MAR 19940006: PINCHER

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ID 19940006

Pincher Block Government Assessment Report

Pincher Block
NTS 82H

Takla Star Resources Ltd. and Fairstar Exploration

BY
D. I. SRAEGA, Geologist
EDMONTON, ALBERTA

DECEMBER, 1994

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Pincher Block Summary

This assessment report pertains to the Pincher Block. The block consists of 10 contiguous metallic and industrial permits in the extreme southwest of Alberta. The block consists of 92000 hectares or 230,000 acres. The block lies within the townships 1 to 6, ranges 24 to 30 west of the 4th meridian and excludes the Blood Indian Reserve and the Waterton Lakes National Park. Six paved roads link the towns, parks, reserves and some of the smaller communities. Access is good with township and range roads in the Pincher Creek area while to the south access is limited near the national park.

A sediment heavy mineral program was conducted in the summer of 1993. The sediment heavy mineral geochemical survey report for the 1993 field season is given in Appendix I. There were 27 samples taken in the summer of 1993 in the Pincher Block.

Field Work	Dates
Stream Sediment Heavy Mineral Program	June 1 to 25, 1992

The sediment heavy mineral program was designed to test stream, till and gravel samples in close proximity and in down ice directions from four kimberlite like aeromagnetic targets. Two of the aeromagnetic anomalies are east of a gas plant 6 km southeast of the hamlet of Drywood. The other two anomalies are 13 km southwest of Cardston and 3 km northwest of Mountain View.

The predominant indicator mineral of diamond bearing alkaline ultrabasic rock found was pyrope garnet. G9 and G11 (Dawson and Stephen, 1975) were reported in samples from the block. The G5 eclogitic garnets classified at Loring Laboratories Ltd. in Calgary were found to contain in excess of 29.94 weight percent FeO and are similar to crustal garnets (Fipke et al., 1989). The pyroxenes found contained elevated sodium as compared to pyroxenes from kimberlites (Mitchell, 1986). Pyroxenes elevated in sodium are found in alkaline syenitic rocks such as the Crowsnest Vulcanics (Pearce, 1970). Titanium andradite garnet was found near the international border indicating the potential for contamination from Crowsnest Vulcanics derived minerals throughout the block.

The till and gravel samples, taken in close proximity to the kimberlite like aeromagnetic anomalies typically contained fewer indicator minerals than other samples. Stream samples taken down ice from aeromagnetic anomalies from streams flowing rectilinear to glacial ice direction contained few indicator minerals.

Near the aeromagnetic anomaly at Mountain View two streams flowing northeast and down ice from the anomaly contained few indicator minerals. Till samples taken in the area contained no indicator minerals. Southeast of the hamlet of Drywood streams down glacial ice direction and west of the two anomalies contained no indicator minerals. Stream samples taken southwest of the aeromagnetic anomalies near Cardston one indicator mineral while downstream five indicator minerals were found. The numbers of

indicator minerals are low and show no correlation with the four anomalies. The indicator minerals may represent a regional background of indicator minerals.

