

Erratum for OFR 1998-09

The following lithological description is missing from log W98-2 on page 11 of the report.

DRILLED DEPTH (metres)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
5.5	7.0	155	155	Till	Dark grey, SAB, sandy silty clay, moderately stiff and very plastic, unoxidized, massive, slightly calcareous, moderately pebbly, clasts: quartzite, granites, minor limestone

**AUGER CORE DESCRIPTIONS, 1998 DRILLING,
PEERLESS LAKE MAP SHEET (NTS 84B),
NORTH-CENTRAL ALBERTA**

Alberta Geological Survey Open File Report 1998 - 09

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SUMMARY

This report presents the lithologic descriptions of core samples from a drilling program carried out during October, 1998 in the Peerless Lake area (NTS 84B) of North-central Alberta. The drilling was in support of the Wabasca Quaternary project to collect shallow subsurface information on the surficial geology and drift stratigraphy. Drilling was done at seven sites located in the northeast and southwest parts of the map sheet.

A truck-mounted auger drilling rig was used to drill to a maximum depth of 43.6 m. Core was collected from holes at five sites and two additional sites yielded auger flight samples. The core was lithologged in the field, boxed and then transported to Edmonton for further inspection and sampling. The core drilling incorporated a CME 1.52 m (5 foot) split barrel which cut a 76mm (3 inch) diameter core and provided continuous coring from surface.

Samples of about 400 grams were selected from each core and will be submitted for geochemical, texture and matrix carbonate analyses. Additional larger bulk samples of about 30 kilograms will be submitted for diamond indicator analysis. Results of these analyses will be presented in a future report.

ACKNOWLEDGEMENTS

The authors wish to thank Gordon Jean for his assistance with field preparations and logistics. His attention to details in making sure that drilling ran smoothly is greatly appreciated. We would also like to thank Ilona Ranger for help in preparation of the figures and logs. Canadian Geological Drilling Ltd. from Edmonton did the auger drilling.

INTRODUCTION

North-central Alberta has been the focus of recent mineral interest with the discovery of diamondiferous kimberlite in 1997 by Ashton Mining of Canada Ltd. (Carlson et al., 1998). Because of the lack of Quaternary information on the area and industry's need for this information, the Alberta Geological Survey (AGS) is carrying out a surficial geology, and drift thickness and stratigraphy study of the Wabasca/Red Earth region (Figure 1). This includes the Peerless Lake map sheet and will complement a parallel AGS study of the mineral potential of the same area by Eccles (in prep.).

As part of the Quaternary study, a small-scaled drilling program was carried out in October, 1998 to collect shallow subsurface information on the drift sediments in the Peerless Lake map sheet (NTS 84B). The borehole locations are shown in Figure 1. A total of 7 holes were drilled using a truck-mounted auger drilling rig (Table 1). Core was collected from five of the holes and auger flight samples from the other two. Core drilling was done with a hollow stem auger utilizing a CME 1.52 m (5 foot) split core barrel to obtain 76 mm (3 inch) diameter core. Maximum depth drilled was 43.6 m and coring was done continuously from surface. Solid stem auger drilling was used at two sites which yielded cuttings in place of core.

The core was logged in the field (Figure 2), boxed and returned to Edmonton for further analysis. All holes with the exception of W98-6 and W98-7 were backfilled immediately after drilling. At these two sites, piezometers were installed as part of a groundwater monitoring network for a project being carried out by the Biology Department from the University of Alberta. The core was then sampled for geochemical, texture and matrix carbonate analyses, and diamond indicator minerals. Results of these analyses will be made available in a future report.

RESULTS

Drilling this year focused on the northeast and southwest areas of the Peerless Lake map sheet (NTS 84B). The results from this years' drilling are a followup to auger drilling that was done last year in the Red Earth region by Pawlowicz and Fenton (1998). The borehole locations from 1997 and 1998 drilling are shown in figure 1, however only the results from this year are presented in

this report. None of the holes penetrated into the bedrock; all terminated in glacial sediments and their characteristics are summarized in generalized lithocolumns in Figure 1.

Along the western flank of the Peerless Lake highland, in the northeastern part of the map sheet, are thick deposits of glaciofluvial sand as indicated in hole W98-1 and in outcrop at two nearby gravel pits. On top of the highland, in the vicinity of Peerless Lake, are thicker deposits of till with interbeds of sand as shown in holes W98-2 and W98-3.

In the southwest portion of the map sheet, holes W98-4 and W98-5 intersected about 25 m of till overlying thick sands. Thin lacustrine sediments (<5 m) were found to mantle the till in holes W98-5 and W98-7. Thick gravels and sands were encountered at surface in hole W98-6 to the west, which is in an area of sinuous ridges trending southwest to northeast. Till was found to underlie the gravel at 10.6 m. The general stratigraphy of this region, as determined by borehole data and surface observations can be summed up as thick fluvial sediments overlain by a deposit of till, which is overlain by glaciolacustrine and glaciofluvial sediments deposited during the final melting of the Laurentide glacier.

