



KENNECOTT CANADA EXPLORATION INC.  
LEGEND JV DIAMOND DRILL LOGS



<b>Drill Hole:</b>	98DH-LE01	<b>Azimuth:</b>	N/A
<b>Easting:</b>	386 200 E (NAD 27)	<b>Dip:</b>	-90° EOH
<b>Northing:</b>	6 340 600 N (Z 12)	<b>Depth (EOH):</b>	228.6m (EOH)
<b>Collar Elevation:</b>	~ 735 m amsl (GPS)	<b>Diameter(s):</b>	NQ
<b>Grid Location:</b>	1015 E, 4920 N	<b>Geologist:</b>	Richard Beck
<b>Drill Contractor:</b>	Aggressive Drilling	<b>Geotech/Sampler:</b>	Floyd Tompkins/Austin Young
<b>Contracted to:</b>	Kennecott Canada	<b>Project Geologist:</b>	Theo Aravanis
<b>Drill Type:</b>	Boyles 25A	<b>Date Collared:</b>	21 November, 1998
<b>Drill Foreman:</b>	Mitch Mcelland	<b>Date Completed:</b>	23 November, 1998

### Summary Information

Drill-hole 98DH-LE0 1 is the initial hole drilled on the Kennecott / Montello Resources Legend Joint Venture target at the legend prospect in northeast Alberta. The hole is sited to test an airborne geophysical target (magnetic) recognized as a potential kimberlite. The hole intersected kimberlite beneath ~ 12m of till sediment cover, and constitutes the discovery hole for the **Legend Kimberlite**.

NQ core recovered coarse fragmental and accretionary lapilli rich kimberlite. 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 identified chrome diopside, ilmenite, olivine and garnet (possible - waiting for confirmation from lab).

The kimberlite as logged appears to have 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.

PVC was put in the hole from the surface to 228.3m (E.O.H.). Down hole logging of the hole was completed by Komex International Ltd. of Calgary, Alberta immediately after drilling was complete

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**Detailed Log****0.0 - 12.2 m****Cased Overburden**

According to the drillers reports the till encountered was that of Predominantly sand with few cobbles and gravel throughout.

**12.2 - 104.1m****Dark grey kimberlite**

Dark grey, competent, matrix supported kimberlite containing (relic and fresh) fine-grained olivine, ilmenite, phlogopite macrocrysts (infrequent), numerous small country rock fragments and accretionary lapilli (in local sections) in an aphanitic dark grey/green serpentinitized matrix. In addition, large relic olivine macrocrysts are recognized.

Olivine is generally recognized in the matrix as a fine-grained constituent, however, throughout the core, below ~50 metres, large relic (carbonate replaced) olivine (9 - 25mm) is observed in local sections.

Phlogopite is rare throughout the core, however, its existence in local sections exhibits the typical light brown colour and sub-rounded shape. The crystals encountered are in the general size range of 12 x 8mm.

Metallic, dark grey Ilmenite is abundant throughout the entire section of kimberlite (~1 - 2%). The ilmenite size varies from (1 - 2mm) crystals, but generally of a larger (4 - 8mm) oval shaped conglomerate of crystals.

Country rock fragments are abundant in this interval with the green fragments, the more dominant. The green xenoliths are predominantly sub-angular argillites and to a lesser degree, green marls. Few black angular mud fragments exist locally, as well as light brown shale? fragments.

Accretionary lapilli exist in local sections throughout this unit as well rounded, black, fine to medium grained forms with the occasional lapilli form supporting a xenolith (sub-angular) nucleus. The lapilli appear to concentrated between 78.3 - 97.0m. The lapilli forms vary from lightly packed to densely packed in local sections, the former being more dominant.

This interval of dark grey/green kimberlite from 12.2 - 104.1m is texturally and mineralogically similar throughout its length, with a few distinct and notable sections. These distinctions are described briefly below:

**12.19 - 16.8m**

Dark grey, very coarse fragmental kimberlite, rich in fine-grained olivine. Country rock fragments comprise ~ 5%, olivine - 10% and ilmenite set in a fine-grained aphanitic matrix. Local Fe-staining is observed and carbonate is minor in the matrix.

