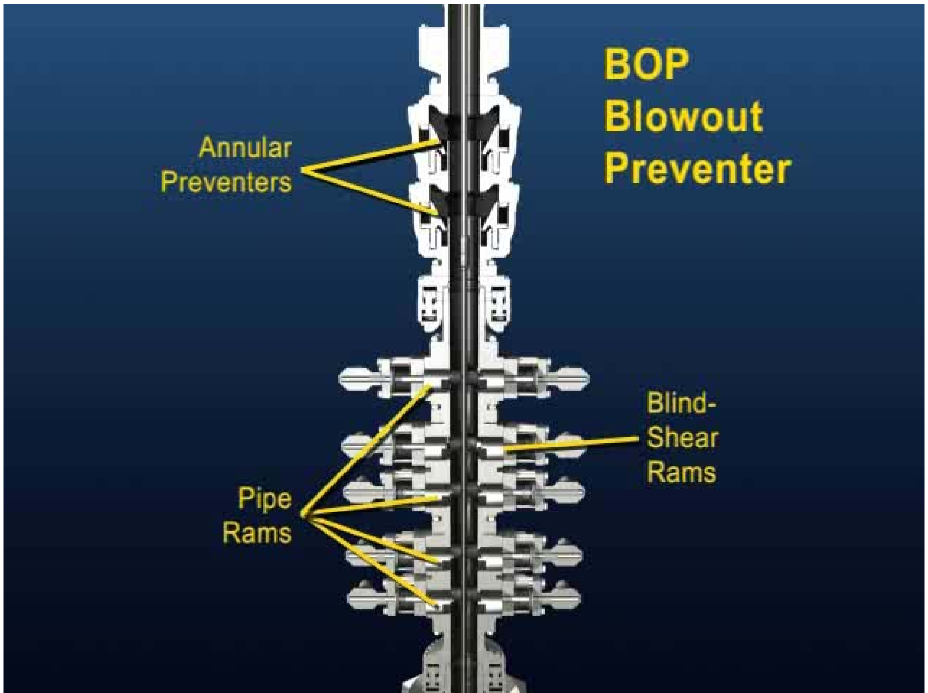

Diagram 3. A Blowout Preventer (BOP).[7]

Because the blowout preventer is intended to be a failsafe last resort that must function in an emergency, blowout preventers are often designed with redundant equipment and control systems, to ensure that at least one set of emergency systems is always functional. In numerous cases, however, blowout preventers have failed to operate, often with catastrophic consequences. The blowout preventer installed on the Macondo well failed to control the blowout.[8]

The Committee identified several potential problems that might have resulted in this failure. According to a 2004 report commissioned by the Minerals Management Service, blind shear rams are not designed to cut through drill pipe tool joints, the thick-walled connections between sections of pipe.[9] Casing shear rams also may not cut

[7] Transocean, *Primer on Offshore Drilling Operations*, at 23 (undated).

[8] Rep. Bart Stupak, Opening Statement, *Hearing on Inquiry into the Deepwater Horizon Gulf Coast Oil Spill* (May 12, 2010) (online at http://energycommerce.house.gov/Press_111/20100512/Stupak.Opening.05.12.2010.pdf).

[9] West Engineering Services, *Shear Ram Capabilities Study* (Sept. 2004) (online at http://www.mms.gov/tarprojects/463/%28463%29%20West%20Engineering%20Final%20Report.pdf).

through tool joints.[10] These tool joints may take up as much 10% of a pipe's length. The use of redundant shear rams could eliminate this risk, ensuring that there is always one shear ram that is not opposite a tool joint. But MMS regulations currently do not require redundant blind shear rams and casing shear rams. The Deepwater Horizon included only one of each.

Blowout preventers usually include one or more emergency backup (or secondary control) systems, including a system commonly called a "deadman switch," to close the blind shear rams and seal the well in case of a loss of communication with the drilling rig.[11] In order for the deadman switch on the Deepwater Horizon to be activated, three separate lines from the rig to the BOP had to be severed: power, communication, and hydraulics. If any one of those lines remained active, the deadman switch would not have been triggered even though the blind shear rams could not be activated from the surface.[12] The Deepwater Horizon also did not have an acoustic backup switch, which might have been able to activate the BOP remotely from the surface.[13]

Offshore drilling operators rely on remote-operated vehicles (ROVs) to activate blowout preventers as a last resort. These unmanned, submersible vehicles travel to the bottom of the ocean and can directly trigger blowout preventers via an interface on the BOP itself. The Deepwater Horizon's BOP, however, has not sealed the well even after many days of ROV intervention.