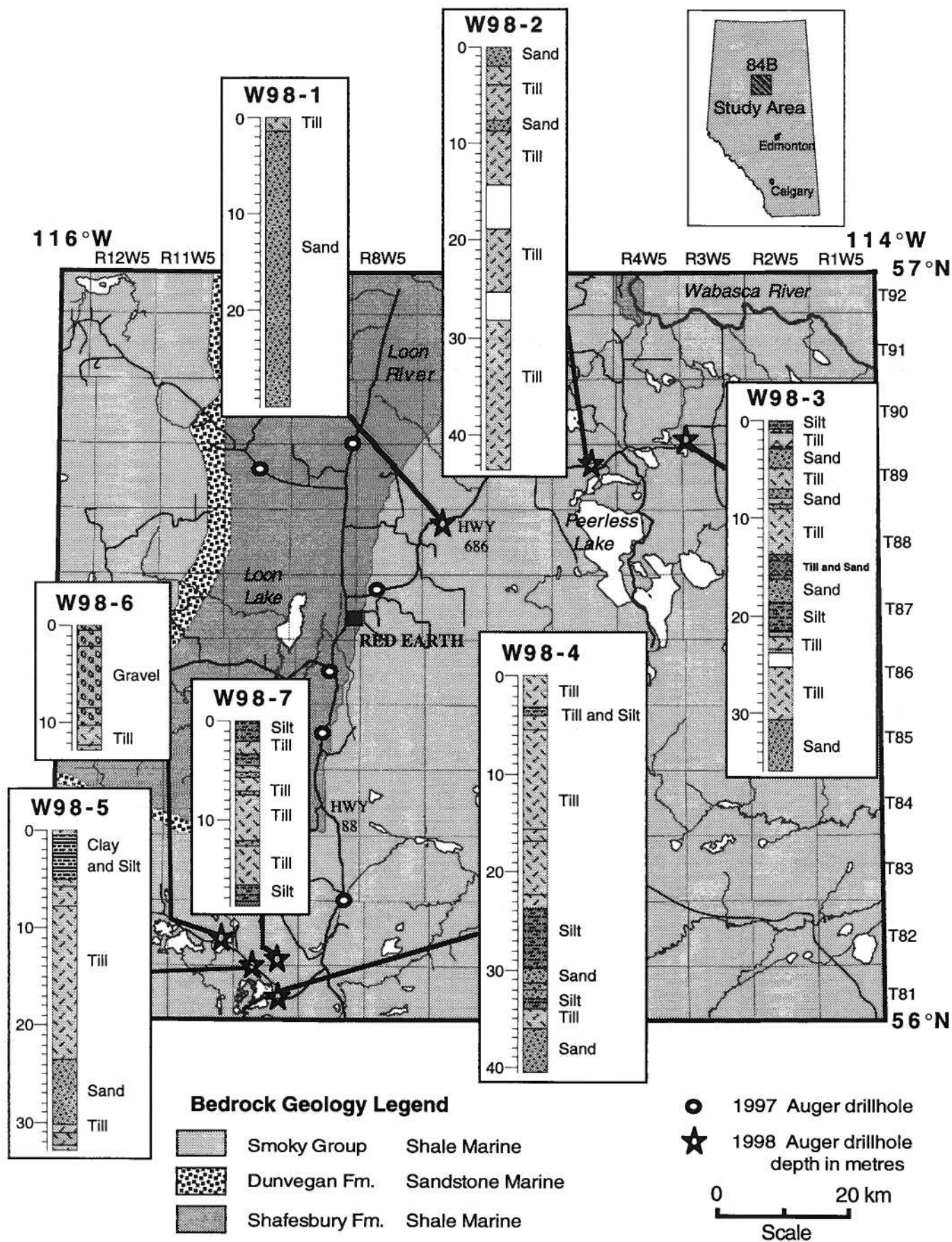


Figure 1. Borehole locations in Peerless Lake map sheet (NTS 84B), and lithocolumns (bedrock geology from Green, 1972).



Figure 2. Field photographs of auger drilling rig and core logging.

Table 1. Location data for auger drill holes.

HOLE #	SAMPLE TYPE	DLS LOCATION	LONGITUDE (GPS)	LATITUDE (GPS)	APPROXIMATE ELEVATION (m)	DEPTH OF HOLE (m)
W98-1	core	14-29-88-7W5	115.076250	56.665700	634	29.9
W98-2	core	14-20-89-5W5	114.757950	56.738350	721	43.6
W98-3	core	4-6-90-3W5	114.479650	56.771583	738	23.8
W98-3A	core	4-6-90-3W5	114.479650	56.771583	738	36.0
W98-4	core	3-23-81-10W5	115.452750	56.030567	663	40.5
W98-5	core	16-32-81-10W5	115.451083	56.037167	671	32.9
W98-6	cuttings	1-14-82-11W5	115.593190	56.103066	661	12.8
W98-7	cuttings	2-3-82-10W5	115.470109	56.073986	665	18.9

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- Eccles, D.R. (in prep). Mineral Resource Infrastructure Series, Report No. 1: Peerless Lake Area, NTS 84B. Alberta Geological Survey, Alberta Energy and Utilities Board.
- Green, R. (1972). Geological map of Alberta. Alberta Geological Survey map 027.
- Pawlowicz, J.G and Fenton, M.M. (1998). Auger core lithologs from the Wabasca/Red Earth area, north-central Alberta. Open file report 98-03, Alberta Geological Survey, Alberta Energy and Utilities Board, 26 p.

BOREHOLE LITHOLOGS

W98-1

W98-2

W98-3

W98-3A

W98-4

W98-5

W98-6

W98-7

PROJECT: Wabasca	DATA NO: W98-1	LOGGED BY: J. Pawlowicz	DATE: 14 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig	Continuous core using; CME 5' core barrel
LOCATION: NTS 84B	SURFACE ELEVATION: 634 m (approx.) from 1:50,000 map		Total depth: 29.9m
LOCATION: GPS	LONGITUDE: 115.07526° E	LATITUDE: 56.66603° N	
COMMENTS ON LOCATION: Peerless Lake road, Hwy 686, 2.5km east of Red Earth fire tower, old burrow pit, western flank of Peerless highland, mixed forest. Water table likely at 17.7m (58').			

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
0	0.9	100	12	topsoil	Ao horizon, black organic, leafy, rootlets
			30	silt	Ae horizon, leached, light grey-brown, dry, loose
			25	silt	B soil horizon, clayey silt, massive, orange-brown, oxidized
			28	till	B horizon, sandy silty clay, brown, oxidized, non-calcareous, minor pebbles
			5	till	C horizon, calcareous, sandy clay, massive, minor pebbles, oxidized, brown
0.9	2.4	125	15	sand	Fine to medium-grained, brown, loose, abrupt contact with above unit
			10	silt	White-brown, massive, strongly calcareous
			71	sand	Fine grained, orangish-brown, strongly oxidized, 10° bedding, minor subhorizontal calcareous fractures
			35	sand	Fine grained, light grey-brown, unconsolidated, subhorizontal bedding, high angle fractures, minor silt beds
2.4	4.0	65	27	sand	Fine grained, light brown, massive noncalcareous, loose
			12	silt	Grey-brown, oxidized, sharp upper and lower contacts, 5° bedding
			26	sand	Fine grained, light brown, Fe oxidized subhorizontal bedding and fractures, loose and clean sand
4.0	5.5	100	100	sand	Fine to med. grained, light brown, oxidized, 5-10° bedding, loose and very clean, 2-10cm thick silt beds
5.5	7.0	95	95	sand	SAB, fine to med. grained, brown, becoming darker brown in lower 30cm, more abundant silty interbeds, noncalcareous, oxidized
7.0	8.5	90	70	sand	Med. to coarse grained, fining upward, light pink-brown, igneous grains, massive, minor pebbles (up to 2cm), abrupt lower contact

