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BP Revised Permits Before Blast

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An EPA worker collects water samples Monday near Venice, La., to test the impact of the oil spill on the fragile ecosystem of the Gulf Coast.(Getty Images).

Just a week before the Deepwater Horizon exploded, BP PLC asked regulators to approve three successive changes to its oil well over 24 hours, according to federal records reviewed by the Wall Street Journal.

The unusual rapid-fire requests to modify permits reveal that BP was tweaking a crucial aspect of the well's design up until its final days.

One of the design decisions outlined in the revised permits, drilling experts say, may have left the well more vulnerable to the blowout that occurred April 20, killing 11 workers and leaving crude oil gushing into the Gulf of Mexico.

The Minerals Management Service approved all the changes quickly, in one instance within five minutes of submission.

New information about the well has become public as BP faces increasing pressure from government officials and Gulf Coast residents angry and frustrated over the protracted spill, now the worst in U.S. history.

With the failure of its "top kill" effort to stop the leak, BP is returning to its strategy of trying to corral the oil, sucking it up from the well a mile below the surface. BP now plans to take the risky step of cutting off a bent pipe into the well. Undersea robots will then try to attach a siphon device to the wellhead.

Both BP and the MMS have faced growing scrutiny from congressional investigators looking into the Deepwater Horizon disaster and the resulting oil spill. Last week, a Wall Street Journal investigation found that BP had made a series of choices that made the well more vulnerable to a blowout.

BP's flurry of revisions and re-revisions stands out as uncommon. Of the more than 2,200 wells that have been drilled in the Gulf since 2004, only 5% have had multiple permit revisions submitted to MMS within one calendar day, according to a Wall Street Journal analysis of MMS records.

In only one other case, a 2005 well drilled in just 48 feet of water, has a company submitted three revisions within 24 hours, as happened on BP's well. BP's well was in nearly 5,000 feet of water, which has made dealing with the well far more complicated.

BP declined to comment on the permit changes. Transocean didn't respond to a request for comment.

MMS declined to comment, citing the ongoing investigation into the causes of the Deepwater Horizon disaster.

By April 14, when BP filed the first of three permits that would later be amended, the London-based oil company had already faced many problems with the well, including losing costly drilling fluid and fighting back natural gas that tried to force its way into the well. The problems had caused BP to use eight pieces of steel pipe to seal the well, rather than the planned six pieces. The permit filed on April 14 dealt with the eighth and final section, which hadn't yet been installed in the well.

BP had hoped to get a 9 7/8-inch pipe—big enough to handle a lot of oil and gas—into the reservoir. But for the final section, the largest pipe they could fit was a 7-inch pipe. The company had to decide whether to use a single piece of pipe that reached all the way from the sea floor down to the oil reservoir, or use two pipes, one inside the other.

The two-pipe method was the safer option, according to many industry experts, because it would have provided an extra layer of protection against gas traveling up the outside of the well to the surface. Gene Beck, a longtime industry engineer and a professor at Texas A&M University, said the two-pipe method is "more or less the gold standard," especially for high-pressure wells such as the one BP was drilling.

But the one-pipe option was easier and faster, likely taking a week less time than the two-pipe method. BP was spending about $1 million per day to operate the Deepwater Horizon.

In an April report, a BP engineer concluded that the one-pipe option was the "best economic case" despite having "some risk" of leaving an open path for gas to travel up the outside of the well. The two-pipe option, the report said, would provide an extra barrier against gas but would only be used if "stability problems" or other issues arose with the well.

On April 14, at 8:34 p.m., BP informed the MMS that it planned to use the one-pipe method, using a single 7-inch-wide pipe for the whole length of the well. The MMS approved the permit at 8:13 the next morning, according to federal records.

At 9:54 a.m. on April 15 BP filed another permit informing the MMS of a correction. Rather than using a 7-inch-wide pipe the whole way, it planned to run a tapered pipe that was wider at the top than at the bottom. This was approved by the MMS seven minutes later.

Then, at 2:35 p.m., BP filed another revision. This one informed the MMS that it had "inadvertently" omitted mention of a section of pipe already in the well. Four and one-half minutes later, MMS approved this permit also.

Demonstrators turned out in New Orleans to express outrage at BP and the U.S. government over their handling of the Gulf of Mexico oil spill. Video courtesy of Reuters.

Last year, the MMS floated a proposal to require all companies to "document and analyze" all major changes. BP responded during a comment period that the proposed safety rules were unnecessary.

In addition to well-design tweaks, the company's day-to-day operational plan was also in flux, according to testimony from an investigative hearing held by the Coast Guard and MMS in Kenner, La., last week.

On Thursday, Jimmy Wayne Harrell, a Transocean employee who was the rig's offshore installation manager, said "the drilling program was constantly changing."

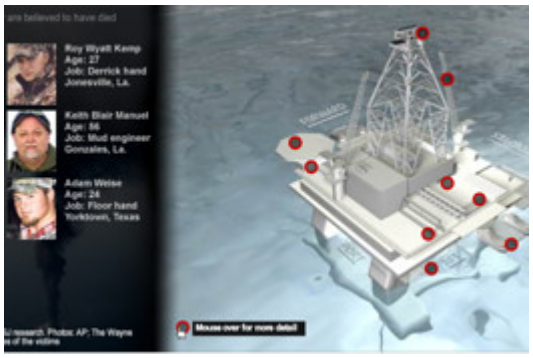
He testified that BP representatives overseeing the job had repeatedly altered plans in the days leading up to the accident, and he had had to argue to ensure certain tests were done.

BP senior drilling engineer Mark Hafle, in testimony on Friday at the same hearings, blamed the multiple well-design corrections on an inexperienced data entry employee who "made some typos" filling out the forms.

—Stephen Power contributed to this article.

(pictures below)

The Final Moments



Timeline