The Committee has also learned that there were several issues with the Deepwater Horizon's maintenance of its BOP system. There are no MMS regulations requiring testing of emergency systems, and BP did not conduct such tests. ROVs discovered several leaks in the hydraulic lines that provide pressure for BOP functions, and found unexpected modifications to the original design of the BOP. These problems resulted in wasted time in the critical days following the accident and might have contributed to the initial failure of the blowout preventer.

H.R. 5626 addresses these and related problems by directing the appropriate federal official to promulgate regulations requiring redundant systems of blind shear rams and casing shear rams; requiring redundant hydraulic and activation systems; effective emergency backup systems; and working ROV intervention capabilities. It also sets out an improved inspection, reporting, and testing regime to ensure proper maintenance and operation of blowout preventers.

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[10] Briefing by David McWhorter, Vice President of Engineering and Quality, Cameron International, to House Committee on Energy and Commerce Staff (May 10, 2010).

[11] See generally West Engineering Services, *Evaluation of Secondary Intervention Methods in Well Control* (Mar. 2003) (online at http://www.mms.gov/tarprojects/431/FinalReport431.pdf) .

[12] Rep. Bart Stupak, Opening Statement, *Inquiry into the Deepwater Horizon Gulf Coast Oil Spill* (May 12, 2010) (online at http://energycommerce.house.gov/Press_111/20100512/Stupak.Opening.05.12.2010.pdf).

[13] *Leaking Oil Well Lacked Safety Device*, Wall Street Journal (Apr. 28, 2010) (online at http://online.wsj.com/article/SB10001424052748704423504575212031417936798.html).

C. Well Design, Fluid Circulation and Displacement, and Cementing Practices

The Committee's investigation has also uncovered several issues concerning decisions BP made in regard to the design and execution of the Macondo well plan.[14]

The Macondo well was designed with a "long string" production casing that extended from the sea floor down to the reservoir from which oil was to be produced. This well design leaves only two barriers along one flow path through which hydrocarbons could flow between the reservoir and the blowout preventer: a layer of cement at the bottom of the well, and a mechanical seal at the wellhead itself. Another design, a "liner-tieback" approach, would have made a blowout less likely by incorporating four barriers between the reservoir and the BOP: two mechanical seals and two layers of cement.

Installing a "lockdown sleeve" on the mechanical seal at the wellhead would have reinforced the wellhead against pressure from below as well as pressure from above. This lockdown sleeve was never installed on the Macondo well, even though drillers on the Deepwater Horizon began procedures that would have put upward pressure on the wellhead seal.

Because the Macondo well was designed with a long string casing, it was critically important that the cement job at the bottom of the well successfully seal off the reservoir. But there are several issues concerning BP's final cement job: BP ran casing with fewer "centralizers" than its cementing contractor predicted would be sufficient to ensure an even seal around the entire casing; it failed to circulate drilling mud throughout the well before cementing, in accordance with industry best practices; and it failed to run a cement bond log test, which could have uncovered failures or imperfections in the bonded cement.

The legislation addresses these issues by directing the appropriate federal official to promulgate regulations to require: three independent barriers across potential flow paths; appropriate fluid circulation and displacement practices; and appropriate cementing practices, including mandatory cement bond logs.

D. Regulatory Development and Implementation

In addition to critical equipment and well design issues, H.R. 5626 also addresses a number of issues related to periodic review and updating of regulatory standards, implementation and enforcement of standards through independent third-party certification, inspections, and other mechanisms, as well as stop-work authority and whistleblower protections.

[14] Letter from Rep. Henry A. Waxman and Rep. Bart Stupak to Tony Hayward, Chairman, BP (June 14, 2010) (online at http://energycommerce.house.gov/documents/20100614/Hayward.BP.2010.6.14.pdf).

II. SUMMARY OF H.R. H.R. 5626

On Friday, June 25, 2010, the Committee on Energy and Commerce released a discussion draft of the Blowout Prevention Act of 2010. Today, Chairmen Waxman, Markey, and Stupak introduced H.R. 5626, the “Blowout Prevention Act of 2010”, which includes several minor modifications to the discussion draft. The bill establishes a number of standards and procedures to ensure the use of appropriate safety equipment and practices during drilling activities at high-risk oil and gas wells. A detailed section-by-section summary is attached. The Subcommittee on Energy and Environment will hold a legislative hearing on the bill on Wednesday, June 30, 2010.