Loss of well control incidents increase in GOM

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INCIDENTS INVOLVING LOSS of well control, though increasing over the past 6 years on the US Outer Continental Shelf, account for far fewer reported incidents than fires or injuries, according to data compiled by the **US Minerals Management Service**.

But statistics and detailed investigations of the incidents make it clear that maintaining well control efficiency among crews—and vigilance during what might seem to be "routine" operations—are still formidable challenges.

MMS data show that 9 events involved loss of well control in 2000 and 7 had occurred in 2001 as of early September.

In 1999, the MMS reported only 5 loss of well control incidents on the OCS compared with 7 in 1998. Only 1 event occurred in 1995.

Of all events recorded by MMS—blowouts, collisions, fatalities, fires, injuries, significant pollution, pipeline incidents and crane accidents—those that occur during drilling operations represent a small share.

In 1999, 54% of all incidents on the OCS happened during production operations, 17% occurred during drilling operations. In 1998, 63% of all incidents occurred during production-related operations; 18% during drilling-related operations.

About 72% of the incidents recorded in 1999 happened while performing development activities and 15% happened during exploration activities.

In 1998, 69% happened during development activities and 12% during exploration activities.

During the past 5 years, the number of total incidents climbed from 94 in 1995 to a peak of 258 in 1997, then declined to 166 in 1999.

The number of wells drilled peaked in 1998 and dropped slightly in 1999.

Though all data for the year were not available at the time this report was prepared, 2000 saw an increase in both total events and events involving loss of well control.

Interestingly, more events involving loss of well control occur while drilling development wells than while drilling exploration wells.

These data may indicate that a higher level of risk results in greater attention being paid to well control procedures.

For example, of the 5 events involving loss of well control in 1999, 1 occurred during exploration drilling, the other 4 during development drilling.

FOCUS ON BLOWOUTS

MMS defines loss of well control as either uncontrolled flow of formation or other well fluids, or flow of formation or other well fluids through a diverter.

In the case of uncontrolled flow, that flow may be between two or more exposed formations or it may be at or above the mud line.

Loss of well control on the OCS

	1995	1996	1997	1998	1999	2000	2001 YTD
Total loss of well control events	1	4	5	7	5	9	7
Uncontrolled flows	1	4	2	5	3	9	6
Diverter events	0	0	3	2	2	0	1

Source: US Minerals Management Service

In its statistics, MMS includes uncontrolled flow resulting from failures of either surface or subsurface equipment or procedures.

Looking in more detail at the MMS report, "Incidents Associated with Oil and Gas Operations," reveals that during 1997-1999, blowouts were the result of lost circulation, swabbing, a poor cement job, diverter problems and an underbalanced wellbore, among other causes.

Following are excerpts from MMS reports of blowout incidents for 1997-1999.

These reports offer insight into the cause of incidents and the steps taken to regain control of the well.

MISSISSIPPI CANYON

In early February 1999, an exploration well being drilling in Block 711 in the Mississippi Canyon area in 2,955 ft of water blew out and experienced saltwater flow.

MMS determined the cause of the blowout to be lost circulation.

Its report on the investigation of the event included the following remarks:

"While drilling a 17 ½-in. hole, the crew encountered lost circulation. Drilling continued until losses became excessive.

"The crew filled the hole with sea water, ran a 16-in. liner below the lost circulation zone and cemented with partial returns. They performed a successful shoe test after drilling out. The crew then drilled ahead and, while circulating out, experienced a continual influx of salt water, so they pulled above the sand and increased the mud weight.

"They filled the hole with sea water on the backside. With the well static, they tripped out to the 16-in. shoe and spotted a lost circulation material pill. To cure the lost circulation problem suspected at the 16-in. shoe, they bullheaded a polymer pill across the shoe, but it was unsuccessful.

"They tried 4 cement jobs at the 16-in. shoe. The crew discovered that the wellbore was in communication with the weak zone previously cased behind the 16-in. liner. The crew ran a ROV to the sea floor and observed a water flow along a trench on the sea floor approximately 250 ft from the well.

