



**U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region**

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LOSS OF WELL CONTROL: ANNULAR FLOW AFTER CEMENTING

Recently, a drilling rig had completed cementing surface casing. Shortly after the surface/conductor casing annulus was washed, the annulus began flowing. Rather than release the flow into the diverter system, the crew attempted use the diverter to hold pressure to allow time for the cement to heal. To hold pressure, the diverter was placed into the "test" mode, which allowed both the diverter packer element and vent-line valves to be closed simultaneously and immediately.

The diverter in use featured a telescopic riser with seals bracketing the vent-line housing. When the diverter was closed, the pressure rapidly increased until seals began leaking, forcing abandonment of the rig floor. It was then discovered that the "test" mode disabled the ability to control the diverter system from the remote location. The seal pressure could not be increased to contain the surface leak; the diverter valves could not be opened to relieve the pressure. With gas on the rig and pressure rising on the untested conductor casing shoe, the rig and adjacent platform were evacuated.

Several factors contributed to the potential severity of the event, including an erroneous chain of decisions, inadequate training of personnel or knowledge of the diverter system, and inadequate planning. For a full report, see [MMS panel report 2003-068](#).

MMS Safety Alert No. 165, issued in April 1995 identified 20 diverter incidents in the Gulf of Mexico from 1973 to 1995 related to well kicks after cementing surface casing. Another 13 similar incidents have occurred since 1995, with the most serious consequences being broaching the surface, cratering, well loss, and rig and platform destruction by fire. Annular flow related to cementing surface casing has been identified as one of the most frequent causes of loss of control incidents in the Gulf of Mexico.

The MMS recommends to the operators and drilling contractors the following:

1. For each well, the operators and contractors should conduct a review of the contingency procedures to be followed in the event of annular flow after cementing. Before using the diverter to hold back pressure after cementing, detailed planning is recommended, including identification of maximum pressure to be held, method of monitoring and measuring pressure, and how that pressure will be diverted if necessary.
2. The operators and contractors should ensure the contingency procedures are clearly disseminated to all rig supervisors and any personnel who could be involved in emergency decisionmaking.
3. The operators and drilling contractors should ensure all supervisory personnel are fully trained in diverter operations specific to each rig, including pressure limits and control mechanisms, under all circumstances.
4. The operators should review cementing practices and procedures for shallow casing strings and adopt best cementing practices that provide the most protection from annular flow after cementing.

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