

## SYSTEM CONCEPT

Designed to extinguish annular fires in a few seconds after ignition, the SNUFF system provides an increased margin of safety for operating personnel. The capabilities of the SNUFF equipment permit the extinguishment of fires in situations of various casing/drill pipe geometrics and gas fluid flow rates of up to 300 MMSCFM/day rates. Through its control system, which can function through periods of rig power loss, the fire will be extinguished in a few seconds. The system then automatically returns to a standby basis, immediately available for activation should reignition occur. This mode of operation can continue 40, 50 times or more depending upon the individual characteristics of the blowout.

It is anticipated that additional personnel reaction time is the major immediate contribution to drilling operations being made by SNUFF. Additional peripheral areas of equipment protection, improved conditions for rework and return of well control are anticipated to be positively affected by immediate fire extinguishment.

The system can also be of potential value where an extinguishment is not desired beyond the initial time for crew protection. As long as the SNUFF equipment has not been damaged either at the well head, or its interconnections, it can be activated later for the purpose of improving conditions for initiating repairs.

This system, operating within its design parameters, is expected to be very appropriate for all phases of drilling operations with possibly special emphasis in early drilling stages utilizing diverters.

The equipment is on-line and immediately available for activation at the time that an annular fire has been detected. The system consists of a custom multi-purpose spool piece installed in the BOP stack connected via rigid pipe spools to a remote inert gas pressurized vessel. Controls are located on the rig floor, at the pressure vessel and a third position to be specified by the drilling contractor or operator as appropriate. All hardware has been designed in accordance with applicable ASME and API standards. The multi-purpose spool piece contains necessary parts for SNUFF as well as choke and kill outlets. It serves the functions of both SNUFF and a drilling spool. Location of the spool piece in the BOP stack is a matter of contractor decision with the exception that Petro Safety recommends that the spool be installed with at least one set of preventers between it and the casing head. In diverter operation this spool would be installed upstream of the diverter lines.