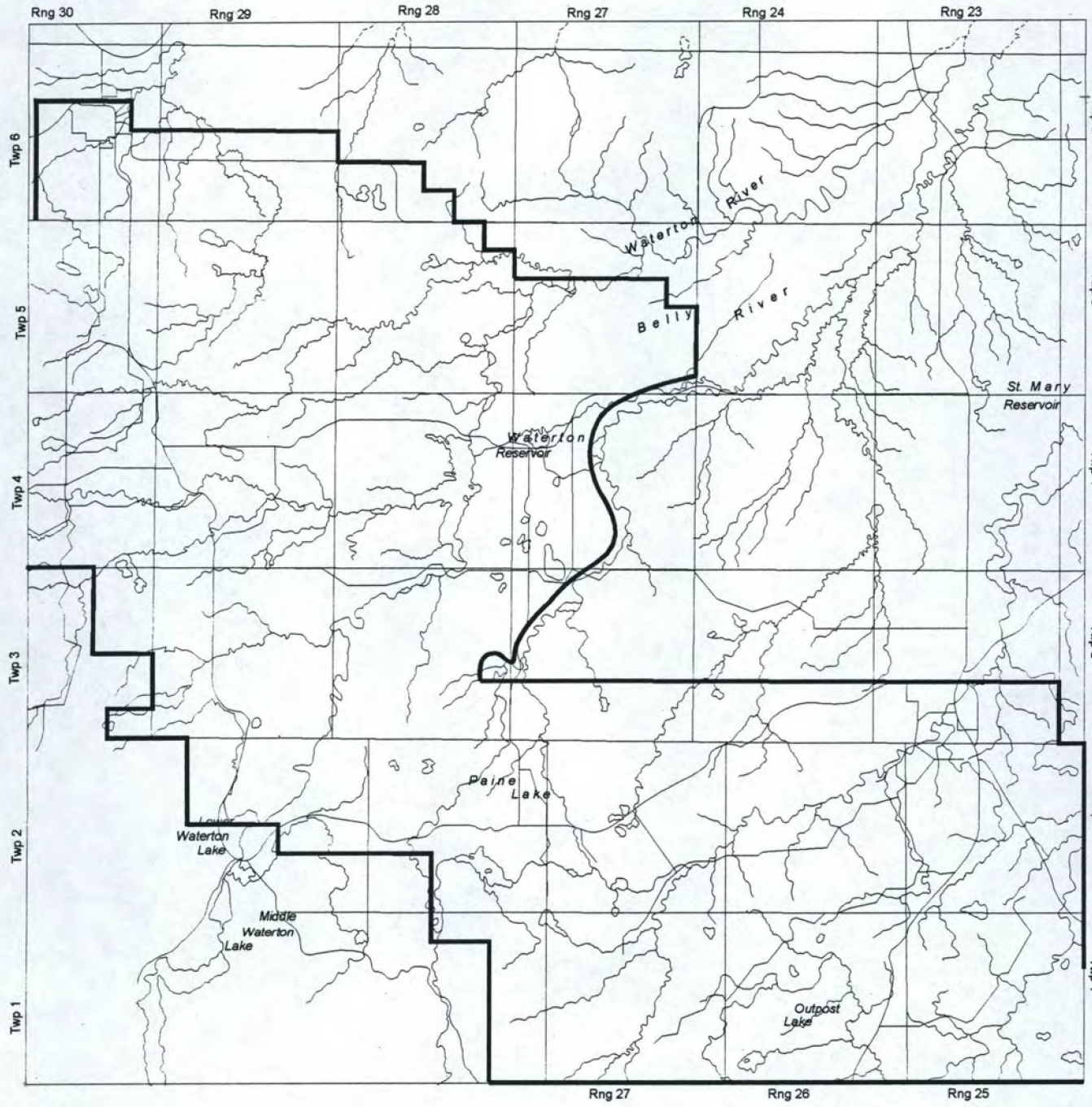
Introduction

This assessment report detail the sediment heavy mineral program carried out in the Pincher Block in the search for diamond bearing alkaline ultrabasic rock. There were 27 samples taken in the summer of 1993 in the Pincher Block.

The Precambrian basement underlying the Pincher Block is the Medicine Hat Block (Ross et al., 1991). The Medicine Hat Block has been dated between 2.65 and 3.27 Ga. The Medicine Hat Block is bounded to the north by the Vulcan aeromagnetic low and to the south by the Wyoming craton. The Medicine Hat Block maybe the northern extension of the Wyoming craton (Luth et al., 1994). The Wyoming Craton is known to host alkaline ultrabasic diamond bearing rocks. The association of a Precambrian basement terrane spatially related to diamond bearing alkaline ultrabasic rock make the Pincher Block a potential target for diamond exploration.