* SAB - Same As Before

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
8.5	10.1	80	80	sand	Med. to coarse grained, faint subhorizontal bedding, light pinkish-brown, igneous grains, few black coal grains throughout, coal grain concentration at bedding planes, loose, very clean sand, 60° fracture, noncalcareous (lower 10cm is strongly calcareous, whitish-brown)
10.1	11.6	100	50	sand	Fine to med. grained, 0-10° bedding, light brown, oxidized, 1 carbonaceous rich bed (0.5cm thick) near upper contact, noncalcareous
			50	sand	Med. to coarse grained, light pinkish-brown, massive, minor pebbles (Athabasca SS), very loose, clean sand
11.6	13.1	75	75	sand	Very coarse grained, pebbly, pinkish-brown with strongly oxidized horizontal beds, subhorizontal bedding, loose and very clean, strongly calcareous beds at top and base, pebbles from 2mm to 2cm, quartzite, igneous, Athabasca SS, black chert
13.1	14.6	110	15	sand	SAB, pebbly
			10	sand	Med. grained, light pinkish-brown
			10	sand	Fine grained, grey-brown, brown and black carbonaceous, subhorizontal bedding, oxidized
			58	sand	Fine grained, numerous interbeds of clayey silt, subhorizontal bedding, brown, oxidized, noncalcareous, minor carbonaceous grains throughout
			17	silt	Horizontal bedding, minor thin clay beds, minor fine grained sand laminae, strongly oxidized bedding, noncalcareous
14.6	16.2	95	10	silt	Dark grey-brown, massive, minor clay, oxidized, noncalcareous
			85	sand	Fine to coarse grained, fining upward, light grey-brown and pinkish-brown towards the base, horizontally bedded, oxidized, 5cm thick brown silt bed near base
16.2	17.7	115	115	sand	Interbedded fine and med. grained sand, brown and grey-brown, horizontal beds and crossbeds (low angle), 5cm brown silt bed at top, upper 35cm has numerous laminae, abundant high angle fractures, noncalcareous
17.7	19.2	105	40	sand	Very fine grained sand, olive brown, oxidized, first sign of moisture, silty, horizontally bedded, sharp 45° lower contact, noncalcareous
			65	sand	Med. to coarse grained, oxidized, strongly oxidized subhorizontal bedding, light pinkish-brown

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
19.2	20.7	95	95	sand	Med. grained, light brown, subhorizontal brown bedding, minor black carbonaceous bedding, strong Fe oxidized beds, 45° fractures, loose and very clean
20.7	22.3	95	55	sand	Coarse grained, minor pebbles, lower 20cm is very coarse grained (2-3mm granules), horizontally bedded, strongly oxidized beds, upper 15cm has abundant coal and carbonaceous beds, sharp horizontal lower contact
			23	silt	Dark grey-brown, horizontally bedded, minor clay, strongly oxidized horizontal sand bed (1cm thick)
			17	sand	Fine grained, brown, oxidized, strongly oxidized horizontal beds, saturated, loose and clean
22.3	23.8	0		sand?	Likely sand, saturated, washing out
23.8	26.8	0		sand?	Drilled down, plugged hole, likely sand
26.8	29.9	0		sand?	Drilled down - no sample, likely same sand as above, saturated fine sand - abandoning hole, caving T.D. = 29.9m (98')

PROJECT: Wabasca	DATA NO: W98-2	LOGGED BY: J. Pawlowicz	DATE: 14 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig	Continuous core using; CME 5' core barrel
LOCATION: NTS 84B	SURFACE ELEVATION: 721 m (approx.) from 1:50,000 map		Total depth: 43.6 m
LOCATION: GPS	LONGITUDE: 114.75816° E	LATITUDE: 56.73832° N	
COMMENTS ON LOCATION: Peerless Lake road, Hwy 686, 45km east of Red Earth, clearing on south side of road in pine and black spruce forest.			

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
0	0.9	100	7	sand	Brown, clayey topsoil (rooted)
			65	sand	Interbedded fine and coarse grained, orange-brown, strongly oxidized, 5° bedding (1-2cm igneous clast), noncalcareous
			3	sand	Fine grained, brown, sharp upper and lower contacts
			5	clay	Dark brown, massive, noncalcareous, sharp lower contact (5°)
			20	sand	Fine to med. grained, orange-brown, strongly oxidized, 5° bedding
0.9	2.4	75	40	sand	SAB, med. to coarse grained, orange-brown
			5	sand	Brown, med. grained, clayey
			10	silt	Brown, massive, oxidized, saturated, gradational upper and lower contacts, slightly calcareous
			20	till	Brown, massive, clayey silt till, very soft, saturated, oxidized, moderately calcareous, very sandy
2.4	4.0	155	100	till	SAB, brown, clayey silt till, very soft, oxidized, massive, few sand stringers -1cm thick, (strongly oxidized orange-brown), 2-60° Fe oxidized fractures, clasts include limestone, granites, coal flecks and rusty orange flecks, top 20 cm moderately calcareous but the remainder is only slightly calcareous
			55	till	Dark grey with olive brown subhorizontal banding, transition zone of oxidation, sandy clay, moderately stiff, slightly calcareous, clasts include igneous, quartzite, green and grey sandstone and siltstone
4.0	5.5	155	155	till	Dark grey, massive, silty clay, sandier zones throughout (~10-20cm thick), unoxidized but has strongly oxidized sand pockets (2-3cm diameter), clasts include limestone, igneous, Athabasca SS, black chert, slightly calcareous, moderately stiff and plastic

* SAB - Same As Before

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
7.0	8.5	100	55	till	SAB, dark grey, massive
			45	sand	Med. to coarse grained, saturated, loose, pebbly, minor clay masses, poorly sorted, clasts of igneous, limestone, and quartzite (up to 3cm), very sharp (45°) upper contact
8.5	10.1	135	135	till	SAB, massive, dark grey, sandy, silty clay till, slightly calcareous.
10.1	11.6	40	40	till	SAB, dark grey, massive
11.6	13.1	100	100	till	Dark grey, massive, sandy clay till, slightly calcareous, clasts include igneous, limestone, quartzite, stiff and very plastic - hole is sluffing. Sand from above is filling up the hole.
13.1	14.6	85	85	till	SAB, dark grey, massive, slightly calcareous
14.6	16.2	0		sand?	Unsure about sample, possible sand - hole is very wet and keeps filling with sand
16.2	17.7	0		sand?	Drilled down, possibly sand
17.7	19.2	20	20	till	SAB, dark grey, sandy, stiff and very plastic, slightly calcareous, one large cobble (5cm diameter) of quartzite in shoe
19.2	20.7	150	150	till	Dark grey, sandy clay till, stiff and plastic, massive, slightly calcareous, looks same as above till except there are now minor inclusions of local weathered bedrock clasts (siltstone and sandstone, clasts up to 1cm) pebbles include igneous, quartzite, sandstone, minor limestone
20.7	22.3	150	150	till	Dark grey, silty clay till, massive, stiff and plastic, clasts include igneous, quartzite, limestone, minor dark grey shale clasts, moderately calcareous - olive brown oxidized fracture zones, oriented ~20°... possibly old weathering horizon?
22.3	23.8	155	155	till	SAB, same olive brown, oxidized fracture zones, few dark grey shale clasts and greenish-grey siltstone
23.8	25.3	90	90	till	SAB, very faintly oxidized (olive brown) in top 10cm, silty clay till, stiffer with depth, moderate to strongly calcareous, massive, minor dark grey shale clasts, one green calcareous siltstone clast, pebbles include igneous, quartzite, limestone
25.3	26.8	0			Lost core, possibly sand
26.8	28.4	0			Drilling down 5' w ith plug on to open up the hole - possibly in sand, last 4' of run drilling into something hard

Continuation W98-2

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
28.4	29.9	155	155	till	Dark grey, clayey silt till, massive, slightly calcareous, dense and stiff, few pebbles (igneous, quartzite, limestone and dark grey shale clasts) -this till appears to have fewer pebbles and granules than the till above. Last 50cm is more clayey (softer drilling) -in upper portion, one large black shale clast ~4cm long
29.9	31.4	155	70	till	SAB, dark grey, slightly calcareous, clayey silt till, few pebbles and granules, same clast lithologies as above
			85	till	Same till as above, more abundant pebbles and granules than above till, brown, oxidized, sandstone clast, slightly to moderately calcareous
31.4	32.9	155	155	till	SAB, clay-silt till, stiff and dense, numerous pebbles and granules (quartzite, igneous, black shale, limestone), slightly calcareous
32.9	34.4	155	155	till	SAB, dark grey, clayey silt, blocky, fractured more than above, breaks easily, not plastic, numerous granite clasts, quartzite, dark grey shale, limestone, massive, slightly calcareous
34.4	36.0	155	155	till	SAB, dark grey, clayey silt till, higher moisture than above unit, massive, stiff, clasts include granite, quartzite, dark grey shale, minor limestone, few yellow-brown siltstone clasts <0.5cm
36.0	37.5	155	155	till	SAB, dark grey, clayey silt, stiff and dense, massive, slightly calcareous, pebbles and granules include igneous, quartzite, limestone, shale, few brown siltstone clasts, pyritic nodule (2mm)
37.5	39.0	150	150	till	SAB, but drier, breaks along fractures into coarse, blocky fragments, few pyrite flecks and black shale clasts
39.0	40.5	95	95	till	SAB, dark grey, clayey silt till, massive, dense and stiff, clasts include igneous, quartzite, black shale, minor brown siltstone clasts, large gneiss cobble (6cm diameter) at base of run, white calcareous deposits, slightly calareous matrix
40.5	42.1	140	140	till	SAB
42.1	43.6	155	155	till	SAB, slightly calcareous, denser than above - T.D. = 43.6m (143') - no more auger to drill any deeper

PROJECT: Wabasca	DATA NO: W98-3	LOGGED BY: J. Pawlowicz	DATE: 16 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig	Continuous core using; CME 5' core barrel
LOCATION: NTS 84B	SURFACE ELEVATION: 738 m (approx.) from 1:50,000 map		Total depth: 23.8m
LOCATION: GPS	LONGITUDE: 114.47800° E	LATITUDE: 56.77144° N	
COMMENTS ON LOCATION: Trout Mountain area, Peerless highland, 200m north of Allcamp site, clearing on east side of road in pine forest.			

DRILLED		CORE	DESCRIBED	LITHOLOGY	COMMENTS
FROM	TO				
0	0.9	90	45	fill	Dark brown, sandy clay, stony, roots and twigs
			24	sand	Clayey sand, subhorizontal bedding, pebbles and granules, noncalcareous, brown, oxidized
			4	silt	Grey
			3	silt	Brown, oxidized
			3	clay	Brown, oxidized Clay and silt is horizontally bedded
			11	till	Brown, sandy clay, oxidized, granules and pebbles, noncalcareous, minor thin 3mm thick subhorizontal clay beds
0.9	2.4	155	155	till	Sandy clay, brown, strongly oxidized, massive, stiff and plastic, moist sample, lower 50cm is slightly calcareous, clasts include igneous, quartzite, rusty sandstone, limestone, minor thin sand lenses
2.4	4.0	120	58	till	SAB, strongly oxidized sand stringers, slightly calcareous, massive, sharp horizontal contact with unit below
			62	sand	Fine to med. grained, brown, strongly oxidized, saturated, massive, clean, top 10cm has thin till interbeds and strongly oxidized horizontal fractures
4.0	5.5	125	55	sand	SAB
			18	till	Dark grey, sandy clay, stiff and plastic, unoxidized with oxidized brown mottling, massive, moderately calcareous, has an abrupt contact with above unit, clasts include igneous, quartzite, limestone
			52	till	SAB, dark grey, unoxidized
5.5	7.0	150	150	till	SAB, clay till, color changing from dark grey at top to dark olive grey at base of interval, massive, strongly oxidized, subhorizontal fracture zones, noncalcareous, zones with higher sand and granule content throughout (30cm thick), clasts include igneous, quartzite, limestone, minor brown oxidized sandstone clasts

