

## INTEGRITY OF DIVERTER SYSTEMS UNDER ABRASIVE, MULTI-PHASE FLOW

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**Objective:** To enhance design criteria for blowout prevention systems used to handle sand cut produced from shallow gas formations.

Safety of personnel, equipment and environment is a concern in offshore hydrocarbons explorations. Blowouts are among the most dangerous hazards in marine environments where abnormal formation pressures may be encountered at very shallow depths. Well control is especially difficult where a threatened blowout situation occurs prior to setting surface casing in the well. If the conventional blowout prevention equipment and procedures are applied, hydraulic fracturing is likely to occur in an exposed shallow formation due to the pressure build-up in the well. Moreover, if one or more fractures reach the surface, the resulting flow can destroy the foundations of a bottom supported structure.

Presently, the best available procedure for handling a threatened blowout from a shallow gas formation is to divert the gas flow away from the rig structure and drilling personnel. This requires the use of a diverter system large enough to prevent a pressure build-up within the well bore, minimizing exposure of the weakest formation to fracture. Figure 1 exhibits the key parts of a diverter system. The essential elements of a diverter system include:

- (1) a vent line for conducting the flow away from the structure,
- (2) means for closing the well annulus above the vent line during diverter operations, and
- (3) means for closing the vent line during normal drilling operations.

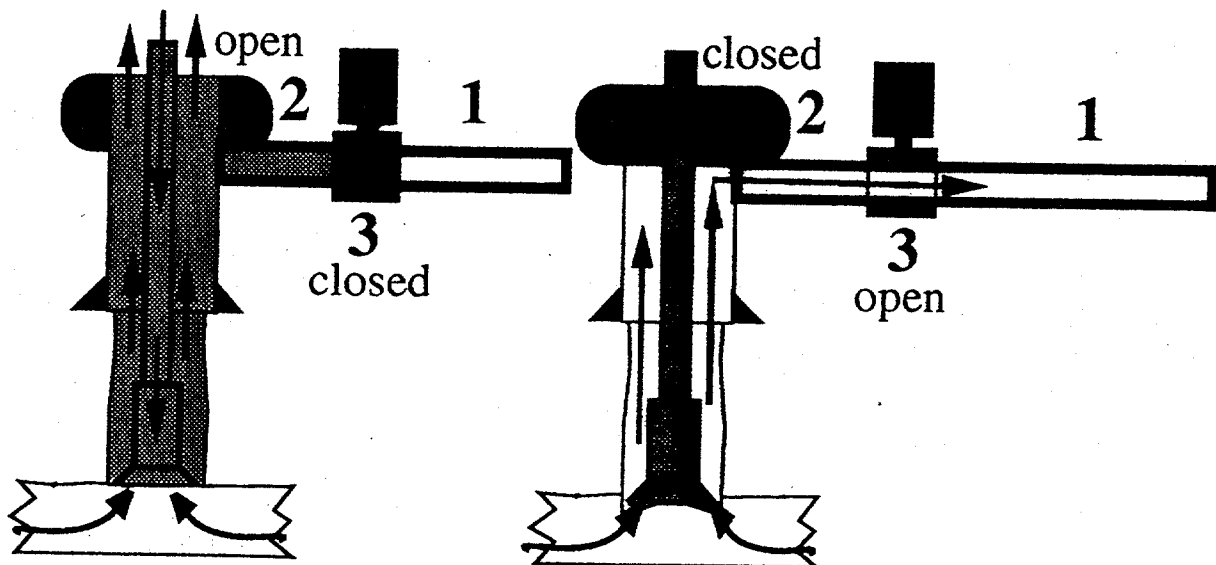


Figure 1.

Schematic of the main components of a diverter system