Location

This assessment report pertains to the Pincher Block. The block is composed of 10 contiguous metallic and industrial permits in the extreme southwest of Alberta. The block consists of 92000 hectares or 230,000 acres. The block lies within the townships 1 to 6, ranges 24 to 30 west of the 4th meridian and excludes the Blood Indian Reserve and the Waterton Lakes National Park. Six paved roads link the towns, parks, reserves and some of the smaller communities. Access is good with township and range roads in the Pincher Creek area while to the south access is limited near the national park.



Pincher Block

Towns
Lakes
Roads
Rivers
Property boundary

0 10 km
scale

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TAKLA STAR
RESOURCES LTD.

Permit Tabulation

The permit holder of the metallic and industrial mineral permits which comprise the Pincher Block is held by Takla Star Resources Ltd. This assessment report is submitted by Takla Star Resources Ltd. and authored by Douglas I. Sraega. G.I.T. The list of permits, which comprise the Pincher Block, is given below with amount of money allocated to retain lands pertaining to each permit. The designated lands are to be kept in good standing for 6 years with exploration expenditures in excess of $25 per hectare. At the current time the block is a joint venture between Takla Star Resources Ltd. 75% and Fairstar Exploration 25%. The description of the tracts of lands pertaining to each permit is given in Appendix II. The statement of expenditures is given in Appendix III.

Permit Number	Amount of Money Allocated to Permit
9393040042	$0.0
9393040043	$14,608.01
9393040044	$0.0
9393040045	$0.0
9393040046	$18,260.02
9393040076	$0.0
9393040077	$0.0
9393040078	$0.0
9393040079	$0.0
9393040033	$10,956.00

The list of metallic and industrial mineral permit numbers with the locations to be retained by Takla Star Resources.

Permit Number	Description of Lands to be Retained
9393040042	-
9393040043	4-27-002: 28; 29
9393040044	-
9393040045	-
9393040046	4-29-004: 18; 20; 7 NE; NW P P-Portions designated as the Drywood River
9393040076	-
9393040077	-
9393040078	-
9393040079	-
9393040033	4-26-001: 27 NE; 28; 34 SW

Work Performed

A stream sediment heavy mineral program was conducted in the summer of 1993. The sediment heavy mineral geochemical survey report for the 1993 field season is given in Appendix I.

Field Work	Dates
Sediment Heavy Mineral Program	June 1 to 25, 1992

Conclusions

The sediment heavy mineral program was designed to test stream, till and gravel samples in close proximity and in down ice directions from four kimberlite like aeromagnetic targets. Two of the aeromagnetic anomalies are east of a gas plant 6 km southeast of the hamlet of Drywood. The other two anomalies are 13 km southwest of Cardston and 3 km northwest of Mountain View.

The predominant indicator mineral of diamond bearing alkaline ultrabasic rock found was pyrope garnet. G9 and G11 (Dawson and Stephen, 1975) were reported in samples from the entire block. The G5 eclogitic garnets classified at Loring Laboratories Ltd. in Calgary were found to contain in excess of 29.94 weight percent FeO and are similar to crustal garnets (Fipke et al., 1989). The pyroxenes found contained elevated sodium as compared to pyroxenes from kimberlites (Mitchell, 1986). Pyroxenes elevated in sodium are found in alkaline syenitic rocks such as the Crowsnest Vulcanics (Pearce, 1970). Titanium andradite garnet was found near the international border indicating the potential for contamination from Crowsnest Vulcanics derived minerals throughout the block.

The till and gravel samples, taken in close proximity to the kimberlite like aeromagnetic anomalies typically contained fewer indicator minerals than other samples. Stream samples taken down ice from aeromagnetic anomalies from streams flowing rectilinear to glacial ice direction contained few indicator minerals.

