SAVE U.S. ENERGY JOBS

Infographic Key Points:

Before A Cement Job On A Well, It Is "Common Cementing Best Practice" To Circulate Drilling Mud Through The Well At Least Once. "Before doing a cement job on a well, common industry practice is to circulate the drilling mud through the well, bringing the mud at the bottom all the way up to the drilling rig. This procedure, known as 'bottoms up,' lets workers check the mud to see if it is absorbing gas leaking in. If so, they can clean the gas out of the mud before putting it back down into the well to maintain the pressure. The American Petroleum Institute says it is 'common cementing best practice' to circulate the mud at least once." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Daily Drilling Reports Show BP Did Not Run Important But Time-Consuming Procedures That Notify Workers Of Gas Building Up In The Well. "Despite the well design and the importance of the cement, daily drilling reports show that BP didn't run a critical, but time-consuming, procedure that might have allowed the company to detect and remove gas building up in the well." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Failure To Run A Proper Test Could Have Left Gas At The Bottom Of The Well, Which Would Have Been Pushed Up The Outside Of The Well By The Poured Cement. "This decision could have left gas at the bottom of the well. When workers poured in cement to seal the sides, that gas would have been pushed up the outside of the well. Expanding as it rose, it would have reached the top, where it either would have pushed against a massive seal on the ocean floor or might have gone even higher and reached the bottom of the pipe connecting the well to the drilling rig." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Running Mud In A Well As Deep As BP's Gulf Well Takes Hours – But Mud Circulation On April 19 Took 30 Minutes, "Not Nearly Long Enough To Bring Mud To The Surface." "Circulating all the mud in a well of 18,360 feet, as this one was, takes six to 12 hours, say people who've run the procedure. But mud circulation on this well was done for just 30 minutes on April 19, drilling logs say, not nearly long enough to bring mud to the surface." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

- **"BP… Cut Short A Procedure Involving Drilling Fluid That Is Designed To Detect Gas In The Well And Remove It Before It Becomes A Problem."** (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Offshore Engineers See The Failure To Completely Circulate The Mud As "A Serious Mistake." "Three offshore engineers the Journal asked to review the drilling reports all pointed to the failure to circulate the mud completely as a serious mistake. Robert MacKenzie, a former oil-industry cementing engineer now at FBR Capital Markets, said, 'If you have any worries about gas, if you have any worries about getting a good cement job, you should definitely do it.'" (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

According to Rep.'s Waxman and Markey, BP's decision to ignore Haliburton's recommendations for 21 centralizers was one of "five crucial decisions made by BP" that lead to the disaster. When the final string of casing was installed, one key challenge was making sure the casing ran down the center of the well bore. As the American Petroleum Institute's recommended practices explain, if the casing is not centered, "it is difficult lt, if not impossible, to displace mud effectively from the narrow side of the annulus," resulting in a faulty cement job. Halliburton, the contractor hired by BP to cement the well, warned BP that the well could have a "SEVERE gas flow problem" if BP lowered the final string of casing with only six centralizers instead of the 21 recommended by Halliburton. BP rejected Halliburton's advice to use additional centralizers. In an e-mail on April 16, a BP official involved in the decision explained: " it will take 10 hours to install them . .. . I do not like this." Later that day, another official recognized the risks of proceeding with insufficient centralizers but commented: "who cares, it's done, end of story, will probably be fine."

(Letter to Tony Hayward from Representatives Bart Stupak and Henry Waxman, June 14, 2010. http://energycommerce.house.gov/documents/20100614/Hayward.BP.2010.6.14.pdf)

Halliburton Advised BP To Install Devices To Make Sure The Pipe Was Centered In The Well, Warning The Pumping Cement Could Develop Small Channels For Gas To Escape. "Halliburton, the cementing contractor, advised BP to install numerous devices to make sure the pipe was centered in the well before pumping cement, according to Halliburton documents, provided to congressional investigators and seen by the Journal. Otherwise, the cement might develop small channels that gas could squeeze through." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

"In An April 18 Report To BP, Halliburton Warned That If BP Didn't Use More Centering Devices, The Well Would Likely Have 'A SEVERE Gas Flow Problem.'" (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

BP's Well Team Leader Objected To Additional Centralizers, Writing In An Email That "It Will Take 10 Hrs To Install Them. … I Do Not Like This." "In their letter, the lawmakers say that BP's well team leader, John Guide, raised objections to the use of the additional centralizers' in an April 16 email released by the panel. 'It will take 10 hrs to install them. … I do not like this,' Mr. Guide wrote. The lawmakers cited another BP email as an indication that 'Mr. Guide's

perspective prevailed.'" (Neil King Jr. and Russell Gold, "BP Crew Focused On Costs: Congress," *The Wall Street Journal,* 6/15/10)

"A BP Official Wrote In An April 16 Email: 'Who Cares, It's Done, End Of Story, Will Probably Be Fine.'" (Neil King Jr. and Russell Gold, "BP Crew Focused On Costs: Congress," *The Wall Street Journal,* 6/15/10)

- "BP Decided To Install Fewer Of The Devices Than Halliburton Recommended -- Six Instead Of 21." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Rep. Waxman cited the casing issue as a "fundamental misjudgment" by BP. "Did BP make a fundamental misjudgment" in using one long piece of well casing instead of many shorter pieces, as other oil companies said they would have done, asked Rep. Henry Waxman, D-Calif.