16.8 - 17.8m	Dark grey competent kimberlite with few olivine macrocrysts and infrequent xenolith fragments.
17.8 - 22.0m	Same as the previous interval, but with a "lumpy" texture.
22.0 - 25.8m	Dark grey kimberlite with minor yellow (Fe-staining) weathered alteration. Vugs of ochreous coloured material (chalcopyrite?) have completely replaced existing minerals (olivine crystals?).
23.3m & 26.9m	Pink/white quartzite xenoliths (~ 15 x 8mm).
25.2m	Sub-angular staurolite? crystal with the typical cross formation in the centre (4 x 5mm) as observed in kimberlite at Lac de Gras.
29.9m	Phlogopite mica crystal (12 x 8mm).
35.0 - 48.3m	Abundant (~5 - 10%) small (2 - 6mm) country rock xenoliths.
38.1m	Mud seam.
38.5 - 38.7m	Mud seam.
48.3 - 48.9m	Abundant (~5 - 10%) large (5 - 10mm) country rock xenoliths.
50.0 - 104.1m	Large (~ 10 x 20mm) relic olivines (~1%).
51.5 - 53.0m	Pyrite veining (1 to 2mm wide).
52.1m	Chalcopyrite and bitumen rich vein (4 x 60mm).
53.0m	Vug of viscous bitumen (4 x 8mm).
54.0m	Mud seam.
57.7 - 70.6m	Black angular mud xenoliths.
78.3 - 97.0m	Accretionary lapilli.
97.0 - 104.1 m	Almost devoid of country rock xenoliths near the end of the interval, though few large, dark green sub-rounded xenoliths occur. Lapilli are generally smaller in this section (4 - 15mm).

**104.1- 108.9m****Light grey weathered kimberlite**

This interval is primarily light grey, competent kimberlite with a medium grained matrix. Relic olivine is present, but infrequent in comparison to adjacent units (<1%). Country rock xenoliths are relatively small (2mm - 6mm) in this rock unit, yet abundant (~5 - 10%). Xenoliths are commonly carbonate replaced with white, powdery remnants remaining. The interval starts as a light grey unit and diffuses into a light brown faulted, brecciated, kimberlite before ending as a moderately competent light grey unit.

104.1 - 104.9m	Light grey, medium fragmental, competent kimberlite. Minor ilmenite is observed (~1%). Very little carbonate in matrix. Unaltered black sub-angular mudstone fragments and slickensides present at 104.9m.
104.9 - 106.8m	Light grey to light brown fault breccia kimberlite. This section appears to be broken apart by a mudstone unit. The light brown colour is derived from both the presence of sulphides (chalcopyrite) and bitumen. Slickensides present along fractured surfaces. Faulted pieces of kimberlite are generally angular.
106.8 - 108.9m	Light grey, competent kimberlite similar to that of the 104.1- 104.9m unit, however, this grey unit is more densely packed and a much harder rock in whole. Small veined carbonate throughout unit. Bitumen is ubiquitous in fractures. Country rock fragments are small (2 - 3mm), but abundant (~5 - 10%).

**108.9 - 119.2 m****Dark grey kimberlite**

Dark grey, competent hard, kimberlite. This unit is a very densely packed kimberlite made up of a fine-grained matrix and few country rock xenoliths.

ilmenite remains present throughout core (~1%), but olivine is not as abundant (< 1%) as a fine-grained constituent within the matrix. Fragments are infrequent and consist predominantly of angular black muds and dark green marls (sub angular). Accretionary lapilli forms are recognized near the end of the interval. These lapilli are generally 4 to 6mm in size, well rounded with a fine-grained kimberlitic matrix consisting of olivine and carbonate, and in a few instances, the core of the lapilli is that of a sub-angular green marl.

110.3 - 110.5m

Two large light brown phlogopite crystals up to (15 x 8mm)

111.3m

Large muscovite crystal (8 x 5mm).

113.4- 113.9m

Slickensides present along fracture surfaces, accompanied by bitumen.

115.8 -119.2m

Small accretionary lapilli forms in a dark grey matrix supported kimberlite.

**119.2 -173.3m****Lapilli rich kimberlite**

This dark grey/green serpentinized unit is identical to that of the 12.19 - 104.1m interval. The rock unit comprises previously recognized matrix supported components. The separation of fragment rich zones to zones of infrequent fragments is identical to the top of the hole. Grain size, percentages of various constituents, bitumen in fractures, etc. is the same as previously described. However, this unit is different in that it hosts numerous accretionary lapilli (~20 - 25%) in a fine-grained, black matrix supported kimberlite. In certain sections the lapilli is clast supported (4 - 9mm) as the core has a botryoidal appearance. The lapilli are generally well rounded, black, fine to medium grained and of various sizes throughout. Within their matrix, fine grained white carbonate is observed alternating with black fine-grained and, in turn, housing small (generally green) xenoliths as a nucleus, thus giving the lapilli a "cored" appearance.

