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Well Log Sample Report

Prepared by:

Line Images (2013) Ltd.

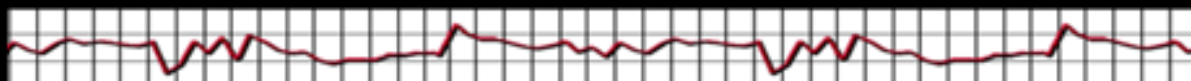
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GEOLOGICAL REPORT



SOMEWHERE CHILLY 102 HZ 12-2-54-6WM

234/02-98-04-6WM

PREPARED BY: LINE IMAGES (2013) LTD.

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WELL DATA SUMMARY

Well Name: Somewhere Chilly 0-0-0-0

Operator: Line Images 2013 Ltd.

Well Location: 0-0-0-0 (surface)
0-0-0-0 (bottom)

Elevations: Ground: 877.9 m (survey)
877.3 m (as built)
Bushing: 882.25 m

Status: 114.3 mm liner set as potential
Cardium oil well

Contractor: Those Guys Rig #1
Rig Manager: Scott Adams

The Oil Company: Directional Drillers: Scott Adams / Stacey Schable
MWD: Calvin & Hobbs

Drilling Supervisor: Dilbert

Geology: Andy Capp

Spud Date: 2013/1/1 14:00

Hole Size: Surface: 251 mm
Monobore: 159 mm
Casing Surface: Set at 437 mKB (177.8mm); 2013/1/1 06:00
Drilled out: 2013/1/1 15:15

Total Depth: 3307 mKB (Driller's Tally) 2013/1/1 10:55

Cores: None cut

Drillstem Tests: None

Cased Hole Logs: To be run after well drilled

Samples: 1060 to 1140 & 1610 to 3307 mKB

Somewhere Chilly 0-0-0-0

K.B. Elev: 882.25

FORMATION / MARKER TOPS

<i>FORMATION</i>	<i>PROGNOSIS</i>		<i>SAMPLE</i>		
	<i>TVD</i>	<i>SS</i>	<i>MD</i>	<i>TVD</i>	<i>SS</i>
There	176.25	706.0			
There	326.65	555.6			
There	382.25	500.0			
There	383.75	498.5			
Surface Casing	400.65	481.6	437.0	436.96	445.29
There	869.45	12.8	870.0	869.91	12.34
There	1115.15	-232.9	1114.5	1114.4	-232.15
There	1122.45	-240.2	1125.0	1124.9	-242.65
Kick Off Point	1038.65	-156.4	1130.16	1130.05	-247.8
There	1258.55	-376.3	1269.0	1260.01	-377.76
There	1291.25	-409.0	1312.1	1292.51	-410.26
There	1359.75	-477.5	1450.0	1358.88	-476.63
There	1367.25	-485.0	1483.8	1367.21	-484.96
Cardium Zone	1405.95	-523.7	1652.0	1405.29	-523.04
Cardium Sand (Cglt)	1433.75	-551.5	1775.0	1433.16	-550.91
Cardium "A" Sand	1434.45	-552.2	1776.0	1433.37	-551.12
Landing Point	1438.75	-556.5	1828.51	1438.86	-556.61
Final TD	1429.05	-546.8	3307	1428.71	-546.46

SUMMARY OF WELL OPERATIONS

The Primary Objective of this monobore well (Somewhere Chilly 0-0-0-0) was to drill a +/- 1450 meter horizontal well bore to obtain oil production from the Cardium Sandstone. This well was drilled from a surface location 548.7 meters North of the South Section boundary in 0-0-0-0- W0M (210.0m West of East) to a bottom hole location 3307 meters measured depth (1428.71m TVD/-546.46m SubSea) at 104.5 meters East of the West section boundary and 13 meters South of the North LSD boundary in 0-0-0-0W0M.