"The crew suspected that the influx of salt water on bottom was in direct communication with the seafloor water flow. Noise and temperature logs confirmed there was no flow across a cement plug set above the problem zone.

"They concluded the flow was going along a fault system. The well was plugged and abandoned and no more water flow was observed on the sea floor."

MAIN PASS

In August, 1999, a development well being drilled in 210 ft of water in Main Pass Block 299 experienced a blowout, again caused by lost circulation problems, according to the MMS report. That report included the following explanatory remarks:

"After drilling, the crew made a short trip into the casing to condition the mud when the hole started to swab. They circulated bottoms up while below the casing and tripped back to the bottom, where they circulated bottoms up again. Gas was bubbling in the mud.

"The crew increased the mud weight and circulated out; the well was taking fluid.

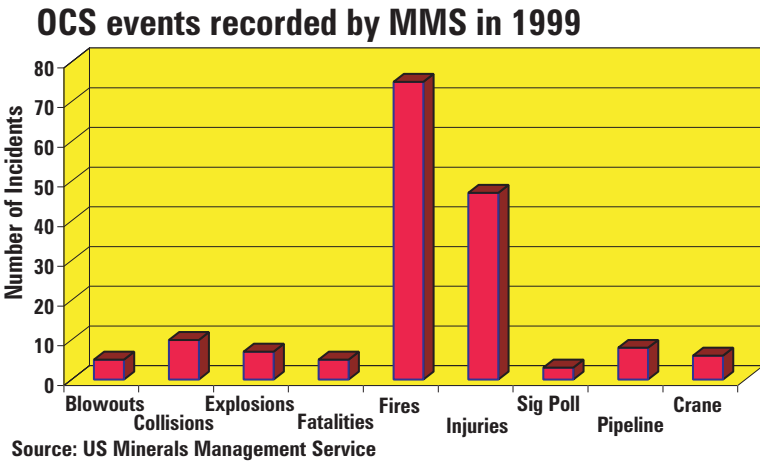
"The crew stabilized the hole, made a short trip into the casing, tripped back to bottom, and resumed drilling. They circulated and stabilized the hole and pulled out to run casing.

"While the crew was running 10 ¾-in. casing, the well started taking fluid and they lost all returns. They then filled the hole and casing annulus with mud, set the casing and stabilized the hole. The crew could not establish returns.

"The first stage of the 10 ¾-in. casing was cemented without returns and the cement allowed to set for 7 hours. Gas bubbled to the surface through the mud. The well began to flow and was put on diverter.

"The crew began pumping seawater and the well flowed for 15 minutes before it stopped.

"They finished the cementing job with full returns and tested the casing successfully."



In late 1999, a development well being drilled in Main Pass Block 299 in 210 ft of water blew out. MMS determined the cause to be swabbing. The report of the investigation included the following remarks:

"After drilling ahead the crew circulated bottoms up and began pulling out of the hole. After pulling 5 stands, the well began to flow. They put the well on

diverter with the bit in the hole. The well flowed for 40 minutes as seawater was pumped down the well.

"The crew experienced lost circulation so they spotted a lost circulation material pill. Circulation was established, but the drill pipe was stuck in the hole and could not be freed. The well was plugged back and the drill pipe was cut.

"A cement plug was set in order to sidetrack around the pipe left in the hole."

In October 1997, another development well being drilled in Main Pass Block 299 in 210 ft of water blew out. MMS determined the cause to be an underbalanced wellbore.

The report included the following remarks:

"Well SW237C was being drilled to caprock when all mud returns were lost at total depth of 2,635 ft MD (1,612 ft TVD) at 2230 hrs on 20 Oct, 1997. The top of the caprock is at 2,635 ft MD.

"The hole was kept full with seawater. The drill pipe was being pulled out of the hole when the well started flowing formation fluid. The well was put on diverter at 2400 hrs.

"After killing the well, the bottomhole assembly and drill pipe were pulled into the 8 5/8-in. casing. The well started flowing again and was put on diverter again at 0300 hrs 21 Oct, 1997. It was killed again.