This kimberlite is also host to few (<0.5%) deep red country rock fragments that had initially been identified as being garnet.

133.7 - 143.7m

This is the first section of recognized abundant accretionary lapilli. The appearance of lapilli in this interval correlates well with the magnetic susceptibility readings. The readings between 132m and 143m average that of 300 x 10E-5SI in comparison to the adjacent (non-lapilli) units where the readings average 80 x 10E-5SI.

142.1 - 142.3m

A (contact?) feature here suggests that the lapillus sections of the core are in fact intruded into the host kimberlite. However, the section of core shows half of it to be lapilli rich and the other half devoid of

lapilli (parallel tca) with a medium grained, black assemblage of minerals separating the two distinct sections. The irregular shape of this separating unit (its width varies from 4 to 10mm) and oriented grains within, suggest that this intrusion of is derived from a flow. A sample of this interval was placed in the representative sample box for this hole.

159.6 - 173.3m

This section at the end of the interval is also abundant with accretionary lapilli.

161.1 - 173.3m

Deep red coloured, sub-angular country rock fragments appear for the first time. These clasts were originally thought to be garnet as their matrix is very hard (scratch test) and their deep red colour.

**177.3 - 177.0****Light brown weathered kimberlite**

Light brown, weathered, moderately competent kimberlite. Ochreous colouring is present as a result of altered sulphides (pyrite and chalcopyrite observed along fracture surfaces) and abundant bitumen along fractures and as small vugs throughout the core. Abundant veining in this unit of core, both quartz and carbonate veining, the latter more dominant. Fine-grained relic olivine is observed. Country rock fragments are infrequent, but few angular black mud xenoliths and sub-angular light blue (argillites?) are present. The majority of the fragments have reaction haloes. The interval appears devoid of phlogopite and ilmenite. This unit of core has clean, sharp contacts with adjacent layers of grey kimberlite.

173.3 - 173.6m

Light brown/grey friable kimberlite with fine-grained relic olivine throughout matrix. Fe-staining present and bitumen throughout.

173.6 - 177.0m

Light brown, moderately competent relic kimberlite. Bitumen abundant. Numerous (5 - 10%) small (2 - 3mm) country rock fragments with reaction haloes occur in this interval.

**177.0 - 201.0****Light grey kimberlite**

This unit is similar to the overlying interval, however, this light grey, competent kimberlite is a much harder rock. The matrix is very fine-grained, almost aphanitic, supporting numerous (5 - 10%) small xenoliths. The xenolith fragments throughout are generally light blue, sub-angular argillites? Other fragments present, but to a lesser degree, are angular green and yellowish argillite, and even fewer pink quartzite (sub-angular). Notable, in this unit of core, is the numerous, small angular mud xenoliths that "pepper" the core. These black xenoliths are range in size from 1 - 3mm and constitute approximately 3% of the matrix. Fine-grained relic olivine is observed in the unit (~1%), but no relic olivine macrocrysts were noted. Ilmenite remains consistent throughout (1 - 2%) with its ovoid shape and its range in size (4 - 8mm). Phlogopite was not noted. This section of the core is also abundant in broken and rubble zones occurring about every 30cm. As the interval increases

in depth the rock remains the same with regards to its recognized components, texture and grain size, however, the colour changes to a dark grey like that of previous intervals. Quartz and few carbonate veins exist locally.

177.0 - 186.1m Light grey, competent hard kimberlite with quartz veining present and minor carbonate veining. Xenoliths are infrequent (~2%) made up of green marl, black mud and pink quartzite. Bitumen is present in fractured surfaces with occasional chalcopyrite.

186.1 - 201.0m Dark grey, competent hard kimberlite. No quartz veining present, unlike its adjacent units. The presence of sub-angular, deep red xenoliths (garnets?) is observed again in this unit like that of the 119.2 - 173.3m interval.

