

Canadian Natural Resources

Llyodminster, AB
 105/9-24-48-2 W4

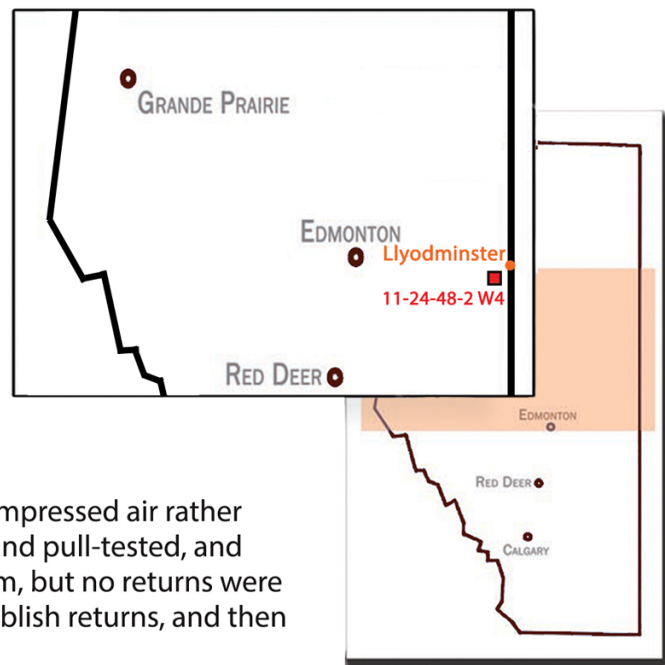
Longhorn received a call from CNRL for a well clean-out that required the new 2 3/8" Sandworm prototype, and would be its first field trial. The 2 3/8" version uses the same helical drive system as the 2 7/8" version, but is designed to clean-out casing and tubing down to 2 7/8" ID, and requires the use of flush connections in its construction to to work inside of tight ID's.

In this particular well, the coil was planned to be energized using compressed air rather than by using nitrogen injection. After rig in, the tool was made up and pull-tested, and finally run in at 8:30am. Sand was initially tagged at a depth of 1100m, but no returns were noticed at surface. The coil was pulled back to 400m in order to establish returns, and then the coil was advanced until 600m until returns were again lost.

The decision was made to run in and tag the sand bridge again, and clean ahead as far as possible without potentially packing off behind the tool and sticking the coil. The coil crew worked the bridge, eventually cleaning 150m of sand and fill to a depth of 1250m. Titanium's foreman was very impressed with the preformance of the tool, noting that "You can see the tool working on the gauges, and actually feel the tool working right back to surface".

While the tool was considered to be extremely effective in its first trial, the lack of returns to surface forced the decision to end the clean-up run prior to reaching TD. In discussions with the foremen from Titanium and Hurricane, they both agreed that they could have proceeded alot further if they had been able to establish returns to surface.

Hurricane's forman noted that other clean-out equipment had be tried in previous runs on the same well with little to no success. Entering the liner with those other tools had been a major concern, as they had alot of difficulty previously. During this run, Longhorn's Sandworm entered the liner effortlessly on three diffrent attempts. Overall, everyone involved in the run was very impressed by this first field trial.



Run Summary

Tool:	2 3/8" Sandworm
Target:	Coil Tubing Clean-out
Production Tubing:	114.3 mm / 4.5"
Coil Tubing Size:	50.8mm / 2"
Well TD:	1442 m / 4731 ft
Total Run Time:	10 Hours
Liner Cleaned:	150 m / 492 ft
Client:	Canadian Natural Resources
Consultant:	Kevin Simard
Coil Service:	Titanium Tubing Technologies
Foamer Service:	Hurricane Industries
Service Rig:	Royal Well Servicing Rig 12