* SAB - Same As Before

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
7.0	8.5	60	35	sand	Fine grained, brown, strongly oxidized, very loose, saturated, (lost recovery likely in sand)
			25	till	Mottled dark grey and dark olive grey, massive, slightly oxidized, same clast lithologies as above, dark rusty brown clast or stringer, carbonaceous ?, large (6cm) quartzite cobble caught in shoe
8.5	10.1	125	15	sand	Coarse grained, grey, pebbly, loose, saturated
			110	till	Dark grey, sandy clay till, massive, noncalcareous, 2- subhorizontal sand lenses (1cm thick, coarse grained and pebbly), clasts include igneous, quartzite, limestone, minor sandstone and siltstone
10.1	11.6	150	150	till	SAB, minor oxidized brown siltstone clasts and dark grey shale clasts
11.6	13.1	150	43	till	Dark grey, silty clay, massive, stiff, unoxidized, noncalcareous, 70° calcareous sand lense (sand fill fracture?) 0.5cm thick, clasts include igneous, quartzite, limestone, and weathered brown shale
			10	till	SAB, very sandy and pebbly
			97	till	SAB, dark grey, silty clay till, olive grey, slightly oxidized zones, minor sandy clayey lenses, slightly calcareous, massive, same clast lithologies as above
13.1	14.6	150	50	till	Silty clay till, mottled dark grey and dark olive grey
			10	sand	Coarse grained, dark grey brown, pebbles (3cm), clasts include igneous and quartzite, saturated, loose
			90	till	SAB, dark grey, silty clay, massive, slightly calcareous, dark olive grey oxidized zones along subhorizontal fractures (2mm apart)
14.6	16.2	90	60	till	SAB, dark grey, unoxidized, silty clay till
			30	till/sand	Dark grey silty clay till, numerous coarse grained sand lenses throughout, oriented from 10° - 60°, dark grey brown sand
16.2	17.7	100	90	sand	Coarse grained, few pebbles, mostly igneous and quartzite, grey-brown, loose and massive
			10	till/sand	Dark grey, sandy clay till with numerous sand filled fractures
17.7	19.2	150	95	sand	Coarse grained, dark grey-brown, igneous and quartzite grains, slightly calcareous, loose, lower 30cm is mixed with clay till
			15	till	Sandy clay till, dark brownish grey, massive igneous and quartzite clasts, numerous brown weathered sandstone clasts

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
			38	clay	Dark grey with subhorizontal olive grey silt interbeds, stiff, noncalcareous, slightly oxidized, minor pebbles, 3cm sand lense
			2	till	SAB, sandy clay, stiff, massive, moderately to strongly calcareous
19.2	20.7	155	45	clay	Silty, massive, mottled dark grey and dark grey-brown, unoxidized, stiff, few granules and pebbles, slightly calcareous
			110	silt	Clayey, dark brownish grey, has some dark grey deformed, thin clay beds (0.5cm thick), 3cm sand bed (fine grained), -20cm from top of unit, massive, unoxidized, slightly calcareous, lower 30cm polished clay fractures, thin deformed sand lenses in lower portion, no pebbles or granules in silt
20.7	22.3	150	90	silt	SAB
			2	sand	Fine grained, grey-brown
			20	clay	Sandy, massive, dark grey with olive grey speckles
			38	till	Silty clay, dark grey, massive, pebbles and granules, clasts include quartzite, igneous, siltstone, weathered olive sandstone, stiff and plastic, noncalcareous, sandy clay zones, igneous pebbles to 3cm diameter, large stone in shoe, deforming core
22.3	23.8	135	30	till	Silty clay till, faint bedding dipping 25°, bedding dark grey and dark olive grey, minor fine grained sand beds at same dip angle, slightly calcareous
			50	till	Dark grey, clayey silt till, massive, quartzite, igneous, limestone clasts, slightly calcareous, minor dark grey shale clasts
			5	sand	Very fine grained, dark grey
			10	till	Sandy clay, dark grey, massive, slightly to moderately calcareous, clasts include igneous, quartzite, limestone, weathered brown sandstone clasts, contains thin deformed fine grained pinkish-grey sand lenses
			40	gravel	Coarse gravel, cobbles up to 7cm diameter, hard drilling, clasts include igneous, quartzite, limestone T.D. = 23.8m (78'). Hit something hard, large boulders from gravel bed. Auger refusal. - moved rig over 5m, to drill through gravel bed.

PROJECT: Wabasca	DATA NO: W98-3A	LOGGED BY: J. Pawlowicz	DATE: 17 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig CME 5' core barrel	
LOCATION: NTS 84B	SURFACE ELEVATION: 738 m (approx.) from 1:50,000 map		Total depth: 36.0 m
LOCATION: GPS	LONGITUDE: 114.47800° E	LATITUDE: 56.77144° N	
COMMENTS ON LOCATION: same location as W98-3, moved rig over 5 m to drill deeper.			

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
0	25.3	0			Drilled down with plug past gravel bed at 23.8m See log for hole W98-3
25.3	26.8	155	22	till	Dark grey, massive, clayey till, unoxidized, igneous and quartzite clasts, 4cm rusty sandstone clast, slightly to moderately calcareous
			9	clay	Dark grey, massive, noncalcareous
			9	till	SAB
			6	clay	SAB clay
			18	till	SAB, silty clay till
			12	clay	SAB clay
			10	till	SAB till
			7	clay	SAB
			31	till	Clay till
			10	sand	Very fine grained, clayey, moderately calcareous
			23	till	SAB, dark grey, silty clay till, igneous, quartzite and limestone clasts, moderately calcareous
26.8	28.4	90	90	till	Sandy silty clay till, dark grey, massive, stiff, dense and plastic, abundant pebbles and granules, moderate to strongly calcareous, light grey siltstone found in lower portion of till, till is very hard, clasts include igneous, quartzite limestone and oxidized sandstone
28.4	29.9	150	150	till	SAB, strongly calcareous, very stiff and hard, minor dark grey shale clasts
29.9	31.4	155	75	till	SAB, dark grey, silty clay, hard and dense, massive, moderately to strongly calcareous, clasts include igneous, quartzite, limestone, black chert
			80	sand	Dark grey brown, fine to medium grained, fining up, massive, igneous grains, loose, moderately clean, till beds 5-10cm thick
31.4	32.9	0		sand?	Likely sand as above

* SAB - same as before

Continuation W98-3A

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
32.9	34.4	0		sand?	Likely sand as above
34.4	36.0	0		sand?	Likely sand as above - abandon hole T.D = 36.0m (118')

PROJECT: Wabasca	DATA NO: W98-4	LOGGED BY: J. Pawlowicz	DATE: 19 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig CME 5' core barrel	
LOCATION: NTS 84B	SURFACE ELEVATION: 663 m (approx.) from 1:50,000 map		Total depth: 40.5 m
LOCATION: GPS	LONGITUDE: 115.45275° E	LATITUDE: 56.03056° N	
COMMENTS ON LOCATION: Utikima lake area, old transportation gravel stockpile pad on Hwy 750, low relief, hummocky terrain. Piezometer nest for water table installed.			

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
0	0.9	100	45	fill	Dark brown, sandy clay, stoney
			8	fill	Brown sand, medium grained
			47	diamict	Clayey sand, minor pebbles, rooted, massive, oxidized brown with white calcareous deposits (possibly fill?)
0.9	2.4	85	85	diamict	Sandy clay, brown, oxidized, faint 10° bedding, minor pebbles, moderately to strongly calcareous, minor white calcareous deposits along 10° bedding planes, clasts include quartzite, limestone, igneous, minor coal
2.4	4.0	155	130	till	Sandy silty clay till, massive, mottled brown and dark brown, oxidized, strongly oxidized high angle fractures, moderately calcareous at top becoming slightly calcareous at base, strongly weathered, one sand lense 1cm thick, clasts include igneous, sandstone, limestone, coal, rotten limestone
			25	clay	Dark brown, finely bedded (10°) silt and sand beds, strongly oxidized, few clasts, noncalcareous
4.0	5.5	135	15	sand	Clayey, massive, dark brown, oxidized, broken up, noncalcareous
			90	till	Dark olive grey, oxidized, sandy silty clay, massive, strongly oxidized sand stringers (moderately calcareous), lightly calcareous, clasts include igneous, quartzite, limestone, minor coal and shale, few rusty granules
			20	sand/clay	Interbedded dark olive grey clay and iron oxidized sand, rhythmic bedding 2cm apart, few clasts
			10	till	SAB
5.5	7.0	155	155	till	Dark grey-brown, sandy silty clay, massive, moderately stiff and plastic, slightly oxidized, slightly calcareous, strongly oxidized sand lense in top 10cm, minor thin grey sand lenses, clasts include igneous, quartzite, limestone

* SAB - Same As Before

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
7.0	8.5	155	155	till	SAB, dark brownish-grey, stiff and plastic, minor thin grey sand lenses as above
8.5	10.1	65	65	till	SAB, dark grey... A rock in shoe prevented full recovery
10.1	11.6	30	30	till	SAB, Rock still in shoe
11.6	13.1	0			Drilled down 5' with plug, trying to dislodge rock
13.1	14.6	155	65	till	SAB, sandy silty clay, minor thin sand lenses
			80	silt?	Dark grey, clayey and sandy, few granules and pebbles, massive, slight to moderately calcareous, possibly till.
			10	till	SAB, silt till, sandy with minor clay, pebbles and granules, massive, slightly calcareous
14.6	16.2	155	155	till	Dark grey, sandy silt till, minor clay, few pebbles and granules, is moist but not saturated, moderately calcareous, clasts include igneous, quartzite, limestone
16.2	17.7	155	65	till	SAB, very silty, dark grey, massive, very few stones or granules, moderate to strongly calcareous
			90	till	Dark grey, clayey silt till, sandy, pebbles and granules, massive, moderately calcareous, clasts include igneous, limestone and quartzite
17.7	19.2	155	155	till	SAB, dark grey, clayey silt till, sandy, minor thin sand lenses, igneous, quartzite and limestone clasts (3cm), minor dark grey shale and iron stone clasts, massive, moderate to strongly calcareous
19.2	20.7	150	150	till	SAB, silty clayey sandy till, more clayey at base of interval, moderately calcareous, massive, dark grey shale clasts, few igneous, quartzite and limestone clasts,
20.7	22.3	150	150	till	SAB, Clayey silt till, stiff, moderately calcareous, massive, cobbles up to 5cm in diameter, minor thin sand lenses, minor dark grey shale clasts
22.3	23.8	110	35	till	SAB, sandy, silty, broken up. Drilling on large cobble causing poor recovery
			75	silt	Dark grey, faint subhorizontal clay beds (2mm thick), has a few stones and granules, sandy massive, possibly silty till
23.8	25.3	140	140	till	Sandy silty clay till, massive, dark grey, unoxidized, stiff and plastic, moderately calcareous, minor clay beds (<1cm thick), igneous, quartzite, limestone, minor brown oxidized sandstone clasts, till is moist but not saturated (no free water)

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
25.3	26.8	100	100	till	Large limestone cobble at top of run is the reason for only partial recovery SAB, moderate to strongly calcareous, minor oxidized clasts, same clast lithologies as above, very clayey zone near bottom of run, stiff and plastic, good till
26.8	28.4	155	155	till	Sandy clay till, stiff, massive, dark grey, numerous cobbles, moderately calcareous, clasts include igneous, limestone, quartzite, minor sandstone clasts
28.4	29.9	95	60	till	SAB, moderate to strong calcareous
			35	till	Sandy silt till, minor clay, strongly calcareous, fewer stones than till above, massive
29.9	31.4	115	5	till	SAB
			25	silt	Clayey, massive, broken up, dark grey, moderate to strongly calcareous
			40	silt	Sandy clayey, dark grey, faint subhorizontal bedding in bottom 15cm, minor small clasts, strongly calcareous
			30	till	SAB, dark grey, strongly calcareous
			15	silt	Minor clay, dark grey, strongly calcareous
31.4	32.9	145	35	sand	Very fine grained, loose, saturated, first sign of water.
			43	till	Dark grey, clayey sand till, massive, moderate to strongly calcareous, clasts include igneous, quartzite, limestone, and dark grey shale
			67	sand	Silty, dark grey, faint subhorizontal bedding, minor clasts, moderately to strongly calcareous
32.9	34.4	150	110	silt	Dark grey, massive, minor clasts, strong HCL reaction
			40	till?	Dark grey, very silty, minor clay, looks like silt above but more clayey and more clasts and granules, massive, slow strong HCL reaction, clasts include limestone, igneous and quartzite
34.4	36.0	60	60	till	SAB, sandy silty clay till, moderately to strongly calcareous, stone in shoe deformed core
36.0	37.5	0		sand?	No recovery, possibly loose sand
37.5	39.0	0		sand?	No recovery, loose sand stuck on core barrel
39.0	40.5	0		sand?	No recovery, loose, very fine grained sand flowing up into augers. Abandon hole. T.D. = 40.5m (133')

PROJECT: Wabasca	DATA NO: W98-5	LOGGED BY: J. Pawlowicz	DATE: 20 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig	Continuous core using; CME 5' core barrel
LOCATION: NTS 84B	SURFACE ELEVATION: 671 m (approx.) from 1:50,000 map		Total depth: 32.9m
LOCATION: GPS	LONGITUDE: 115.51547° E	LATITUDE: 56.07193° N	
COMMENTS ON LOCATION: Utikuma Lake area, UNOCAL road, 6.9 km north of Hwy 750, old burrow pit clearing, 150m south of lake, high relief, hummocky terrain. Piezometer nest installed for water table installed.			

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
0	0.9	115	70	fill	Dark grey-brown clay, no pebbles
			10	silt	Light grey-brown, clayey, massive, orange oxidation, noncalcareous
			35	clay	Silty, dark grey-brown, oxidized, massive, stiff and plastic, noncalcareous, no pebbles, strong Fe oxidation on high angle fractures
0.9	2.4	155	15	clay	SAB
			140	clay	Silty, mottled brown and dark brown, oxidized, massive, faint silt clay subhorizontal interbeds (deformed), noncalcareous, lacustrine, no pebbles or granules (quite silty)
2.4	4.0	135	135	clay	SAB, silty, deformed horizontal clay and silt interbeds, strongly oxidized fractures, noncalcareous, minor white calcareous deposits towards base of interval, vertical roots
4.0	5.5	125	32	silt	Clayey, massive, brown, strongly oxidized vertical fractures, white calcareous deposits and nodules, minor pebbles, noncalcareous
			27	clay	Mottled brown and dark brown, deformed bedding, no pebbles, noncalcareous, massive
			34	clay	Silty, brown, oxidized, 10° bedding, strongly oxidized, small gypsum crystals along bedding planes, noncalcareous
			32	clay	Silty, dark grey-brown, becoming sandier towards base, 10° brown clay/silt interbeds, gypsum crystals throughout (<1cm diameter), minor carbonate along bedding planes, strongly Fe oxidized deposits
5.5	7.0	100	68	silt	Clayey, dark grey-brown, slightly oxidized, 10° bedding, abundant gypsum crystals on bedding planes, occasional pebble, minor rusty grains, moist, matrix is slightly calcareous
			32	till	Dark brownish-grey, moist but not saturated, clayey silt till, few pebbles- quartzite, limestone, black shale, Fe oxidized, lenses throughout, minor gypsum, slightly calcareous, slightly oxidized

* SAB - Same As Before

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
7.0	8.5	150	150	till?	Dark grey, clayey silt till, massive, unoxidized, few pebbles and granules, pebbles include quartzite, limestone and rotten limestone, igneous and black shale, 2cm sand lense (water in sand) near base, large gypsum crystals (rosettes) about 2cm in diameter in middle of run, slight to moderately calcareous
8.5	10.1	115	30	till?	SAB, pebbles to 2cm
			40	silt	Sandy, 10° bedding, clay interbeds, numerous clasts and granules, dark grey, unoxidized, slight to moderately calcareous
			45	silt	Clayey, clay interbeds 10° bedding, becoming sandier towards base, minor pebbles, dark grey, unoxidized, slight to moderately calcareous
10.1	11.6	155	120	clay	Silty, dark grey, massive, sandy clay masses throughout, few pebbles and granules, very slightly calcareous, gradational contact with unit below, stiff and plastic, unoxidized
			35	till	Dark grey, sandy silty clay, stiff and plastic, slight to moderately calcareous, unoxidized, clasts include igneous, quartzite and limestone
11.6	13.1	125	50	till	SAB, clay interbeds
			75	silt	Clayey silt, dark grey, stiff and plastic, clay interbeds (10°, slightly deformed), few pebbles up to 3cm, slight to moderately calcareous
13.1	14.6	100	15	silt	SAB
			85	till	Dark grey, silty sandy clay till, stiff and plastic, massive, slightly to moderately calcareous, clasts include igneous, quartzite, Athabasca sandstone, limestone, cobbles to 6cm diameter (rotten Athabasca sandstone clast), large cobble caught in shoe
14.6	16.2	150	150	till	SAB, dark grey, sandy silty clay till, moderately calcareous
16.2	17.7	115	70	till	SAB, 5cm angular sulphide rich clast at SS top of run (possibly from shale bed)
			35	silt	Dark grey, clayey, clay interbeds, 10° bedding, minor pebbles, slightly calcareous
			10	till	SAB, sandy silty clay till, moderately calcareous
17.7	19.2	155	30	till	SAB, clasts include igneous, quartzite, limestone (upto 3cm)
			8	clay	Silty, massive, dark grey, slightly to moderately calcareous
			60	till	Sandy silty clay till, stiff and plastic, slight to moderately calcareous

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
			57	silt	Clayey, thin sand interbeds, 5° bedding, stiff, dark grey, moderately calcareous, minor pebbles and granules
19.2	20.7	155	155	till	Dark grey, sandy silty clay, massive, moderately calcareous, clasts include igneous, quartzite, limestone, stiff and plastic
20.7	22.3	155	155	till	SAB, moderately calcareous
22.3	23.8	115	100	till	SAB, slight to moderately calcareous, 2cm sand lense about 20cm from base
			15	sand	Grey, saturated, fine to medium grained, loose, slightly calcareous
23.8	25.3	145	145	sand	Grey, medium to coarse grained, massive, very clean, loose, saturated, small clasts include igneous, quartzite and minor black shale, noncalcareous
25.3	26.8	140	130	sand	Grey, coarse to very coarse grained, few pebbles throughout (upto 2cm), clasts include igneous, quartzite, sandstone (pebbles are rounded to angular), loose, saturated, massive
			10	sand	Fine to medium grained, minor clay, pebbles to 2cm, noncalcareous
26.8	28.4	130	80	sand	SAB, Coarse to very coarse grained, grey, massive, loose saturated, well sorted, clean, minor pebbles
			38	sand	Medium to coarse grained, clayey, grey, grey clay rip-up clasts (1cm diameter), minor pebbles, massive
			12	sand	Medium grained, massive, saturated, loose, minor pebbles
28.4	29.9	125	72	sand	Medium to coarse grained, grey, massive, loose, clean, saturated
			12	sand/clay	Medium grey sand mixed with grey clay, massive, minor pebble to 2cm, Fe oxidized siltstone clasts along horizontal plane, slightly calcareous
29.9	31.4	130	25	sand	(Possibly slough), medium grained, brownish-grey, clean, loose
			20	till	Dark grey, sandy clay, massive, slightly calcareous, stiff, clasts include quartzite, igneous and limestone clasts, pebbles to 3cm
			85	till	SAB, clay rich, stiff and plastic
31.4	32.9	120	50	sand	(Possibly slough from above), coarse grained, grey, loose wet, pebbly in bottom 10cm
			10	clay	Dark grey, stiff and plastic, massive, silty, minor pebbles

Continuation W98-5

DRILLED DEPTH (meters)		CORE RECOVERY (cm)	DESCRIBED INTERVAL (cm)	LITHOLOGY	COMMENTS
FROM	TO				
			48	till	Dark grey, sandy silty clay, massive, slightly calcareous, clasts include igneous, quartzite, limestone, and dark grey shale
			8	clay	Stiff, dark grey
			4	sand/clay	Interbedded, dark grey, sand is coarse grained, minor pebbles Sand flowing up into auger, unable to get back down the hole. Abandon hole. T.D. = 32.9m (108') Piezometer well installed

PROJECT: Wabasca	DATA NO: W98-6	LOGGED BY: J. Pawlowicz	DATE: 22 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig	Auger flight samples; solid stem auger drilling
LOCATION: NTS 84B	SURFACE ELEVATION: 661 m (approx.) from 1:50,000 map		Total depth: 12.8 m
LOCATION: GPS	LONGITUDE: 115.593190° E	LATITUDE: 56.103066° N	
COMMENTS ON LOCATION: Lake Utimuma area, abandoned government gravel pit on UNOCAL road. High relief ridged terrain. Water table approximately 1.2 m. Piezometer nest installed. Note: no coring at this site, only cuttings from solid stem auger drilling.			

DRILLED DEPTH (meters)				LITHOLOGY	COMMENTS
FROM	TO				
0	2.1			gravel	Sandy, minor black silt/clay interbeds, water level at 1.2 m
2.1	8.5			gravel	Coarse gravel (>5mm) with grey sand, minor silt
8.5	10.1			gravel	Fine gravel (<5mm)
10.1	10.7			sand	
10.7	12.2			till	Dark grey, silty, minor oxidized sand blebs
12.2	12.8			till	SAB, with large boulders and cobbles
					Hole caving in from gravel above. Abandon hole. T.D. = 12.8 m (42') Piezometer well installed

PROJECT: Wabasca	DATA NO: W98-7	LOGGED BY: J. Pawlowicz	DATE: 22 Oct 98
DRILLER: Kelly Faris, Canadian Geological Ltd.	TYPE DRILL: MS 61	Auger drilling rig	Auger flight samples; solid stem auger drilling
LOCATION: NTS 84B	SURFACE ELEVATION: 665 m (approx.) from 1:50,000 map		Total depth: 18.9 m
LOCATION: GPS	LONGITUDE: 115.470109° E	LATITUDE: 56.073986° N	
COMMENTS ON LOCATION: Lake Utimuma area, roadside clearing on trail north of UNOCAL road, hummocky terrain. Piezometer nest installed for water table. Note: no coring at this site, only cuttings from solid stem auger drilling			

DRILLED DEPTH (meters)				LITHOLOGY	COMMENTS
FROM	TO				
0	2.1			clay	Silty, mottled brown, oxidized, minor sand lenses, white carbonate mottling at base
2.1	3.4			till	Brown, clayey, oxidized, cobbles, strongly oxidized layers, wet sandy silt near base
3.4	4.6			till	Brown and grey mottled, minor sand lenses, saturated
4.6	5.2			till	Grey and red brown mottled, sandy clay, no stones
5.2	5.8			sand	Brown, fine grained
5.8	7.2			till	Dark grey, unoxidized, clayey
7.2	7.5			clay/sand	Interbedded layer, (lacustrine)
7.5	12.3			till	Dark grey, clayey, minor clay bands, pebbles, minor pebbles from 8.2 - 9.8 m saturated silt lense at 10.4 m
12.3	12.8			sand	Grey, silty, clayey, water zone
12.8	16.8			till	Dark grey, silty clay, pebbles to 2 cm
16.8	18.6			silt	Dark grey, clayey, laminated, lacustrine
18.6	18.9			till	Dark grey, silty clay, minor pebbles, minor sulphide crystals
					T.D. = 18.9 m Piezometer well installed