### **201.0 - 203.7m**

#### **Light brown weathered kimberlite**

This zone is identical to that of the 104.9 - 106.8m sub-interval previously described. The ochreous colouring is dominant throughout the core. This moderately competent core is strongly fractured with abundant bitumen on surfaces. Fine-grained relic olivine is seen in matrix. numerous country rock fragments are observed. The fragments are comprised of white to light green carbonate replaced marls and argillites.

### **203.7 - 228.6m**

#### **Grey kimberlite tuff**

Light grey, competent hard kimberlite tuff with a fine-grained matrix. Country rock fragments are abundant throughout, but relatively small in comparison to previous units (1 - 3mm). Olivine is dominant throughout this interval, as it appears widespread as small (~1mm) carbonate replaced, white grains (5 -10%). This "peppered" effect of the olivine in light grey matrix disappears when the core becomes dark grey at 218.1m. The olivine remains as a dominant mineral of the, now grey/green, serpentinized core, however, it is no longer carbonate replaced to the extent of the overlying light grey unit. Ilmenite is present throughout (~1%). Phlogopite occurs rarely.

Country rock fragments are abundant, as mentioned, with the most dominant being the angular "mud chips". These "mud chips" are approximately 1- 3mm in size and comprise about 2% of the matrix. In certain sections these "mud chips" appear to align themselves, thus, suggesting flow direction within the kimberlite. Other fragments populating this rock unit, but to a lesser degree are green and white marl and argillite and even fewer pink quartzite clasts. The deep red coloured clasts previously recognized appear again in the later portions of this kimberlite interval i.e. 218.1 - 228.6m, thus suggesting that these clasts appear only in the darker grey segments of the kimberlite, therefore,



They may very well exist elsewhere, but weathered alteration is disguising their deep red colour.

205.4m	A single, large (15mm) accretionary lapilli. Fine-grained with a green marl nucleus.
200.7 - 209.0m	Relatively abundant country rock xenoliths. Predominantly green marl and green argillite
210.7m	Phlogopite crystals present - 2 individual crystals averaging 6 x 7mm in size. More bleached than in previous occurrences.
218.1 - 228.6m	Ilmenite becomes more dominant than the top of this unit. Ovoid shape and typically 3 - 6mm in size (~1 - 2%).

228.6m

E.O.H.

### Representative Samples

#	Depth in Hole	Geological Unit	#	Depth in Hole	Geological Unit
1	12.19	Dk grey kimberlite	25	124.9	Lapilli rich kimberlite
2	17.65	Dk grey kimberlite	26	129.8	Lapilli rich kimberlite
3	19.4	Dk grey kimberlite	27	134.9	Lapilli rich kimberlite
4	24.95	Dk grey kimberlite	28	136.3	Lapilli rich kimberlite
5	27.1	Dk grey kimberlite	29	141.4	Lapilli rich kimberlite
6	40.8	Dk grey kimberlite	30	142.2	Lapilli rich kimberlite
7	46.2	Dk grey kimberlite	31	151.9	Lapilli rich kimberlite
8	53.0	Dk grey kimberlite	32	161.2	Lapilli rich kimberlite
9	53.9	Dk grey kimberlite	33	168.4	Lapilli rich kimberlite
10	57.7	Dk grey kimberlite	34	171.7	Lapilli rich kimberlite
11	60.8	Dk grey kimberlite	35	173.8	Light brown weathered kimberlite
12	69.3	Dk grey kimberlite	36	175.3	Light brown weathered kimberlite
13	77.9	Dk grey kimberlite	37	177.7	Light grey kimberlite
14	78.5	Dk grey kimberlite	38	183.9	Light grey kimberlite
15	78.6	Dk grey kimberlite	39	185.2	Light grey kimberlite
16	92.4	Dk grey kimberlite	40	189.3	Light grey kimberlite
17	100.0	Dk grey kimberlite	41	192.5	Light grey kimberlite
18	102.6	Dk grey kimberlite	42	197.3	Light grey kimberlite
19	104.3	Light grey weathered kimberlite	43	200.5	Light grey kimberlite
20	106.0	Light grey weathered kimberlite	44	205.8	Grey kimberlite tuff
21	106.6	Light grey weathered kimberlite	45	210.1	Grey kimberlite tuff
22	108.4	Light grey weathered kimberlite	46	217.5	Grey kimberlite tuff
23	110.3	Dk grey volcaniclastic kimberlite	47	221.6	Grey kimberlite tuff
24	114.3	Dk grey volcaniclastic kimberlite	48	225.4	Grey kimberlite tuff

