



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

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Hanger Failure and Ejection Lead to Well Control Incident

During a workover, a possible casing failure allowed high pressure from an alternate zone unexpectedly to invade the tubing string, which was parted at a shallow depth. This event caused the tubing hanger to become the last barrier to loss of control. Because the tubing was parted, the weight on the tubing hanger was negligible, and because the tree had been replaced by a BOP stack, only the hanger hold-down pins were acting to hold the hanger in place.

Although the Cameron tubing hanger was rated to withstand 15,000 psi, the hold-down pins sheared when pressure reached 6,150 psi. When the pins sheared, the hanger, followed by the SCSSV and 600 ft of 2 7/8-inch production tubing, was blown out of the well, almost to the crown block. As the BOP stack had no shear rams, the well flowed uncontrolled for a period of time.

An investigation concluded the hanger pins sheared because of a design flaw that failed to allow the pins fully to engage the hanger energizing ring. The hanger manufacturer, Cameron, has issued Safety Alert #014086, notifying customers of record of the design flaw, and the MMS has published a complete report on the accident which is available on the web, see [OCS Report MMS 2004-048](#).

According to Cameron, the products at risk include the following:

Type C Tubing Spools/Housings: API 6A Top Connection Size: 7 1/16-inch Nominal; Pressure Rating: 2,000 psi to 15,000 psi; Styles: Type C.

Tubing Hangers: API 6A nominal Size: 7 1/16-inch; Styles: T-40, T-40CL; CXS, CT.

In a letter, Cameron also stated, "...most hangers and spools installed prior to 1998 will likely fall into the affected category. These spools in many cases can be identified as a Cactus product via part numbers...Ingram Cactus...using a 13-digit part number stamped in a 'XX-XXX-XXX-XXX-XX' manner. After the purchase of Ingram by Cameron in 1996, these parts were later changed to a part number prefixed with a 'Y' in the following format: 'YXXXXX-XXXXXXX'. Positive field identification of part numbers is often difficult. In addition the well may have been worked over or [have] alternative tubing suspension equipment installed by Cameron or other equipment suppliers. In the absence of positive identification of the hanger and spool, the precautions discussed in the Safety Alert [#014086] are to be followed."

Cameron has redesigned the hanger to allow full engagement of the hold-down pins. The MMS recommends the use of multiple barriers to loss of control and extreme care when working over or recompleting wells with the unmodified hangers. The MMS recommends contacting the manufacturer if in doubt about the pressure-holding capabilities of specific tubing hangers.

The MMS also recommends the following: (1) Operators should consider installing shear rams in their BOP stacks when working over wells that present unusual control problems; (2) when planning workovers or recompletions in wells that penetrate sands with high pressure differentials in alternate zones, operators should explicitly prepare for the potential worst-case control problems that may be encountered.

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