This well was drilled with Those Guys #1 and The Oil Company, directional drilling and MWD. The 251mm surface hole was spudded on January 1, 2013 @ 14:00 hours. The 251mm surface hole was drilled to 437 meters where the 177.8mm surface casing was landed and cemented.

A bottom hole assembly including mudmotor, directional tools and a 159mm VOX U513M PDC bit was assembled and run in the hole. The surface casing shoe was drilled out on January 1, 2013 at 15:15 hours. The 159mm hole was drilled northeast, and then north from the surface location. The monobore hole was drilled with an invert mud system. The nominal landing point was reached on January 1, 2013 at 11:50 hours at a depth of 1828.51m MD (1438.86m TVD/ -556.61m SubSea). The well path at landing point is approximately 6 meters below the top of the Cardium Sandstone at an angle of 89.2 degrees in a position 920.98 meters north of the south section boundary and 98.8 meters East of the West section boundary in 0-0-0-0. The drilling of the 159mm monobore hole continued through landing point.

The monobore lateral section was drilled for 1479 meters north (from Landing Point at 1828.51 meters measured depth to total depth). The Final Total Depth of 3307m MD (1428.71m TVD/-546.46m SubSea) was reached on January 1, 2013 at 10:55 hours. The end point location was calculated at 13m South of the North LSD boundary and 104.5m East of the West section boundary in 5-7-48-5 W5. A rise of 9.5 meters for the entire 1479 meters from Landing Point to Total Depth was plotted from the structure map for the Cardium Sand top in combination with the actual initial encounter of the top along the projected well path.

Cased hole logs were to be run after drilling was completed.

To complete the well, a 114.3mm OD liner was run.

FORMATION EVALUATIONS

CARDIUM SANDSTONE:

The primary objective of the Somewhere Chilly 0-0-0-0 well was to drill a horizontal well bore from the south to the north for 1450+/- meters at approximately 100 meters east of the west section boundary of the northern half of section 0-0-0-0 and the southern half of section 0-0-0-0. The plan was to drill to approximately 20 meters south of the north LSD 0-0-0-0 boundary. The planned vertical well path was to drill at approximately 5 meters below the top of the Cardium Sand.

STRUCTURE:

The Cardium Sand top (very thin conglomerate with sandstone below) was intersected in the build section of this well at 1775.0m MD (1433.16m TVD/-550.91m SubSea).

The monobore landing point was reached at 1828.51mMD (1438.86m TVD/ -556.61m SubSea). From plotting the first encounter of the Cardium Sand and using the structure contour map, a rise of 9.5 meters was used for the entire 1479 lateral meters from Landing Point to Total Depth.

A final total depth of 3307m MD was reached on March 19, 2014 at 10:55 hours. This total depth is at a true vertical depth of 1428.71 meters (-546.46m SubSea) which appears to be approximately 5.5 meters down from the projected top of the Cardium Sand.

CARDIUM SANDSTONE:

The best of the Cardium sandstones drilled in the 159mm monobore section from landing point to total depth are; light to dark gray brown to brown argillaceous and tight (60%), clear to light clear brown to light to medium brown to gray brown (40%), very fine grained upper to lower, occasional fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, streaks 7 to 9% porosity, streaks 10 to 12% porosity, rare 13 to 15% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut. See the geological striplog for detailed gas readings and lithologies.

From the well path drilled there appears to be some lateral differences in the porosities and permeabilities within the Formation. There are 1479 lateral meters drilled in the Cardium sandstone from landing point 1828.51mMD to total depth. This well path was drilled mostly at 3.5 to 6 meters below the top of the projected Cardium Sand. See the geological striplog for details. The well path appears to be in close enough proximity that the frac program should open the well bore to the most porous intervals above.

RESERVOIR:

Overall, this Somewhere Chilly 0-0-0-0 well exposed sands of net 3-6% porosity, with streaks of 7-9% porosity, and traces 10-12% porosity in most of the lateral section drilled. This well bore should have excellent potential for oil production after completion of the frac program.