**Heavy Mineral / Micro-diamond Sample List**

Sample No.	From (m)	To (m)	Interval (m)	Mass (kg)	Shipped
VR88459A	13.0	18.4	5.4	10	Nov. 29, 1998
VR88460A	18.4	23.9	5.5	10	Nov. 29, 1998
VR88461A	23.9	29.1	5.2	10	Nov. 29, 1998
VR88462A	29.1	32.0	2.9	10	Nov. 29, 1998
VR88463A	32.0	38.5	6.5	10	Nov. 29, 1998
VR88464A	38.5	43.2	5.7	10	Nov. 29, 1998
VR88465A	43.2	48.6	5.4	10	Nov. 29, 1998
VR88466A	48.6	53.5	4.9	10	Nov. 29, 1998
VR88467A	HM	COMP.	49.9-100.4	12	Nov. 29, 1998
VR88468A	53.5	58.3	4.8	10	Nov. 29, 1998
VR88469A	58.3	63.1	4.8	10	Nov. 29, 1998
VR88470A	63.1	67.3	4.2	10	Nov. 29, 1998
VR88471A	67.3	73.8	6.5	10	Nov. 29, 1998
VR88472A	73.8	76.3	2.5	10	Nov. 29, 1998
VR88473A	76.3	80.9	4.6	10	Nov. 29, 1998
VR88474A	80.9	86.0	5.1	10	Nov. 29, 1998
VR88475A	86.0	90.2	4.2	10	Nov. 29, 1998
VR88476A	90.2	94.8	4.6	10	Nov. 29, 1998
VR88477A	94.8	100.4	5.6	10	Nov. 29, 1998
VR88478A	HM	COMP.	100.4-155.4	12	Nov. 29, 1998
VR88479A	100.4	103.9	3.5	10	Nov. 29, 1998
VR88480A	103.9	109.8	5.9	10	Nov. 29, 1998
VR88481A	109.8	116.0	6.2	10	Nov. 29, 1998
VR88482A	116.0	121.1	5.1	10	Nov. 29, 1998
VR88483A	121.1	125.6	4.5	10	Nov. 29, 1998
VR88484A	125.6	130.6	5.0	10	Nov. 29, 1998
VR88485A	130.6	135.9	5.3	10	Nov. 29, 1998
VR88486A	135.9	141.5	5.6	10	Nov. 29, 1998
VR88487A	141.5	146.4	4.9	10	Nov. 29, 1998
VR88488A	146.4	151.1	4.7	10	Nov. 29, 1998
VR88489A	151.1	155.4	.3	10	Nov. 29, 1998
VR88490A	HM	COMP	155.4-228.6	15	Nov. 29, 1998
VR88491A	155.4	160.9	5.5	10	Nova 29, 1998
VR88492A	160.9	165.3	4.4	10	Nov. 29, 1998
VR88493A	165.3	169.9	4.6	10	Nov. 29, 1998
VR88494A	169.9	175.8	5.9	10	Nov. 29, 1998
VR88495A	175.8	184.2	8.4	10	Nov. 29, 1998
VR88496A	184.2	190.1	5.9	10	Nov. 29, 1998
VR88497A	190.1	196.1	6.0	10	Nov. 29, 1998
VR88498A	196.1	201.3	5.2	10	Nov. 29, 1998
VR88499A	201.3	206.5	5.2	10	Nov. 29, 1998

VR88500A	206.5	211.9	5.4	10	Nov. 29, 1998
VR88001A	211.9	216.7	4.6	10	Nov. 29, 1998
VR88002A	216.7	221.1	4.4	10	Nov. 29, 1998
VR88003A	221.1	225.3	4.2	10	Nov. 29, 1998
VR88004A	225.3	28.6	3.3	10	Nov. 29, 1998
VR88458A	HM	COMP	12.2-49.9	15	Nov. 29, 1998

### Petrology Samples

#### Petrographic Samples

Sample No.	Depth	Sampled by	Submitted to
VR31378A	187.9m	Theo Aravanis	
VR31379A	188.65	Theo Aravanis	

#### Geochronology Samples

Sample No.	Depth	Sampled by	Submitted to
VR31380A	29.9m	Theo Aravanis	
VR31381A	53.85m	Theo Aravanis	ROM
VR31382A	110.55m	Theo Aravanis	