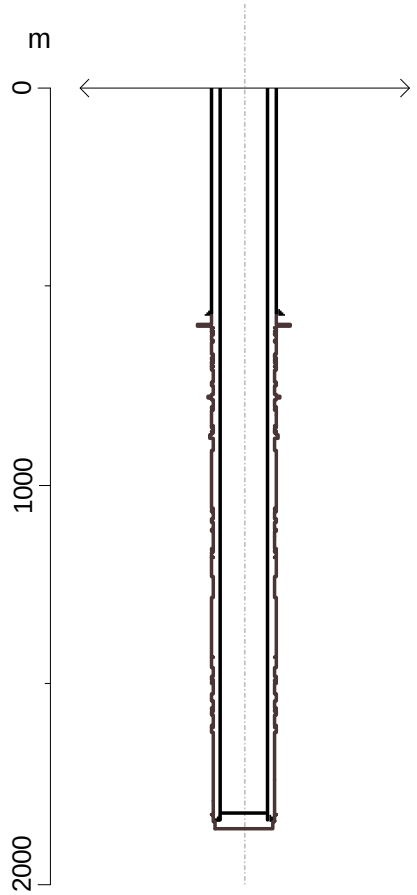
Well Name COPRC Loon Creek 006 65-10 127-00

Subject **178mm Casing cement job analysis**

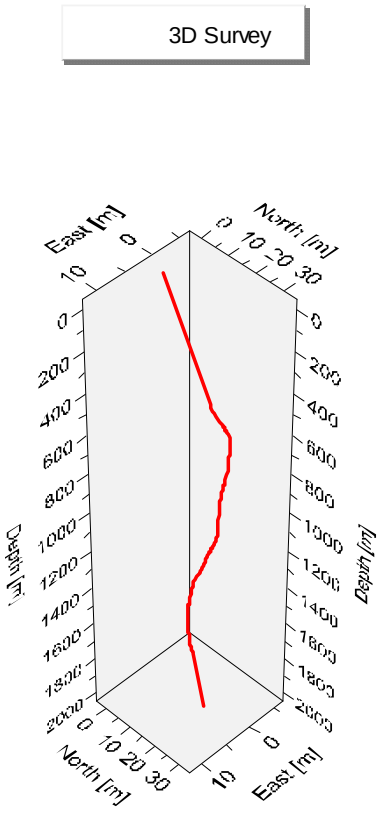
Date Feb 20 2013

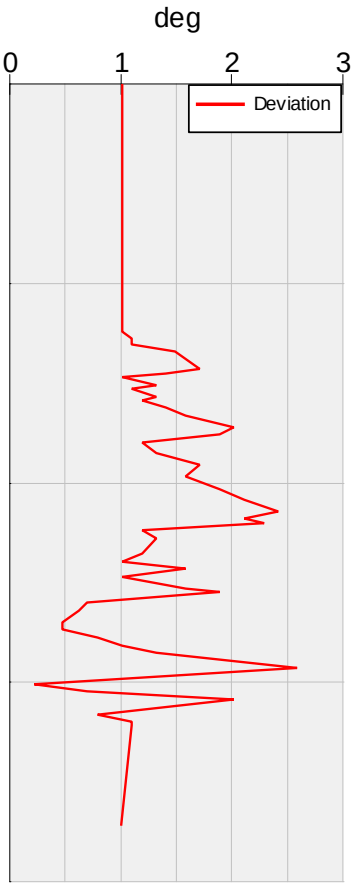
Well Data:

Job Type:	Casing Cementing
TVD:	1860.0 m
OH:	222.0 mm
Casing:	178 mm (38.7 kg/m)
Previous Casing Depth:	600.0 m
Previous Casing:	244 mm (53.6 kg/m)



Well





Deviation

Fluid Design:

