

Stanley Associates Engineering Ltd.

WELL CONSTRUCTION DETAILS - SUMMARY

Location <u>WATSON LAKE, Y.T.</u>
Legal Description <u> </u>
U.T.M. <u>APPROX. 9:5168/66588</u>
Well No. <u>WATSON LAKE No. 1a</u>
Status of Well <u>PERMANENT - STANDBY</u>
Date Constructed <u>MAY 20, 1977</u>
Rig Type <u>FAILING 1000 ROTARY</u>
Contractor <u>MIDNIGHT SUN DRILLING</u>
Elev. Surface <u>2278.24'</u>
Elev. Top of Casing <u>2280.09'</u>
Elev. From : <u>LEVEL SURVEY</u>

E. log <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	Well Log	Casing Diagram
0-47 GRAVEL and V.COARSE SAND SOME TILL and WOOD CHIPS 47-50 TILL, GREY 50-85 SAND, MED.-COURSE and FINE GRAVEL, WOOD CHIPS 85-105 SAND, MINOR SILT, WOOD CHIPS.		

WELL CASING

Diameter of Reamed Hole <u>7 7/8"</u>
Depth of Reamed Hole <u>83'</u>
Casing I.D. <u>6.255"</u> Casing O.D. <u>6.625"</u>
Casing Length <u>70.5'</u>
Material <u>STEEL</u>
Wall <u>0.185"</u>
Joints <u>THREADED INSERT</u>
UngROUTED <input checked="" type="checkbox"/> , GROUTED <input type="checkbox"/> from <u> </u> to <u> </u>
Casing Top Above Ground <u>1.85'</u>

WELL SCREEN

Screen Diameter <u>6" NOMINAL</u>
Total Length <u>13.75'</u>
Effective Length <u>12.0'</u>
Material <u>STAINLESS STEEL</u>
Type <u>HOWARD SMITH TELESCOPIC</u>
Slot Arrangement <u>3-4' X No. 40 SLOT</u>
Attachment to Casing <u>6" LEAD PACKER</u>
Top of Screen <u>65.75'</u>
Gravel Pack Size <u>NIL</u>
Gravel Pack Amount <u>NIL</u>
Bottom of Screen <u>BAIL PLUG</u>
Bottom Depth <u>79.50'</u>

WELL DEVELOPMENT

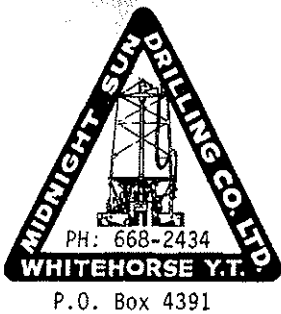
Remarks COMPLETION ZONE DEVELOPED BY MEANS OF JETTING, COMPRESSED AIR AND AIR SURGING.

PUMP TEST

Date 2728/05/1977 Pumping Rate 20 l/gpm
 Static W.L. 13.36' Water Temp. 38°F
 Pump Intake 54.75' Drawdown 27.50'
 Pump Time 18 hrs. Avail. D.D. 52.39'
 Specific Capacity 98 l/gpm/ft. @ 18 hrs.
 Water Condition While Pumping CLEAN, SAND-FREE
 Recovery: 90 min. to 13.40'
 Max. Long-term, Continuous Pump Rate 225 l/gpm
 Estimated Drawdown 34'
 Estimated Dynamic Water Level 48'
 Proposed Pump Intake 60'

WATER QUALITY (Mg/l)

Ca <u>40</u>	CO ₃ <u>—</u>
Mg <u>7</u>	HCO ₃ <u>—</u>
Na <u> </u>	SO ₄ <u>—</u>
Fe <u>0.57</u>	Cl <u>2.5</u>
Mn <u>0.6</u>	NO ₃ <u>< 0.02</u>
T.D.S. <u>90-141</u>	T. Hardness <u>130</u>
T. Alkalinity <u>140</u>	pH <u>8.2</u>



FIELD REPORT

Well 1A

Started.. May. 17.....1977.

Completed. May. 20.....1977..