Near the aeromagnetic anomaly at Mountain View two streams flowing northeast and down ice from the anomaly contained few indicator minerals. Till samples taken in the area contained no indicator minerals. Southeast of the hamlet of Drywood streams down glacial ice direction and west of the two anomalies contained no indicator minerals. Stream samples taken southwest of the aeromagnetic anomalies near Cardston one indicator mineral while downstream five indicator minerals were found. The numbers of indicator minerals are low and show no correlation with the four anomalies. The indicator minerals may represent a regional background of indicator minerals.

References

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Luth R. C., Creaser R. A., Covell P. A. and Buhlman A. L., 1994, Lower crustal xenoliths of the Sweetgrass hills: preliminary findings. In Ross G. M., (editor), 1994, Alberta basement transects workshop (February 14-15), Lithoprobe Report #37, Lithoprobe Secretariat, University of British Columbia, pages 240-249

GSC, Map 9856G-Aeromagnetic Series, Pincher Creek, Alberta, NTS 82H/5, scale 1:50000

GSC, Map 9860G-Aeromagnetic Series, Waterton Lakes, Alberta, NTS 82H/4, scale 1:50000

GSC, Map 9861G-Aeromagnetic Series, Cardston, Alberta, NTS 82H/3, scale 1:50000

Pearce T. H. 1970, The analcite bearing volcanic rocks of the Crowsnest Formation, Alberta Canadian Journal of Earth Sciences, 7, 46, pages 50-62.

Ross G. M., Parrish R. R., Villeneuve M. E. and Bowring S. A., 1991, Geophysics and Geochronology of the Basement of the Alberta Basin, Western Canada. Canadian Journal of Earth sciences, vol. 28, pages 512-522.

Stephen W. E. and Dawson J. B., 1977, Statistical comparison between pyroxenes from kimberlites and their associated xenoloiths. Journal of Geology, vol. 85, pages 443-449.

Statement of Qualification

I, Douglas I. Sraega of [redacted] Edmonton , Alberta do hereby certify that.

1.) I am a graduate of the University of Alberta, Edmonton with a B.Sc. in Science obtained in 1987.

2.) I have completed a Special Certificate in Geology from the University of Alberta obtained in 1993.

3.) I am the author, except for the statement of expenditures, of this report.

Certified [redacted] Data Dec. 16/94

Appendix I

Report on the 1993 Stream Sediment Heavy Mineral Geochemistry Survey

REPORT ON THE 1993 STREAM SEDIMENT HEAVY MINERAL GEOCHEMISTRY SURVEY

ON THE

PINCHER BLOCK
ALBERTA
NTS 82H

Prepared for

TAKLA STAR RESOURCES LTD.

BY

D.I. SRAEGA, Geologist
EDMONTON ALBERTA

FEBUARY 1994

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Executive Summary

General

Stream, gravel and till spatially associated with kimberlite like aeromagnetic anomalies in the Pincher block were sampled to assess the potential for diamondiferous source rock. There are four aeromagnetic anomalies in the block. Two aeromagnetic anomalies are east of a gas plant 6 km southeast of the hamlet of Drywood. The other two anomalies are 13 km southwest of Cardston and 3 km northwest of Mountain View (GSC Maps: 9856G, 9860G and 9860G).

Results

There are indicator minerals in the Pincher block but indicator minerals do not source from the areas associated with the aeromagnetic anomallies. The indicator minerals may be due a regional background of indicator minerals.

Recomendations

The work to date indicates that there are no concentrations of indicator minerals correlating with the aeromagnetic anomalies. The suite of indicator minerals found gives no indication of diamond potential in the area. No further work should be planned in the block.

1 Introduction

This report describes the results of a heavy mineral stream geochemistry program carried out on the Pincher Block during the spring of 1993. The aim of this exploration program is to test stream, gravel and till spatially associated with kimberlite like aeromagnetic anomalies in the Pincher block to assess the potential for diamondiferous source rock. There are four aeromagnetic anomalies in the block. Two aeromagnetic anomalies are east of a gas plant 6 km southeast of the hamlet of Drywood. The other two anomalies are 13 km southwest of Cardston and 3 km northwest of Mountain View.

