

For Immediate Release
OGC IB # 07-09
July 15, 2009

INFORMATION BULLETIN

Safety Alert Regarding Welding of Casing Bowls

FORT ST. JOHN – The BC Oil and Gas Commission (Commission) is advising industry of an investigation conducted by an independent engineering firm on a recent casing head failure during frac operations. Concern surrounds the safety integrity of the well during repeated, high pressure pumping operations.

The investigation revealed a failure at the casing to casing bowl weld as evidenced by:

- Surface casing break immediately below the weld in the heat affected zone,
- Presence of mainly brittle, non-tempered martensitic weld by microscopic analysis, indicative of one or a combination of insufficient preheat, failure to maintain temperature during welding, rapid cooling of job, and/or lack of post weld heat treatment (stress relieving),
- Excessive weld stop build-up, stop start (weld should be continuous), under cut and slag, and/or
- Use of improper weld electrode.

The weld failure may have been initiated by one or a combination of; vibration during frac, slight bending moment stress exerted on wellhead, axial force exerted by frac pressure and/or routine drilling operations.

Follow-up investigation by the Commission of general industry welding procedure included onsite visits and discussions with drilling and experienced welding personnel. This revealed a lack of detailed welding procedure, Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR) onsite. In addition to the lack of detailed procedure, the Commission found an absence of qualified supervision and minimal assistance to the welder for maintaining preheat, interpass and post weld temperatures. Also frequently noted was the rapid cooling of welds to speed up operations and evidence of weld failure during drilling operations.

The casing to casing bowl weld is critical to wellbore integrity and its failure has potential serious consequences. The operator must follow an appropriate written welding procedure, WPS and PQR, made available onsite for reference. Appropriate governing standard(s) and material specific welding parameters, i.e. welding electrode type,

preheat condition, min/max interpass temperature and post weld heat treatment conditions, should be referenced.

If stress relieving for sour wells is deemed necessary, welding procedure and WPS must state post weld heat treatment conditions and PQR include hardness testing.

Onsite drilling supervisor must verify welder qualifications and experience, and also review welding procedure with the welder onsite and document same in the tour sheets. Supervisor must also ensure the job is completed according to stated protocol.

Regardless of the standards used to prepare the WPS, the operator is responsible for the weld. The company must utilize an approved WPS that documents a qualified welding procedure and must employ only a welder qualified to that procedure.

The welder must demonstrate good workmanship and use the proper electrode for casing grade and assure the electrode is in good condition (not wet). The welder may require assistance to maintain preheat and temperature throughout welding. Slow cooling of the weld is critical.

At the end of the job the work must be documented, including but not limited to preheat, interpass heat, type of rod used, number of passes, voltage setting of each pass and the cooling time and temperatures.

The Commission is mandated authority to discontinue operations in whole or in part until proper protocols are followed.

For further information regarding this Bulletin, please contact:

Don Buckland
Sr. Drilling Engineer
Engineering Division
BC Oil and Gas Commission
250.261.5761
Don.Buckland@gov.bc.ca