"The bottomhole assembly was then pulled out of the hole. The well was taking approximately 1 bbl of fluid every 15 minutes."

SHIP SHOAL

A workover operation being conducted in September 1999 in Ship Shoal Block 354 in 463 ft of water resulted in a blowout and fire.

Completion of the investigation and the cause of the incident are still pending, according to the MMS report, which includes the following remarks:

"During a workover operation, coiled tubing parted between the stripper assembly and the injector head allowing gas to escape to the atmosphere.

"The crew shut the pipe rams, shear rams, and blind rams but the well still flowed. The platform was shut in and all personnel were evacuated. On 12 Sept, the well caught on fire."

MISSISSIPPI CANYON

On 30 April, 1998, a development well being drilled in 659 ft of water in Mississippi Canyon Block 148 experienced a blowout caused by what MMS concluded was human error.

The report contained the following information:

"While attempting to come out of the hole on a wiper trip, the pipe began to stick. When the operator pulled 100,000 lb over the drill weight with the bit at 4,024 ft, gumbo mud started to come over the kelly bushing.

"The pumps were turned off, and the hole began unloading, blowing the rotary bushing out of the rotary table. All personnel except the drillers evacuated the rig floor.

"The diverter system was engaged at the master control panel. The well started to blow gas and was diverted. The pumps were engaged, pumping 11.1 ppg mud in the hole. After 15 minutes, the well bridged over.

"The crew began mixing and pumping 12-ppg mud down the hole. When they were unable to get returns, the driller began pumping 12-ppg mud down the annulus to fill the hole.

"They were still unable to establish returns, so they backed the annulus pressure off and worked the drill pipe.

"The crew opened the diverter and found the diverter plugged above the diverter lines.

"The riser was then filled with mud and cleared of the gumbo that was plugging the diverter lines. They then filled the hole with 12-ppg mud through the casing valve at the wellhead, and regained control of the well."

SOUTH TIMBALIER

In early 1997, an exploration well being drilled in 337 ft of water in South Timbalier Block 299 experienced a blowout. MMS cited the diverter as the cause of the incident.

The report on the investigation included these remarks:

"The operator was drilling at 2,428 ft on 10 Jan, 1997, when the crew encountered a shallow gas pocket. The mud weight in the hole was 9.6 ppg.

"The operator opened up the diverter valve on the starboard side of the rig to release the gas to the atmosphere.

"The operator started pumping 1,500 bbl of 11.0-ppg mud into the well. This was followed by 500 bbl of 12.4-ppg mud. The well was still blowing gas at this point.

"While waiting on more mud and weight material to arrive at the rig, the operator started pumping seawater into the well at a rapid pump rate. Firefighters were called and non-essential personnel were evacuated at 1330 hrs.

"The operator then received 900 bbl of 13.8-ppg liquid mud on the rig. Flow from the well appeared to be diminishing at 1330 hrs.

"The operator started pumping 11.0-ppg mud into the well at 1640 hrs and received bottoms up at 1840 hrs. At 1900 hrs the well was under control.

"The operator built the mud weight level in the hole to 10.2-ppg. The crew then pumped seawater into the well to fill the hole.

"The well was static at this point. The mud losses were treated with lost circulation material. The operator raised the mud weight in the hole to 10.6 ppg and resumed drilling."

Also in early 1997, a development well in 288 ft of water in South Timbalier Block 295 experienced a blowout. MMS lists the cause as "other."

The report on the incident said:

"On well A-29 at approximately 0100 hrs the 13 3/8-in. surface casing was cemented in place at 4,950 ft MD. At 0400 hrs, while in the process of nippling down the diverter, a flow was observed on the backside of the casing within the 13 3/8 x 18 5/8-in. annulus. The 18 5/8-in. casing is set at 1,614 ft MD.

"The diverter was nippled back up and the well was put back on diverter while pumping seawater down the annulus. At 0915 hrs the well was shut in while seawater was continuously pumped.

"Previously, 400 bbl of 11.8-ppg kill weight mud was mixed and pumped at 1100 hrs with more mud en route to the rig," said the report.