Title: Gas leakage through 30”x20” annulus during side tracking

Location: Unmanned well head platform

Activity Type: Side Tracking

(Result/outcome): Production loss

What happened?

While drilling 12 1/4” hole at a depth of 1183m for side tracking (7th time) of the existing well observed flow of gas from 30” x 20” annulus of the well. Gas and muddy water was coming out from 30” casing through a approx. 4” diameter hole about 2m below the well head deck.

What Caused It?

- When the well was taken for side tracking there was pressure of 400 psi in B annulus. The pressure in B annulus (13 3/8” x 9 5/8”) of old well may be due to leakage in casing body or joints above the cement top behind the casing. It may also be due to gas migration through possible channeling in the cement behind the 9 5/8” casing.

- The 13 3/8” casing was cut at 292m established circulation behind it. Observed flow of gas from 13 3/8” x 20” annulus. The presence of gas at 13 3/8” casing cut point area may be due to migration of gas from the reservoir through the damaged casings / poor cementation behind casings, cement plugs of bottom portions of the wells left abandoned for side tracking.

- The present well was side tracked and cased with 13 3/8” casing leaving abandoned bottom portion of existing well aside.

- The 17 ½” phase was drilled with 10.3ppg mud. During drilling Effective mud wt. (EMW) may have induced seepage loss in weak formations below 20” casing shoe, which may have gone un-noticed during drilling and lowering / cementation of 13 3/8” casing.

OR

During 13 3/8” casing lowering, weak formations below 20” casing shoe might have fractured because of surge pressure developed by casing lowering speed.

- The seepage loss lowered the mud level in 20” x 13 3/8” annulus and resulted in reduction of hydrostatic head above the previous 13 3/8” cut area. The reduction of hydrostatic head allowed the gas influx to enter the 20” x 13 3/8” annulus from the cut point area and pressurized the annulus.

It is provided for information purpose. This information should be evaluated to determine if it is applicable in your operations, to avoid reoccurrence of such incidents.
Due to pressurized gas in 20” x 13 3/8” annulus, the weak point in 20” casing got burst (the casing was 20 years old) and allowed the gas influx passage through 30” x 20” annulus.

The gas migrating from reservoir to the cut point area have entered the 20” x 30” casing annulus of new side tracked well due to absence of a tested barrier above it because the cement rise behind the lowered 13 3/8” casing was much below the cut point.

**Corrective Actions:**

- Annulus pressure monitoring of A, B and production casing annulus should be carried out at regular intervals and records to be maintained for sustained casing pressure management.
- If the outer annulus and production casing annulus have pressures, the reason for the same should be diagnosed and work-over program should be prepared accordingly.
- The Bottom portion of the well should be abandoned by permanent abandonment procedures prior to side tracking operations.
- Possibility of retrieving old 20” casings by back off above sea bed and milling may also be explored while side tracking old wells.