LONGHORN
CASING TOOLS



SANDWORM



Downhole Schematic (Heavy Oil) CNRL 104 LLOYD 9-24-48-2

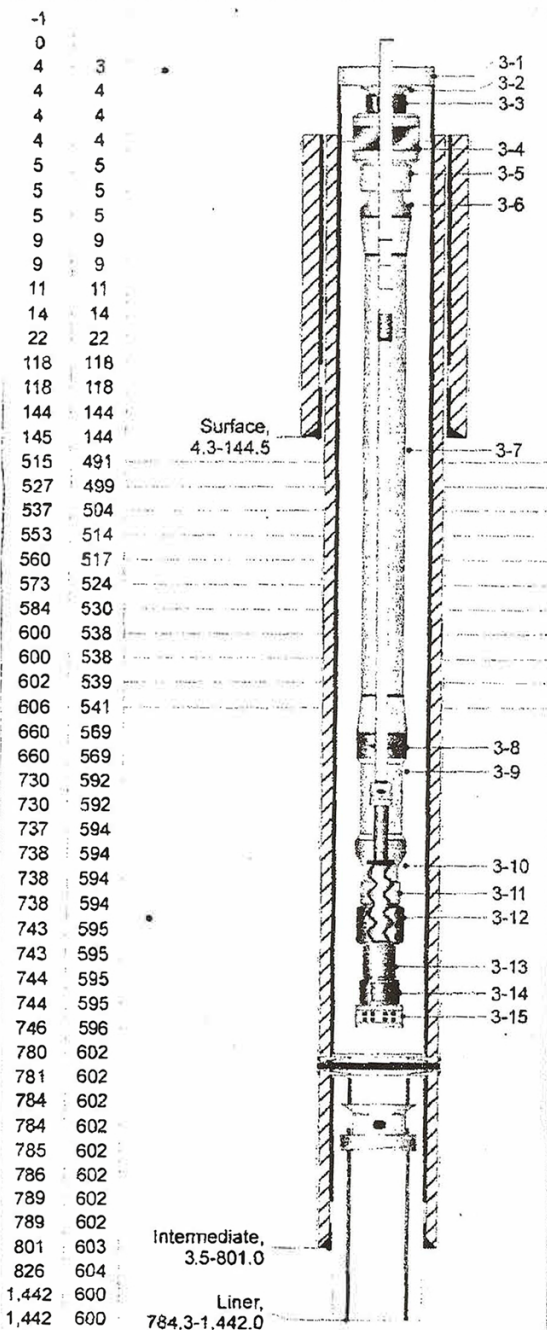
Bottom Hole Location 104/09-24-048-02W4/00	Surface Legal Location 100/11-24-048-02W4	License No. 0413979	Field Name RIVERCOURSE OIL	Province Alberta
Well Profile Horizontal	Fluid Type Heavy Oil	Original KB Elevation (m) 639.34	KB-Ground Distance (m) 4.34	KB-Casing Flange Distance (m) 3.50

Directions To Well

Lloydminster Hwy # 17 South to Sec Hwy # 619, West to RRD 21, South .5 km, East into pad.

Well Profile: Horizontal - Original Hole, 4/19/2011 12:34:36 PM

mKB (MD) Schematic - Actual



PBTD's

Date 1/17/2010 Depth (mKB) 1,442.00

Well History (with last 3 jobs)

General Notes

Comment
Potential H2S as this well continues to produce.

Casing Strings

Casing Description	OD (mm)	Wt (kg/m)	Grade	Top (mKB)	Set Depth (MD) (mKB)
Surface	298.4	62.503	H-40	-0.47	144.50
Intermediate	219.1	41.669	J-55	3.45	801.00
Liner	139.7	23.067	J-55	784.33	1,442.00

Tubing Strings

Tubing - Production set at 745.65mKB on 2/24/2011 12:00

Tubing Description	OD (mm)	Wt (kg/m)	String Grade	Set Depth (mKB)
Tubing - Production	114.3	18.980	J-55	745.65

Comment

New Weatherford 10-1600xxtl @ 75 % eff, w/ Midfield gas breaker

Item No.	Jts	Item Description	OD (mm)	Len (m)	Top (mKB)	Botm (mKB)
3-1	1	Tubing Hanger lock tite	218.0	0.25	3.50	3.75
3-2	1	Swedge 114.3mm x 88.9mm	114.3	0.10	3.75	3.85
3-3	1	Nipple & Coupling	88.9	0.33	3.85	4.18
3-4	1	T.C.S. Tbg Rotator # 6827	150.0	0.78	4.18	4.96
3-5	1	Coupling 88.9mm	114.3	0.15	4.96	5.11
3-6	1	Swedge 88.9mm x 114.3mm	114.3	0.10	5.11	5.21
3-7	68	Tubing / Enerlined	114.3	654.71	5.21	659.92
3-8	1	Tbg Drain 9 pin 45K	114.3	0.42	659.92	660.34
3-9	8	Tubing / Enerlined	114.3	77.10	660.34	737.44
3-10	1	Swedge w/ 114.3mm Enerlined Cplg x 88.9mm welded	114.3	0.30	737.44	737.74
3-11	1	Pup Jt welded	88.9	0.69	737.74	738.43
3-12	1	Weatherford 10-1600 stator # E68212 @75% eff	108.0	4.93	738.43	743.36
3-13	1	Solid Tag Bar	73.0	0.83	743.36	744.19
3-14	1	x-over	88.9	0.13	744.19	744.32
3-15	1	Midfield Gas Breaker	108.0	1.33	744.32	745.65

Rods

Pro-rod 620c /28.6mm on 2/24/2011 14:30

Rod Description	OD (mm)	Wt (kg/m)	String Grade	Set Depth (mKB)
Pro-rod 620c /28.6mm	28.6			743.35

Item No.	Jts	Item Description	OD (mm)	Len (m)	Top (mKB)	Botm (mKB)
3-1	1	Polished Rod	31.7	9.14	-0.24	8.90
3-2	1	Pony Rod	31.7	0.33	8.90	9.23
3-3	1	Pony Rod	31.7	1.83	9.23	11.06
3-4	1	Pony Rod	31.7	3.03	11.06	14.09
3-5	1	Sucker rod	31.7	7.62	14.09	21.71
3-6	1	Continuous Rod	28.6	708.00	21.71	729.71
3-7	1	Shear Coupling 40,000 lb	49.0	0.22	729.71	729.93
3-8	1	Sucker rod	31.7	7.62	729.93	737.55