Vertical permeability may be impeded by the presumed laminar nature of the porous streaks, as well as by the common occurrence of thin shale interbeds. The frac program may mitigate much of this problem.

This Somewhere Chilly 0-0-0-0 well appears to have excellent potential for significant rates of light oil production.

SAMPLE DESCRIPTIONS

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1060 - 1070	70	SANDSTONE: White grey, fine to minor medium grained, grey white to grey yellow quartz, dark chert, predominantly well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II, Id permeability.
	15	SHALE: Light grey, subfissile, silty in part, sandy in part.
	15	COAL: Black, vitreous.
1070 - 1080	80	SANDSTONE: White grey, light brown white, fine to minor medium grained, grey white to grey yellow quartz, dark chert, predominantly well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II, Id permeability, spotty light brown oil staining.
	20	COAL: Black, vitreous.
1080 - 1090	70	SANDSTONE: White grey, light brown white, fine to minor medium grained, grey white to grey yellow quartz, dark chert, predominantly well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II, Id permeability, spotty light brown oil staining.
	18	COAL: Black, vitreous.
	2	IRONSTONE: Light brown, cryptocrystalline, loose silt grains, hard.
1090 - 1100	50	SHALE: Light grey, subfissile, silty in part, micromicaceous in part.
	20	SANDSTONE: White grey, light brown white, fine to minor medium grained, grey white to grey yellow quartz, dark chert, predominantly well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II, Id permeability, spotty light brown oil staining.
	30	COAL: Black, vitreous.
1100 to 1110	35	SANDSTONE: White grey, very fine grained grading to siltstone, grey white to grey yellow quartz, dark chert, well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II, III permeability.
	15	SANDSTONE: White, grey, fine grained as above.
	30	SHALE: Light grey, subfissile, silty in part, micromicaceous in part.
	20	COAL: Black, vitreous.
1110 - 1120	60	SANDSTONE: White grey, very fine grained to fine Lower, grey white to grey yellow quartz, dark chert, well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II permeability.
	20	SHALE: Light grey, subfissile, silty in part, micromicaceous in part.
	20	COAL: Black, vitreous.
1120 - 1130	50	SANDSTONE: White grey, very fine grained to fine Lower, grey white to grey yellow quartz, dark chert, well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, II permeability.
	50	SHALE: Light grey, subfissile, silty in part, micromicaceous in part.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1130 to 1140	70 30	SHALE: Light grey, subfissile, silty in part, micromicaceous in part. SANDSTONE: White grey, very fine grained to fine Lower, grey white to grey yellow quartz, dark chert, well sorted, subrounded to subangular, kaolinite and minor calcareous cement, poorly consolidated, 3 to 5% porosity, 11 permeability.
1610 - 1620	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty in part, sandy in part, weakly bentonitic.
1620 - 1630	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty in part, sandy in part, weakly bentonitic, trace massive pyrite, trace Inoceramus.
1630 - 1640	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty in part, sandy in part, weakly bentonitic, minor massive pyrite.
1640 - 1650	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty in part, sandy in part, weakly bentonitic.
1650 - 1660	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty in part grading to siltstone, sandy in part, weakly bentonitic, minor massive pyrite.
1660 - 1670	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone stringers, sandy in part, rarely grading to sandstone, weakly bentonitic, minor massive pyrite.
1670 - 1680	100	SHALE: light grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone stringers, sandy in part, rarely grading to sandstone, weakly bentonitic, minor massive pyrite.
1680 - 1690	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, trace very fine to fine grained lower sandstone lense to stringer, slightly bentonitic in part, rare trace pyritic, rare ironstone, sub blocky to platy to sub fissile, firm.
1690 - 1700	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, trace very fine to fine grained lower sandstone lense to stringer, slightly bentonitic in part, rare trace pyritic, trace ironstone, sub blocky to platy to sub fissile, firm.
1700 - 1710	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, slightly bentonitic in part, rare trace sandstone lense, rare ironstone, sub blocky to platy to sub fissile, firm.
1710 - 1720	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, slightly bentonitic in part, rare ironstone, sub blocky to platy to sub fissile, firm.
1720 - 1730	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, slightly bentonitic in part, rare trace sandstone lense, rare trace pyritic, rare ironstone, sub blocky to platy to sub fissile, firm.
1730 - 1740	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, slightly bentonitic in part, rare trace sandstone lense, rare trace pyritic, sub blocky to platy to sub fissile, firm.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1740 - 1750	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, rare trace sandstone lense, slightly bentonitic in part, rare trace pyritic, sub blocky to platy to sub fissile, firm.
1750 - 1760	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, rare trace sandstone lense, slightly bentonitic in part, rare ironstone, sub blocky to platy to sub fissile, firm.
1760 - 1770	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, rare trace sandstone lense, slightly bentonitic in part, rare ironstone, sub blocky to platy to sub fissile, firm.
	Trace	CONGLOMERATE: light to dark gray brown to brown to cream, slightly translucent in part, pebble fragments to shards, trace very slow leaching faint light yellow white cut.
	Trace	SANDSTONE: light clear brown to light to medium brown, very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, 2% black lithic grains, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, rare 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1770 - 1775	100	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, rare trace sandstone lense, slightly bentonitic in part, rare ironstone, sub blocky to platy to sub fissile, firm.
	Trace	CONGLOMERATE: rare trace light to dark gray brown to brown to cream, slightly translucent in part, pebble fragments to shards, trace very slow leaching faint light yellow white cut.