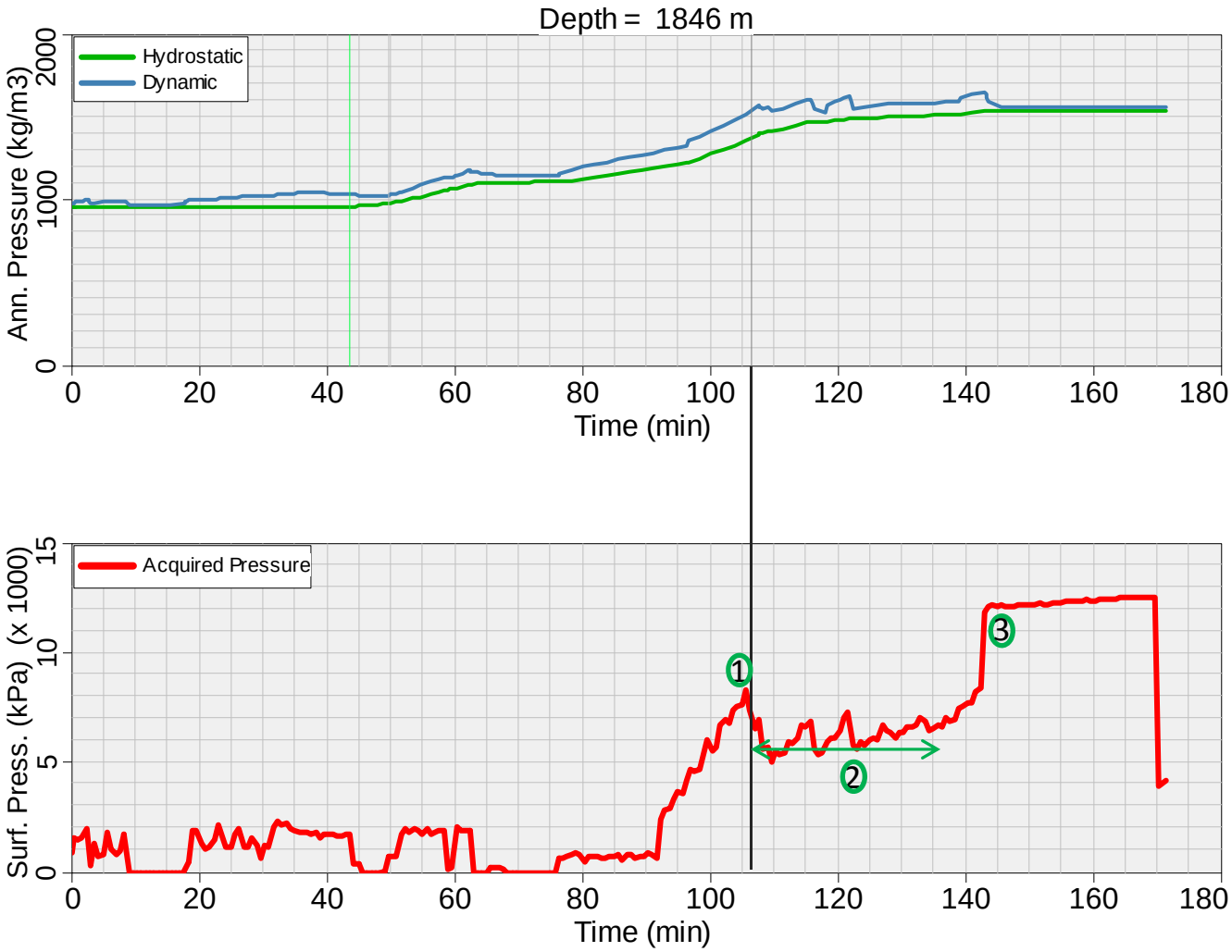
Mud Weight:	950 kg/m3
Spacer:	MUDPUSH II at 1175.0 kg/m3
Lead Cement:	1400 kg/m3
Tail Cement:	1900 kg/m3
Designed Top of Tail:	1400.0 m
Designed Top of Lead:	0.0 m (surface)
Annular Excess:	30% over caliper log

Pressure Calculations:

Looking into fluid movement and pressure calculations, point-1 is where the tail slurry enters the casing shoe and into the annulus. The surface pressure increases up to point-1 indicating the height of cement slurry into the annulus (lead) and when tail cement gets into the annulus, there is drop in pressure indicating that losses occurred during that point.

The possibility of fractured limestone at the casing bottom could be the thief zone and looking at the pressure graph, the tail cement is fed into this zone and the surface pressure stabilizes around 5.2 MPa (point-2) when the pump rate is slowed down.

Assuming all the heavy weight tail cement is lost into the fractured limestone zone at the bottom; surface pressure of 5.2 MPa is equivalent to around 1700m of lead cement (1400 kg/m3). This put the lead cement to around 160m in the surface casing. Spacer returns of around 0.5 m3 to surface also indicate the presence of cement well into the surface casing of 600m. With a total of 3.3 m3 of spacer pumped and around 0.5 m3 returns to surface, leaves 2.8 m3 of spacer in the annulus accounting for around 180m in the casing.



1 – Tail Cement through shoe

2 – Pressure around 5.2 MPa

3 – Plug bump

Job Data Graph: