



KENNECOTT CANADA EXPLORATION INC.
LEGEND JV DIAMOND DRILL LOGS



Drill Hole:	98DHPH02	Azimuth:	N/A
Easting:	351 550 m E (NAD 27)	Dip:	-90° to -87° at EOH
Northing:	6 330 493 m N (Z 12)	Depth (EOH):	201.2m (EOH)
Collar Elevation:	~ 735 m amsl (GPS)	Diameter(s):	NQ
Grid Location:	100013,5060N	Geologist:	Richard Beck
Drill Contractor:	Aggressive Drilling	Geotech/Sampler:	Richard Beck
Contracted to:	Kennecott Canada	Project Geologist:	Theo Aravanis
Drill Type:	Boyles 25A	Date Collared:	02 October, 1998
Drill Foreman:	Mitch McLelland	Date Completed:	06 October, 1998

Summary Information

Drill-hole 98DHPH02 is the second hole drilled into the **Phoenix Kimberlite** on the Kennecott / Montello Resources Legend Joint Venture in northeast Alberta. The hole intersected Kimberlite beneath ~ 126m of till sediment cover.

NQ core recovered mudstone and numerous kimberlitic clasts. The core has been split: half core has been sampled for detection of diamonds (by caustic fusion at Kennecott's micro-diamond facility in Thunder Bay, ON.) Samples have also been taken for indicator HM recovery / EPMA mineral chemistry, petrographic examination, geochronology and palynology (refer end of log). Visual logging has not identified any P or E -type indicator minerals / xenoliths (except olivine).

The kimberlite as logged appears to have few HM kimberlitic indicators. Magnetism thought to be a result of locally prolific serpentine + magnetite alteration of the: some (particularly the smaller) olivine grains in more magnetic intervals appear to be mantled by a black magnetite-bearing alteration rim.

Summary Log

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Detailed Log**0.0 - 108.2 m****Cased Overburden**

Drill timesheets indicate gravel and boulder tills encountered throughout tricone drilling to set the casing. Large boulders and intermittent sand seams and compact clay seams are common through the deeper portions of the till

108.2 - 126.8 m**Cobble and Boulder Till**

Medium grained polymictic sands

108.2 - 110.0m	Quartzite, granodiorite and qtz diorite cobbles
110.0- 113.0m	Fine grained whole core sands with Mudstone; < 5% pebbles
113.0 - 125.27m	Fine grained till with qtz diorite and quartzite cobbles; Fe staining present; pebbles are sub - rounded with the presence of hornfels
114.75 - 114.8m	Kimberlite fragment (~1.5cm) within a 5cm gravel band dominated by a granodiorite cobble; kimberlite has a fine grained sand and clay matrix rich in carbonate (acid test). Serpentinized, olive green with olivine & carbonate and a single reddish/orange crystal (garnet?). 5cm band of gravel includes pink granite, qtz, sub-angular pyrite, biotite and a non-magnetic mafic mineral
125.27 - 126.8m	Fine to medium grained sands, > 20% pebbles with abundant quartz diorite and quartzite cobbles. Greenish fragments at 125.3 and 125.9m (kimberlite? possibly shale)

126.8 – 136.9m**Mudstone with kimberlitic zones**

This interval consists of black friable mudstone and light brown, medium grained sands and sandstones with kimberlite zones. These zones are thought to have intruded the mudstone (small sills?) as they show sharp, clean contact with the mudstone.

126.8 - 129.2m	Competent stiff black mudstone
129.2 - 129.8m	Medium grained sands; pebbles (---15%) sub-rounded
129.8 - 133.7m	Dark grey friable mudstone with laminations perpendicular to c.a. 10cm granitoid boulder; foliated; with qtz, pink feldspars, biotite and hornblende
133.7 - 133.8m	Green kimberlite cobble; sub-angular, 5cm long with veined carbonate similar to 109.0m in PHO1, but contains rounded (partially carbonate replaced) autoliths similar to 221.0m in the PHO1 Rep. Samp. Box
133.8 - 134.0m	Very fine grained, light brown sand seam showing excellent cross bedding
134.0 - 134.4m	
134.4 - 136.9m	Competent light brown fine grained sandstone

135.05m Sand supported cobbles and fragments of autolithic kimberlite similar to that described g 134.0 - 134.4m. Sand reacts somewhat to acid as some of the sand is made up of crumbled pieces of kimberlite. The kimberlite is supported by a sand and mud matrix

136.9 -159.1 m**Mudstone with Lapilli-rich kimberlite intervals**

This interval consists of approximately 70% mudstone and 30% kimberlite clasts. The kimberlite is competent, dark green (serpentinized?), coarsely fragmental to friable, light green/grey rich in veined carbonate. Lapilli fragments are abundant in both competent and friable sections, supported by a carbonate-rich matrix. Phlogopite and "relic" olivine macrocrysts are observed throughout the clasts in the entire interval.

Carbonate rich mud "nodules" become abundant deeper in the interval (between 151.5 - 161.9m) and range in size from 0.5cm to 3.0cm. Nodules are well rounded, black and are host to calcite crystals and pellet shaped pyrite. Carbonate in whole becomes more abundant deeper the interval The lapilli - rich kimberlite begins to exhibit rounded to sub-rounded autoliths at the conclusion of the interval.

136.9 - 137.1m	Competent stiff dark green and coarsely fragmental kimberlite with a densely packed lapilli texture. Sub-angular to angular mud xenoliths with some sub-angular xenoliths exhibiting carbonate haloes. Minor carbonate in matrix (acid test) with altered and fresh macrocrysts of olivine (<1%) observed
137.1 - 137.4m	Heavily altered kimberlite fragments with major carbonate veining. Polished phlogopite present in "inferred" lapilli textured kimberlite (similar to interval @ 196.0 - 196.1m PH02)
137.4 - 137.5m	Competent stiff grey/green kimberlite clast with a densely packed, coarse fragmental texture; minor carbonate in matrix. Angular mud xenoliths are abundant as are macrocrysts of phlogopite and olivine
137.5 - 140.8m	Dark grey to light grey mudstone with small kimberlitic clasts. Mudstone varies from rubble to competent core with fresh phlogopite. Carbonate present in groundmass yet minimal (acid test). A single fresh, orange/beige shell is observed @ 140.5m.
140.8 - 143.5m	Light to medium grey mudstone with sub-angular black mudstone clasts. Minor carbonate, however, localized sections are "eroded" with carbonate giving the unit a "porous" appearance. Fresh shell fragments (some completely intact) can be seen @ 143.4m. Good example of slumping in the muds @ 143.0m with a layered contact at -60 deg. tca.
143.5 - 149.1m	This interval is much the same as the aforementioned, however, it is host to a heavily altered lapilli kimberlite with fresh

	phlogopite. An increase in carbonate in both the mudstone and the kimberlitic matrices exists (acid tests)
149.1 - 153.7m	Dark grey, competent lapilli kimberlite (fragment size and packing density is less than that of the above mentioned kimberlite) set in a black mudstone (this is suggestive of injection - kimberlite exhibits unaltered sharp contacts with mudstone
154.0 - 155.4m	Light grey to black mudstone. Carbonate rich, altered kimberlite with relic olivine and polished phlogopite and traces of pyrite. Kimberlite fragments are rounded to sub-rounded housed in a fine grained carbonate rich matrix
155.4 - 156.0m	Broken zone of mudstone
156.0 - 157.4m	This interval is identical to that of the 152.0 - 154.0m interval
157.4 - 159.1m	Pyrite rich sandy mudstone with abundant mud nodules

159.1-182.4m**Mudstone with Autolithic Kimberlite**

This interval is made up of competent stiff, coarsely fragmental and autolith and lapilli-rich kimberlite. Separating the local sections of kimberlite are broken zones of mudstone, lightly packed, laminated sandstone units and light grey aphanitic mudstone units.

The kimberlite is coarse, densely packed and fragmental at the start of the interval with a carbonate supported matrix, and as the depth increases the fragments become smaller, more matrix supported and not as carbonate rich. Macrocrysts of relic olivines and phlogopite are dominant throughout kimberlitic sections with minor traces of phlogopite throughout mudstone units. Macrocrysts of mildly replaced olivine are present further down the interval.

In the local competent sections of kimberlite, the rock unit is lapillus rich and gradational with respect to fragment size, over the entire interval length (smaller lapilli forms exist with increasing depth)

The Autoliths are generally light grey/green to light brown, rounded and exhibit minor carbonate replacement (acid test). Though the matrix of many autoliths is replaced with carbonate, "cored" autoliths are present and have a primary "central" matrix with thin carbonate rims. The autoliths range in size from 4mm to 32mm (the smaller lapilli autoliths are generally rounded "pellet" shaped and the larger "cored" autoliths are sub-rounded.

Pyrite is abundant throughout the interval and dominant as rims to mudstone xenoliths and small seams in the mud, as well as being present in the matrix of the sandstone/mudstone units.

159.1 - 159.2m	This 10cm interval houses three 1cm, sub-rounded, carbonate rich kimberlitic (inferred) lapilli in a dark grey mudstone
159.2 - 160.4m	Black, fine grained silty mudstone with carbonate matrix (acid test) and minor veined carbonate
160.4- 164.5m	Light grey mudstone with light grey/green, carbonate rich kimberlite fragments
164.5- 164.8m	Broken zone
164.8 - 165.0m	Same as the 160.4 - 164.5m interval
165.0 - 165.8m	Broken zone
165.8 - 166.0m	Dark grey mudstone with grayish kimberlite housing black angular xenoliths of mud
166.0 - 166.8m	Rubble zone
166.8 - 167.2m	Competent light green carbonate rich kimberlite with angular black mud xenoliths and small lapilli autoliths
167.2 - 167.4m	Mud seam
167.4 - 167.6m	Broken zone of dark grey pyrite rich sandstone
167.6 - 167.8m	Competent autolithic kimberlite with large grey mud xenoliths and lapilli autoliths. <i>Relic</i> macrocrysts of olivine and dominated polished phlogopite are observed
167.8 - 170.3m	Light grey, very fine grained sandstone with "layered" and interwoven equigranular dark brown sandstone. A large 10cm, light grey veined carbonate sandstone boulder can be seen @ 168.6m
170.3 - 170.7m	Coarsely fragmental autolithic kimberlite set in a dark grey mudstone unit. Kimberlite has abundant lapilli forms and many large (1 cm) "cored" autoliths and black, carbonate rimmed mud xenoliths. Polished phlogopite and relic olivines are observed in a carbonate driven matrix
170.7 - 170.9m	Sandstone unit (the same as the 167.8 - 170.3m interval)
170.9 - 173.7m	A predominantly sandstone unit with kimberlite clasts. Clasts are coarse fragments; macrocrysts of phlogopite and <i>olivine</i> in the matrix accompanied by pelletal lapilli and small mud nodules with pyrite rims
173.7 - 178.6m	Competent light grey aphanitic mudstone with minor carbonate matrix. Carbonate rich, autolithic kimberlite seams observed at 175.4m, 176.2m and 177.2m. At 176.2m the kimberlite houses macrocrysts of phlogopite and relic olivine, with the <i>olivine</i> macrocrysts exhibiting preferred orientation 30-leg. tca. At 177.2m a single large "cored" autolith (3.2cm) is present with macrocrysts of fresh olivine and phlogopite in the surrounding kimberlitic matrix
178.6 - 179.9m	This interval is the same as that of 167.8 - 170.3m with mixed light and dark grey sandstones
179.9 - 182.4m	Broken zone (mudstone)

182.4 - 201.2m**Mudstone and Sandstone with Kimberlitic zones**

This unit consists of intercalated mudstone and sandstone units with few kimberlite fragments throughout the entire interval. The sandstone units are light grey, fine grained units with an abundance of pyrite crystals and mica (phlogopite?).

The mudstone is a medium grey and competent throughout the interval with a minor carbonate matrix.

Black/ green kimberlite fragments are observed in the unit and are host to lapilli form coarse fragments and fresh phlogopite with fine grained relic olivine and veined aragonite??

182.4 - 191.5m

Light grey mudstone and sandstone with local rubble zones and frequently observed pyrite crystals in the fine grained matrix.

191.5 - 201.2m

Kimberlite fragment observed at 189.2 - 189.6m

Light grey mudstones housing black/green carbonate rich kimberlite. Frequent rubble zones of mudstone throughout with only micas present in their matrix. Kimberlite clasts @ 191.6 - 191.8m, 196.0 - 196.1m (same as interval 137.1 - 137.4m), 196.4 - 197.7m and 198.8 - 198.9m. Extensive carbonate veining in the friable black/green kimberlite with frequent black mudstone xenoliths and "inferred" lapilli forms. A large 5cm pyrite crystal is seen @ 199.9m.

201.2m**E.O.H.**

Representative ('Rep') Samples

#	Depth in hole	Geological Unit
1	117.0m	Cobble and Boulder Till
2	128.2m	Mudstone with Kimberlitic Zones
3	136.2m	Mudstone with Kimberlitic Zones
4	146.2m	Mudstone with Lapilli-rich Kimberlitic Intervals
5	154.2m	Mudstone with Lapilli-rich Kimberlitic Intervals
6	163.0m	Mudstone with Autolithic Kimberlite
7	166.7m	Mudstone with Autolithic Kimberlite
8	176.6m	Mudstone with Autolithic Kimberlite
9	179.9m	Mudstone with Autolithic Kimberlite
10	180.2m	Mudstone with Autolithic Kimberlite
11	193.1m	Mudstone and Sandstone with Kimberlitic Zones
12	199.9m	Mudstone and Sandstone with Kimberlitic Zones

Heavy Mineral /Micro-diamond Sample List

Sample No.	From (m)	To (m)	Interval (m)	Mass (kg)	Shipped
VR87829A	HM	Composite	-	15.5	Oct. 14, 1998
VR87830A	135.05	139.9	4.85	10	Oct. 14, 1998
VR87831A	139.9	145.5	5.6	10	Oct. 14, 1998
VR87832A	145.5	150.3	4.8	10	Oct. 14, 1998
VR87833A	150.3	156.0	5.7	10	Oct. 14, 1998
VR87834A	156.0	160.4	4.4	10	Oct. 14, 1998
VR87835A	160.4	165.6	5.2	10	Oct. 14, 1998
VR87836A	165.6	170.0	4.4	10	Oct. 14, 1998
VR87837A	170.0	174.7	4.7	10	Oct. 14, 1998
VR87838A	174.7	180.1	5.4	10	Oct. 14, 1998
VR87839A	180.1	185.0	4.9	10	Oct. 14, 1998
VR87840A	185.0	190.6	5.6	10	Oct. 14, 1998
VR87841A	190.6	195.4	4.8	10.5	Oct 14, 1998
VR87842A	195.4	201.2	5.8	11.2	Oct 14, 1998