	Trace	SANDSTONE: light clear brown to light to medium brown, very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, 2% black lithic grains, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, rare 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1775 - 1780	95	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, rare trace sandstone lense, slightly bentonitic in part, rare ironstone, rare trace pyritic, sub blocky to platy to sub fissile, firm.
	Trace	CONGLOMERATE: rare trace light to dark gray brown to brown to cream, slightly translucent in part, pebble fragments to shards, trace very slow leaching faint light yellow white cut.
	5	SANDSTONE: light clear brown to light to medium brown to gray brown, very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, 2% black lithic grains, trace chert fragment, rare ironstone, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, rare 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1780 - 1785	90	SHALE: light to dark gray to black, silty to very silty in part, trace siltstone laminae to lense, rare trace sandstone lense, slightly bentonitic in part, rare ironstone, rare trace pyritic, sub blocky to platy to sub fissile, firm.
	Trace	CONGLOMERATE: trace light to dark gray brown to brown to cream, slightly translucent in part, pebble fragments to shards, trace very slow leaching faint light yellow white cut.
	10	SANDSTONE: light clear brown to light to medium brown to gray brown, very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, 2% black lithic grains, trace chert fragment, trace ironstone to sideritic cement, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, rare 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1785 - 1790	60	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, trace ironstone, sub blocky to blocky, platy to sub fissile in part, firm.
	40	SANDSTONE: light to dark gray brown to brown argillaceous and tight (50%), light clear brown to light to medium brown to gray brown (50%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, rare trace pyritic, rare ironstone, trace chert fragment, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare 10 to 12% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1790 - 1795	60	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	40	SANDSTONE: light to dark gray brown to brown argillaceous and tight (60%), light clear brown to light to medium brown to gray brown (40%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace pyritic, trace ironstone to sideritic cement, trace chert fragment, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare 10% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1795 - 1800	65	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	35	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace to 1% ironstone to sideritic cement, trace chert fragment, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, trace streaks 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1800 - 1805	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (60%), light clear brown to light to medium brown to gray brown (40%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone to sideritic cement, trace chert fragment, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1805 - 1810	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace to 1% ironstone to sideritic cement, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare 10% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1810 - 1815	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone to sideritic cement, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1815 - 1820	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (80%), light clear brown to light to medium brown to gray brown (20%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace to 1% ironstone to sideritic cement, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, trace streaks 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1820 - 1840	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (80%), light clear brown to light to medium brown to gray brown (20%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, trace streaks 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1840 - 1860	50	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	50	SANDSTONE: light to dark gray brown to brown argillaceous and tight (80%), light clear brown to light to medium brown to gray brown (20%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, rare trace ironstone, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, trace 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1860 - 1880	50	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	50	SANDSTONE: light to dark gray brown to brown argillaceous and tight (85%), light clear brown to light to medium brown to gray brown (15%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, rare trace ironstone, rare trace pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, rare 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1880 - 1900	50	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	50	SANDSTONE: light to dark gray brown to brown argillaceous and tight (85%), light clear brown to light to medium brown to gray brown (15%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, trace very pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, rare 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
1900 - 1920	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (80%), light clear brown to light to medium brown to gray brown (20%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, rare trace ironstone, trace very pyritic, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, trace 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1920 - 1940	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (80%), light clear brown to light to medium brown to gray brown (20%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, trace very pyric, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, trace 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1940 - 1960	40	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	60	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, trace very pyric, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1960 - 1980	35	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	65	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, trace very pyric, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare 10% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
1980 - 2000	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (70%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (30%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, rare 10 to 12% porosity, spotty brown oil staining.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