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
Stanley and Associates	w/w/for town of	
	Watson Lake	
	Well #1	

FORMATION LOG			DESCRIPTION OF WORK	TIME			
FROM	TO	FORMATION		DATE	FROM	TO	HOURS
			MOVE to Watson Lake	May16	8am	6:30	9.5
0'	5'	gravel, till	(drilled 6" to 105'	May 17	9am	2:45am	8
5'	10'	gravel, till sandy	(reamed 7 7/8" to 69'			5:30	8.5
10'	15'	silt, sand, till	(set 6" to 69' fill in	May 18	7am	7pm	12
15'	22'	gravel, silt, sand, till	(hole to 82'				
22'	30'	gravel, sand	(pull screen and casing	May19	7am	8pm	13
30'	31'	peat	set 6" to 69' screen				
31'	45'	gravel, till clay	stuck				
45'	47'	peat	(setting screen, developing	May20	7am	10pm	15
47'	50'	gravel, till	moving to T.N.#2				
0'	51'	sand					
51'	53'	sand, gravel					
53'	53'6"	peat					
53'6"	70'	sand, gravel, peat, wood layers					
70'	85'	sand					
85'	105'	sand, silt, wood layers					

Rcrd. of Casing & Pipe				Remarks:
Size	Type	Size	Type	
6"				sampled 40' gravel till
				51' sand
Feet	Inch	Feet	Inch	70' sand clean and wet
8	10			screen 3 4'6"x5' 13'9" total 40 slot
20'	10			casing 1'10" above ground
20	10			bottom of casing 68'2"
20	00			bottom of screen 79'
70'	6"			
-	6"			
70'	00			
				STATIC LEVEL
				Ground level
				Top of casing
				Total Rig Time
				hrs.
				Total Standby
				hrs.
				Drilling Mud
				6 sacks

SIGNATURES

MIDNIGHT SUN.....
TITLE.....

CLIENT.....
TITLE.....

Table 1: Well Drilling and Completion Summary
Town of Watson Lake
GUDI Assessment for Wells 1, 1A, 3 and 4

Well ID	Date Drilled	Lithology (m)	Screened Interval (m)	Slot Size ¹	Pumping Rates
Well 1	December 1973	0 - 5.8 Gravel, Boulders, some clay 5.8 - 12.8 Gravel and Boulders	8.8 - 13	0.125" (125 slot)	11.7 L/sec (186 USgpm)
Well 1A	May 1977	0 - 14.3 Gravel and Sand 14.3 - 15.2 Till 15.2 - 25.9 Sand and Gravel 25.9 - 32 Sand, trace silt & wood	20 - 23.2	0.040" (40 slot)	10.1 L/sec (160 USgpm); later reduced to 8.3 L/sec (132 USgpm)
Well 2	September 1993	0 - 24.9 Gravel 24.9 - 25.6 Silt	21.85 - 24.9 ²	0.200" (200 slot)	11.9 L/sec (189 USgpm)
Well 3	November 2005	0 - 11.9 Sand and Gravel 11.9 - 16.5 Silt and Sand (Till) 16.5 - 23.8 Silty Sand 23.8 - 29 Silt and Sand, wood 29 - 35 Peat 35 - 36 Silty Sand 36 - 41.1 Sand and Gravel	36.4 - 38.8	0.080" (80 slot) 36.4 - 37.6 m 0.040" (40 slot) 37.6 - 38.8 m	12.7 L/sec (202 USgpm)
Well 4 ³	April 2012	0 - 12.2 Sand and Gravel 12.2 - 13.8 Till 13.8 - 22.9 Gravelly Sand 22.9 - 29.9 Sand, trace gravel	28.3 - 31.34	0.060" (60 slot)	30 L/sec (475 USgpm) ⁴

Notes:

Well details from EBA 2006, unless otherwise noted.

1. Slot sizes are given in 1/1000 inch. So, a 100 slot well screen is 1/10 inch or 2.54 mm. The maximum typically manufactured slot size is 250 slot or 1/4 inch, 6.25 mm.

2. Screen depths from RCPL 1993.

3. Well information from AECOM, 2012.

4. Estimated long-term yield