



# Wellhead Pressure Monitoring

API 6A Process to Instrument Valves  
Application Story



ENGINEERING **YOUR** SUCCESS.

# Offshore Safety Measures

The importance of pressure monitoring in offshore and onshore environment.



*Jim Breeze*

*Product Manager,  
Instrumentation Connections  
and Process Valves*

**High profile accidents such as the Deepwater Horizon, Macondo Prospect, well blowout and explosion that occurred in the Gulf of Mexico in 2010, and the gas leak in the Elgin Field in the North Sea in 2012, are causing the industry to rethink its approach to pressure monitoring during drilling and production, in order to further improve operational safety.**

One aspect that is receiving particular attention is the pressure in the voids between the annular casing strings of a well – any sudden increase or change could indicate leaks in the casing strings, cement bonding or production tubing. There is consequently now a growing trend to monitor the pressure in each void, so that operators can gain early warning of impending problems and implement emergency shutdown procedures to avoid disaster.

The need for improved annular casing pressure management is

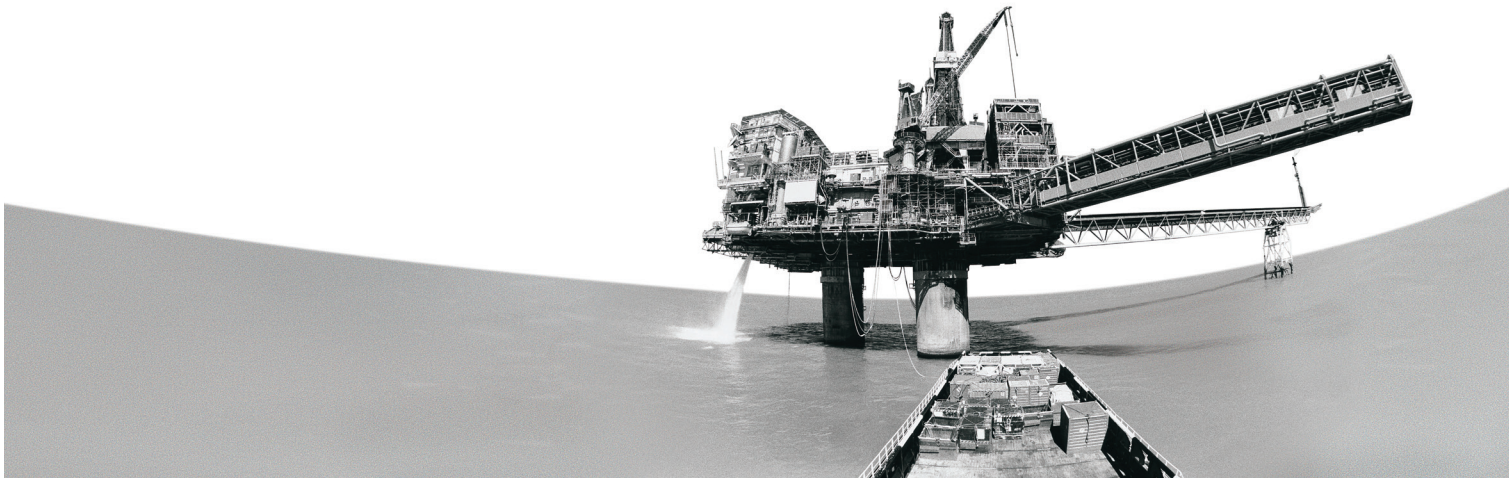
## **Problem**

Lack of pressure monitoring within the casings to the wellhead annulus.

becoming more acute as operators of offshore oil and gas platforms move into deeper waters and encounter higher reservoir pressures and temperatures – and it is one of the reasons why the UK's Health and Safety Executive is urging operators to adopt its guidelines for well integrity.

Nor is the issue confined to the offshore sector.

Energy companies are being forced to drill to greater depths at many onshore exploration sites now that the shallow layers of oil and gas reservoirs have been substantially exploited, which again necessarily involves higher operating pressures.



# Parker's Solution

Instrumentation valves and fittings for surface wellhead pressure monitoring applications.

Parker is supplying two leading energy companies that operate wellhead platforms in the North Sea with instrumentation valves and fittings for surface wellhead pressure monitoring applications.

To monitor the casing pressure, the gauges or transmitters need to be connected through to the various annuli – and the associated valves and fittings need to comply with the rigorous API 6A specification for wellhead and Christmas tree equipment.

The installations cover a number of platforms in the following fields operating in water depths of around 100 metres:

- West Franklin
- Elgin-Franklin
- Judy
- Joanne

These are all high temperature/high pressure (HTHP) gas condensate fields .

West Franklin is the hottest, highest-pressure reservoir in the world. Located some 6000 metres below the seabed, it has a fluid temperature of 197°C and a pressure of 1155 bar.

## Customers

Two leading offshore operators in the UK.  
Platforms:

- West Franklin
- Elgin-Franklin
- Judy
- Joanne



Wellhead assembly annulus

# Parker's Products

## API 6A Process to Instrument Valves

Both customers needed API 6A valves for direct flange mounting on wellhead assemblies. The flange class depends on the pressure rating of the annuli that are being monitored.

### Pro-Block Valves

One customer required custom versions of Parker's Pro-Bloc valves, with 5k and 10k flanges, incorporating two needle valves and two vent outlets. These valve assemblies feature a straight-through bore to facilitate accurate pressure measurement, with one

vent outlet used for the pressure gauge, the other equipped with a special coupling to allow quick connect and release of measuring equipment while monitoring the well.

### Double Block and Bleed Needle Valves

The other customer required double-block-and-bleed needle valves with 5k, 10k and 15k flanges, for installation between two large gate valves on each of three annulus pressure monitoring

ports on wellhead assemblies. Parker also supplied similar valves for the high pressure protective systems (HIPS) that the company uses for wellhead flowline pressure protection. The valves feature Parker Autoclave female outlets machined within their hubs, to provide the customer with the option of using direct or remote mounting pressure transmitters.



Double Block and Bleed valve straight through bore twin vent



Double Block and Bleed utilising heavy-duty needle valves

### Benefits

- Ease of installation to existing designs
- Lightweight - low cost of fabrication
- Compact design, fitting into existing space with minimum modifications to existing christmas tree.

