Appendix C: Alert for Operators Drilling in Quaternary Gravels

Originally published as an Information Letter to alert operators drilling in Quaternary Gravels, particularly in Midwinter-Helmet North Field areas, but also in the rest of British Columbia.

Background

On January 28, 2005 the Nabors 29 rig on the CNRL HZ Midwinter b-93-L/94-P-10 well encountered a low differential gas kick while drilling at approximately 140 m KB. The well blew out, ignited, and burned for approximately 12 hours causing one fatality and destroying the rig.

It seems the rig encountered a gas pocket in Quaternary gravels. These gravels are known to be pressured but water bearing in the northern portion of 94-P-15. The gravels have been encountered sporadically in the southern portion of 94-P-15 and the northern portion of 94-P-10. This is the first report of gas bearing Quaternary gravels within a 60 kilometer radius. No water was produced with this blowout.

Requirements

Quaternary gravels are present throughout northeast British Columbia. Equivalent gravels at Sousa field in T112-R1W6 and Rainbow T110-R3W6 in Alberta have produced gas. ISH Energy has produced gas from the Dunvegan zone at two wells in the Desan field at c-82-K & d-81-K/94-P-2. These wells are approximately 60 kilometres south of the blowout location. A new interpretation of this zone suggests it may be Quaternary gravels.

Deposition of Quaternary gravels is generally interpreted to be glacio-fluvial sediments in bedrock erosional lows. At Sousa field, there are occurrences of four stacked gravels found in one well bore. However, researchers have found significant gravel deposits on the flanks of bedrock highs. Minor gravel deposits on the tops of bedrock highs cannot be ruled out.

The gas in these gravels has been interpreted to be biogenic gas. The blowout zone pressure was reported to be of normal gradient. In light of the foregoing, operators are advised to:

4. Review new northeast British Columbia well locations thoroughly for the presence of bedrock lows and any indication of Quaternary gravels.
5. Design drilling programs with the expectation of encountering shallow Quaternary gravel gas in 94-P and 94-I. Serious consideration should be given to the use of diverters on subject area surface holes.

6. Take and monitor sample cuttings from the surface where gas bearing Quaternary gravels are anticipated and to have gas detection equipment operational.
7. Utilize “main” hole drilling practices on surface holes in this area (i.e. blowout prevention drills, trip sheets, avoid the pumping out of singles and possible resulting charge up of zones, etc).

Operators are also reminded of the standing requirement to run a gamma-ray log from total depth to surface (open-hole, cased-hole or Measurement While Drilling), data which may prove useful in the identification of shallow gas zones for the programming of future wells. The log data will assist industry and operators in mapping the gas-bearing gravel formations.

It is also noteworthy some recent well control problems have been experienced in shallower zones in other areas of British Columbia. The offending zones are thought to be Quaternary gravels or possibly the Dunvegan zone, but the source of the gas therein is uncertain at this time.