WELL CONTROL ALERT

The International Association of Oil & Gas Producers (IOGP) Well Control Incident Alert System was established as a means of notifying fellow IOGP members of the lessons learned from well control incidents and near misses. The sharing of these alerts with the IOGP community will help to promote learning and avoid the repetition of similar errors. The result will move the industry to a higher level of well control safety. IOGP is grateful for all contributions and the continued support of the Well Control Incident Database reporting system. All well control incidents and near misses are requested to be reported to the IOGP Well Control Incident Database secretariat (wp@iogp.org). All information received by IOGP is treated with utmost confidentiality and any published data is always anonymous. Further information can be found in the IOGP website http://www.iogp.org.
Note: Original alert wording from IOGP Member Company.

The reporting company has authorised unrestricted distribution of this alert.

Alert #16-2

Well Control Incident

The incident occurred during the final stages of the completion of a horizontal screen producing well.

The installation of lower completion was completed and the liner top packer was successfully set and pressure tested.

The remaining program steps were to place a base oil cushion above the closed fluid loss valve to create an under-balanced condition to support production kick off.

The path for the brine to base oil displacement was from the cement unit, down the tubing string, through a ported sub installed above the completion packer and then up the annulus. Brine returns were discharged overboard until a dyed interface was observed. The intention was to displace the entire well (tubing and annulus volume) above the fluid loss valve to base oil (+/-125m³).

The well displacement to base oil commenced once the tubing hanger was landed, latched, and over-pulled. When displacement was complete, flow was observed to continue from the well. The Driller shut-in at the surface choke and monitored the wellbore pressures on the tubing and annulus. It was estimated that an influx of 23m³ had entered the well.

The influx was bullheaded back into the formation by pumping base oil from the cement unit.

Contributing Factors

- Fluid Loss Valve failed unexpectedly to the open position. The cause of the valve opening could not be determined (i.e. failed open or opened unintentionally).
- Brine returns were being discharged overboard and were not being accounted for.
- No in-flow (negative pressure) test was incorporated into the displacement to hold constant bottom hole pressure until the displacement was complete.
- A previous in-flow test to a seawater gradient was believed to be sufficient to qualify the barrier, but this test did not expose the well barrier to the maximum pressure differential that would have been experienced at the completion of the displacement to base oil.
- A loss of situational awareness by the Driller contributed to by various cognitive biases allowed the influx to continue while indicators were present.
- There was an inadequate focus of process safety (major accident hazards) in favour of occupation/environmental hazards associated with the task.

Root Causes:

- Lack of well control procedures implementation
- Well integrity requirements not implemented in Operator well planning process.

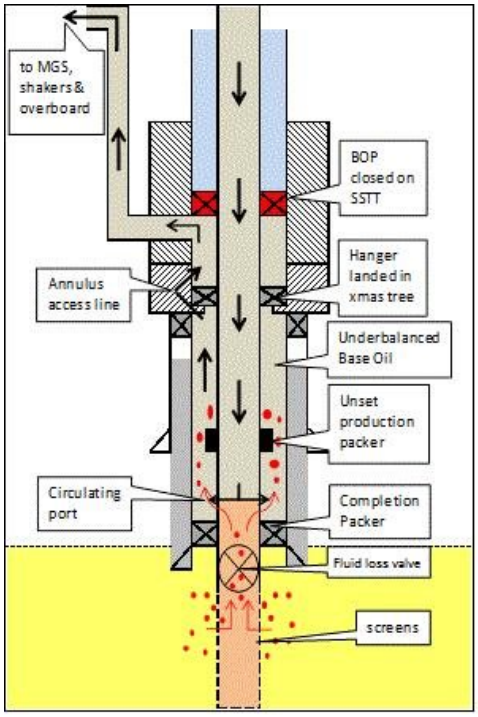
Lessons Learned

- Improve well planning process to include more detailed assurance checks for key well integrity requirements and improved stakeholder review.
- Improve understanding and use of major accident hazard risk assessment (Bow Tie diagrams) in the verification activities to control major accident hazards conducted by rig site supervisors.
- Incorporate specific requirements to demonstrate management system requirements into the competency assurance

program.

- Improve well control auditing to obtain objective evidence of policy implementation.
- Increase awareness of the effects of cognitive bias in process safety and ways to increase sensitivity to "weak signals" in well control.

Figure 1



International Association of Oil & Gas Producers
City Tower, 40 Basinghall St, 14th Floor, London EC2V 5D, UK
Reception: +44 20 3763 9700

Follow us on Twitter @IOGP_News

Visit our website at http://www.iogp.org

IOGP is registered in England. Registration number: 1832064. Registered office: City Tower, 40 Basinghall St, 14th Floor, London EC2V 5D.