2000 - 2020	25	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	75	SANDSTONE: light brown grey, very fine grained grading to siltstone (70%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (30%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, ironstone lenses, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, rare 10 to 12% porosity, spotty brown oil staining.
2020 - 2040	20	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	80	SANDSTONE: light brown grey, very fine grained grading to siltstone (70%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (30%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, rare 10 to 12% porosity, spotty brown oil staining.
2040 - 2060	20	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	80	SANDSTONE: light brown grey, very fine grained grading to siltstone (70%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (30%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, rare 10 to 12% porosity, spotty brown oil staining.
2060 - 2080	20	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	80	SANDSTONE: light brown grey, very fine grained grading to siltstone (80%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (20%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, rare 10% porosity, spotty brown oil staining.
2080 - 2100	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (80%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (20%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, spotty brown oil staining.
2100 - 2120	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (80%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (20%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, spotty brown oil staining.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
2120 - 2140	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (80%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (20%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, spotty brown oil staining.
2140 - 2160	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (80%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (20%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity, spotty brown oil staining.
2160 - 2180	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (75%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (25%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, 7 to 9% porosity in part, minor 10 to 12% porosity, spotty brown oil staining.
2180 - 2200	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (75%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (25%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, 7 to 9% porosity in part, minor 10 to 12% porosity, spotty brown oil staining.
2200 - 2220	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (80%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (20%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity in part, rare 10% porosity, spotty brown oil staining.
2220 - 2240	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (85%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (15%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity in part, rare 10% porosity, spotty brown oil staining.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
2240 - 2260	30	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	70	SANDSTONE: light brown grey, very fine grained grading to siltstone (85%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (15%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, trace ironstone, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity in part, spotty brown oil staining.
2260 - 2280	35	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	65	SANDSTONE: light brown grey, very fine grained grading to siltstone (85%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (15%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, trace ironstone, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity in part, spotty brown oil staining.
2280 - 2300	35	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	65	SANDSTONE: light brown grey, very fine grained grading to siltstone (85%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (15%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, common pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity in part, spotty brown oil staining.
2300 - 2320	35	SHALE: medium to dark grey, subfissile to blocky, micromicaceous in part, silty grading to siltstone lenses, sandy in part, weakly bentonitic.
	65	SANDSTONE: light brown grey, very fine grained grading to siltstone (85%), light brown, very fine grained, trace fine Lower grains, microsucrosic, quartzose (15%) well sorted, subangular, silica cement in part, argillaceous in part, 2% black lithic grains, trace pyrite replacing matrix, tight to 3% porosity, 4 to 6% porosity in part, minor 7 to 9% porosity in part, spotty brown oil staining.
2320 - 2340	30	SHALE: light to dark gray to brown gray, trace black, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	70	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace very pyric, rare ironstone, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, minor streaks 7 to 9% porosity, rare 10% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
2340 - 2360	30	SHALE: light to dark gray to brown gray, trace black, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	70	SANDSTONE: light to dark gray brown to brown argillaceous and tight (65%), light clear brown to light to medium brown to gray brown (35%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace very pyric, rare ironstone, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, streaks 7 to 9% porosity, trace 10 to 12% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
2360 - 2380	30	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	70	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace very pyric, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, streaks 7 to 9% porosity, trace 10 to 12% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
2380 - 2400	30	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	70	SANDSTONE: light to dark gray brown to brown argillaceous and tight (70%), light clear brown to light to medium brown to gray brown (30%), very fine grained upper to lower, trace to occasional fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace very pyric, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, streaks 7 to 9% porosity, trace 10 to 12% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
2400 - 2420	25	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	75	SANDSTONE: light to dark gray brown to brown argillaceous and tight (60%), clear to light clear brown to light to medium brown to gray brown (40%), very fine grained upper to lower, occasional fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace very pyric, trace ironstone, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, streaks 7 to 9% porosity, trace 10 to 12% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.