"I wasn't involved in that decision," replied Hayward, saying that the single piece was better for the well's long-term stability.

Waxman produced transcripts from BP's engineers saying that the single casing was "unlikely to be successful." Waxman said BP went ahead with it anyway to save $7 to $10 million. (Steve Hargreaves, "BP's chief accused of 'stonewalling'," *CNN Money,* 6/17/10)

Petroleum Engineers Believe The Blow-Out Was Probably Related To The Cementing Process, Which Secures The Well And Prevents Oil From Escaping. (Russell Gold, "Safety Tool Questioned in '04," *The Wall Street Journal,* 5/3/10)

Schlumberger Company Documents Report BP Skipped A Test To Determine If The Cement Had Properly Bonded To The Well And Rock Formations. "BP also skipped a test to determine if the cement had properly bonded to the well and rock formations, according to documents from oilfield service firm Schlumberger Ltd., whose crew was sent back to shore hours before the explosion." (Neil King Jr. and Russell Gold, "BP Crew Focused On Costs: Congress," *The Wall Street Journal,* 6/15/10)

"A Petroleum Engineer Advising The Congressional Committee Called The Decision Not To Run A Cement Bond Test 'Horribly Negligent.'" (Neil King Jr. and Russell Gold, "BP Crew Focused On Costs: Congress," *The Wall Street Journal,* 6/15/10)

"While The Test Would Have Allowed BP To Check If The Cement Job Was Adequate And Allowed For Repairs, It Would Have Taken Nine To 12 Hours Just For The Test." (Neil King Jr. and Russell Gold, "BP Crew Focused On Costs: Congress," *The Wall Street Journal,* 6/15/10)

- **On Subcontractor Employee Said "To Me It Looked Like They Were Trying To Rush Everything."** "Some saw indications that managers wanted to wrap up quickly. Kevin

Senegal, a subcontractor employee who cleaned tanks, said he was told to be ready to clean two tanks on a coming shift instead of the usual one. 'To me it looked like they were trying to rush everything,' he said." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Hours Before The Explosion, A "Negative Pressure" Test To Check For Leaks Was "Inconclusive At Best And 'Not Satisfactory' At Worst." "The memo sheds new light on a key test performed hours before the explosion that has been a focus of congressional investigations. BP previously told investigators that a 'negative pressure' test, which checks for leaks in the well, was inconclusive at best and 'not satisfactory' at worst." (Stephen Power, "BP Cites Crucial 'Mistake,'" *The Wall Street Journal,* 5/26/10)

While The Results Indicated "A Very Large Abnormality," Workers Deemed The Test A Success – A Decision BP Called A "Fundamental Mistake." "BP went further, saying the results were an 'indicator of a very large abnormality' but that workers -- unnamed in the memo -- decided by 7:55 p.m. that the test was successful after all. That may have been a 'fundamental mistake,' BP's investigator said in the meeting, according to the memo." (Stephen Power, "BP Cites Crucial 'Mistake,'" *The Wall Street Journal,* 5/26/10)

Hours Later, BP Conducted A "Negative Pressure Test" Under The Auspices Of A Well-Site Leader Experienced In Land Drilling Who Wanted To "Learn About Deep Water." "A little after 5 p.m., to check the well's integrity and whether gas was seeping in, rig workers did what is called a 'negative pressure test.' It was supervised by a BP well-site leader, Robert Kaluza. His experience was largely in land drilling, and he told investigators he was on the rig to 'learn about deep water,' according to Coast Guard notes of an interview with him. BP declined to comment on his experience." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

The Initial Test, Which Strayed From Procedure, Demonstrated A Possible Leak – A Second Test Followed Government Procedure And Showed Pressure Rising Quickly. "The test initially strayed from the procedure spelled out in BP's permit, approved by the MMS, according to the Coast Guard interview with Mr. Kaluza. When the first test results indicated something might be leaking, workers repeated the test, this time following the permitted procedure. The second time, pressure rose sharply, with witnesses saying that the well 'continued to flow and spurted,' according to notes gathered by BP's investigators that were reviewed by the Journal." (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

"Well-Control Experts Say It's Clear Gas Was Leaking Into The Well, Most Likely Through The Seal At The Top But Possibly Through The Bottom Or Even Through A Collapsed Pipe." (Ben

Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

BP Chose To Remove The Mud Before Placing A Final Cement Plug Inside The Well, Leaving Little To Prevent Any Gas Inside The Pipe From Rising To The Rig. (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

BP Ordered Drilling Mud To Be Replaced By Seawater Before Performing Two Procedures Designed To Confirm Gas Could Not Get Into The Well. (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)

Then BP Chose To Remove The Mud Before Placing A Final Cement Plug Inside The Well, Leaving Little To Prevent Any Gas Inside The Pipe From Rising To The Rig (Ben Casselman and Russell Gold, "Unusual Decisions Set Stage For BP Disaster," *The Wall Street Journal,* 5/27/10)