

- Successful operation of blind-shear rams (intentional or not) permanently forecloses other well control options;
- MMS did not consider the consequences of inadvertent operation or malfunction of the rams;
- MMS underestimated the number of surface BOP stacks that would need blind-shear rams by 50 percent, thus underestimating the costs by 50 percent; and
- If the final rule requires the blind-shear rams, then industry will need an additional 2 years to comply with the requirement.

—Operating limits of blind-shear rams are frequently unclear for some drilling operations due to pipe grades, mud weights, and wellbore pressures, and that consideration should be given to ensure that these limits are clear

Response: MMS continues to believe that having blind-shear rams in a surface BOP stack is an important safety measure. Blind-shear rams offer an additional opportunity to control the well in a difficult situation. We believe that these rams provide the last line of defense against a blowout when drill pipe or tubing is hung in the BOP stack and there are difficulties in installing or closing the drill string safety valve, inside BOP, or tubing safety valve. Successful operation of the blind-shear rams may prevent damage to the drilling rig, platform, or other facilities, and prevent injuries or the loss of life.

The IADC and industry provided a number of comments on why MMS should not require blind-shear rams in surface BOP stacks. Their most compelling reason against requiring blind-shear rams is industry's recent performance concerning incidents where blind-shear rams might have prevented or minimized a blowout. Those comments are correct in that industry's recent performance is good, especially when compared to the relatively high number of incidents that occurred in the early 1980's. However, there have been three serious incidents where blind-shear rams may have prevented a blowout since 1996 (two incidents occurred in 2001). A brief description of each event follows:

Incident 1—occurred on Platform A, Eugene Island Block 380, on January 24, 1996. During completion operations, the well began to flow while the tubing was

extended above the BOP stack. The crew tried to stab the top drive into the top of the tubing but the flow had increased and they were unable to make the connection. The driller closed the blind rams to reduce the flow but that did not help. Gas began to flow out of the top of the tubing, so the drilling crew closed the pipe rams and annular preventer and evacuated the rig floor. During the evacuation of the rig and platform, the well caught fire. The fire destroyed the rig substructure and derrick and severely damaged other parts of the rig. Fortunately there were no injuries or pollution. After investigating the accident, MMS' investigation team recommended that blind-shear rams should be required in surface BOP stacks. The investigation report can be found on our Web site at: http://www.gomr.mms.gov/homepg/offshore/safety/acc_repo/98-0012.pdf.

Incident 2—occurred on Platform A Eugene Island Block 277, on July 6, 2001. While killing a kick that occurred during workover operations, the pressure safety valve on the mud pump ruptured. The well then flowed uncontrolled through the drill pipe and the ruptured pressure safety valve. The area around the rig equipment and drill floor became inundated with a hazardous accumulation of gas and formation sand which forced all personnel to evacuate to a standby boat. Fortunately there were no injuries and only major damages to the rig. The investigation report can be found on our Web site at: http://www.gomr.mms.gov/homepg/offshore/safety/acc_repo/2002-040.pdf.

Incident 3—occurred on a jack-up drilling rig drilling in Brazos Block 417 on July 13, 2001. During drilling operations, the well began to flow while the crew was making up the next joint of drill pipe in the mouse hold. The rig floor safety valve was stabbed but would not close with two men applying torque to the handle. Both men were burned on their arms and back by the hot mud. Because of the high temperature of the mud, the men had to put on slicker suits and were sprayed with water to continue working on the rig floor. A third man assisted in the attempt to close the valve and sufficient torque was applied to the closing handle to shear it off at the key opening of the valve. Mud continued flowing out of the drill pipe

until it was shooting over the top of the derrick. Gas began to flow with the mud from the drill pipe and it became unsafe to work on the rig floor. The crew was ordered to abandon the rig. After the rig was abandoned, it was discovered that the night supervisor was missing. The Coast Guard searched for two days but the night supervisor was never found. The BOP stack, casing and drill pipe were damaged by high pressure gas and sand that flowed from the well. The rig was also damaged by the gas and sand flow. The investigation report can be found on our Web site at: http://www.gomr.mms.gov/homepg/offshore/safety/acc_repo/2002-062.pdf.

In these incidents, the drilling crews had run out of options to control the well and were forced to abandon the rig. We believe that the injuries, the fatality, and rig damages could have been avoided if blind-shear rams were in the BOP stack and were closed prior to evacuating the rig. Similar incidents have occurred during drilling, workover, and completion operations in the past, and blind-shear rams stopped the blowout. Similar incidents are very likely to occur in the future.

In the preamble of the proposed rule, MMS stated that it had reviewed the blowouts that have occurred since 1977 and found at least 12 incidents where blind-shear rams had helped or could have helped control the situation. Upon closer review of our records, we have identified 24 incidents where blind-shear rams either helped control a blowout or may have helped prevent a blowout (these records include MMS's database, memoranda, accident reports, investigations, operator letters, and operator investigations). The table below gives the date, location, and a brief description of each of those incidents. There were 10 fatalities, 23 injuries, 3 rigs destroyed, and 9 rigs damaged during those incidents. Furthermore, six of the investigation reports recommended that blind-shear rams be installed in surface BOP stacks. Considering that the installation of blind-shear rams provides an additional means of controlling a blowout and can help prevent future injuries, fatalities, and protect property and the environment, MMS will require the installation of blind-shear rams in surface BOP stacks.

Date	Block/lease #	Description of incident
6/23/77	Eugene Island 307, G 2110	Blowout while running dual completion string. Tubing was 84 feet above the drill floor when well began blowing through the tubing. The tubing safety valve could not be installed so blind rams were closed but only crimped the tubing. Crew evacuated the rig safely. The blowout was controlled later that day. The Investigation Report recommended that the U.S. Geological Survey require shear rams on all BOP stacks.