<u>INTERVAL:</u>	<u>%:</u>	<u>DESCRIPTION:</u>
2420 - 2440	25	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	75	SANDSTONE: light to dark gray brown to brown argillaceous and tight (50%), clear to light clear brown to light to medium brown to gray brown (50%), very fine grained upper to lower, occasional fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale laminae, argillaceous in part, silty in part, 2% black lithic grains, trace ironstone, brown oil stain in part, tight to 3% intergranular porosity in part, 4 to 6% porosity in part, streaks 7 to 9% porosity, streaks 10 to 12% porosity, rare 13 to 15% porosity, rare specks yellow to very dull yellow fluorescence in part, fair to excellent leaching to streaming light yellow white cut.
2440 - 2460	25	SHALE: light to dark gray to brown gray, silty to very silty, sandy, slightly bentonitic in part, sub blocky to blocky, platy to sub fissile in part, firm.
	75	SANDSTONE: light to dark gray brown to brown argillaceous and tight (50%), clear to light clear brown to light to medium brown to gray brown (50%), very fine grained upper to lower, occasional fine grained lower grains, subangular, well to moderately sorted, siliceous cement in part, occasional quartz overgrowths, shale.

BIT RECORD

<i>BIT #</i>	<i>SIZE mm</i>	<i>TYPE</i>	<i>JETS</i>	<i>DEPTH out</i>	<i>DRILLED m</i>	<i>HOURS</i>	<i>RATE m/hr</i>	<i>CONDITION</i>
<u>SURFACE HOLE</u>								
1A	251	The Drill	5 x 9.5	437	437	6.5	67.23	0-0-0-0-0-0
<u>MONOBORE HOLE</u>								
2	159	The Drill	3 x 9.5 2 x 12.7	3307	2870	91.75	31.28	

DAILY OPERATIONS STATUS

DATE	0700 DEPTH	PROGRESS	OPERATION	DENSITY	VISCOSITY	W / LOSS	pH
			Well spudded 2013/1/3 14:00				
1/1/13	437	437	Pressure test	1080	64		
1/1/13	1137	700	Drilling 159mm build section	1110	67		
1/1/13	1711	574	Drilling 159mm build section	1110	63		
1/1/13	2353	642	Drilling 159mm monobore lateral	1095	64		
1/1/13	2777	424	Drilling 159mm monobore lateral	1120	64		
1/1/13	3234	457	Drilling 159mm monobore lateral	1100	63		
1/1/13	3307	73					

SURVEYS

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