Kimberlites and lamproites are the primary source of diamond. Diamondiferous kimberlites are found in deep Archean cratons and lamproites with paleobenioff zones in mobile belts. Diatreme clusters and fields lie along linears controlled by deep crustal fractures. The Legend Block lies over the Archean Medicine Hat Block which has been interpreted as the northern extension of the Wyoming craton. Diamondiferous kimberlites are found in the Wyoming craton along the Colorado-Wyoming border.

2 Location, Access and Physiography

2.1 Location and Access

The Pincher Block comprises an area from range 25 to 30 west of the 4th meridian and from the U.S. border north to the 6th township. The Block excludes Waterton Lakes National Park and the Blood Indian Reserve. The area is predominantly agricultural with major population centers of Pincher Creek and Cardston. The Waterton and Belly Rivers are the major drainages in the area and the Waterton Reservoir is the only large body of water. Six paved highways link the towns, parks, reserves and some of the smaller farming communities. Access is good near the town of Pincher Creek with township and range roads while south of the Waterton Reservoir access is limited.

2.2 Physiography

The Pincher Block physiographically lies in the Southern Foothills of the Canadian Cordillera and the Cardston Plain of the Western Alberta Plains. The foothills are subdivided from west to east into the Beauvais Lake Upland and Goose Lake Bench. The Cardston Plain lies along the eastern strip of the Pincher Block and belongs to the Southern Alberta Upland. The Cardston Plain is a gently sloping plain with local relief of 90 to 120 meters and incised river valleys. The Southern Foothills consists of a series of roughly parallel ridges with a southeast to northwest trend.

Elevations range from 1600m near the Montana border to 1100m along the northeast margin of the block. Rivers drain from southwest to northeast and are part of the Nelson Drainage system to Hudson Bay. Vegetation in the foothills consists of fescue grassland and parkland in sheltered areas. The vegetation in the plains is dominantly fescue (Walker, 1991).

3 Regional Geology

The Precambrian basement underlying the Pincher Block is the Medicine Hat Block (Ross et al., 1991) which is dated between 2.65 and 3.27 Ga. The 1.8 Ga Great Fall Tectonic Zone separates the Wyoming craton from the Medicine Hat Block. The block is bounded to the north by the Vulcan aeromagnetic low which is interpreted to be an aulocogen or a collision suture (Ross et al., 1991).

The youngest rocks in the block are the Paleocene Porcupine and Willow Creek Formations subcropping along the northeast margin of the Pincher Block. The Cretaceous Alberta Group and the Brazeau Group which includes the Belly River, Bearpaw and St. Mary River Formations subcrop and outcrop along the Foothills.

An inlier of Precambrian Purcell group rocks exists in Waterton National Park. The Lower Cretaceous Crowsnest Vulcanics at Blairmore in the Crowsnest Pass outcrop along a north to south 209 km^2 trend. The vulcanics are predominantly pyroclastic rocks with tuffs and agglomerates. The vulcanics are an undersaturated sodic rock comparable to nepheline syenite containing titanium andradite garnet and aegirine-augite pyroxene. The titanium andratite garnets, known as melanite, are black euhedral dodecahedrons containing more than 1.9 wt. % TiO_2. The pyroxenes are typically zoned deep to pale green with greater than 2 wt. % Na_2O and greater than 15 wt. % CaO (Pearce, 1970).

The Laurentide ice sheet advanced, in a southerly direction, through the area and retreated about 19000 years ago. The most western portion of the block was affected by the cordilleran ice sheet. Glacial deposits are predominantly till and mixed till and glaciolacustrine deposits along the eastern margin of the Foothills. Till and till overlain by ice marginal glaciofluvial sediments are found at higher elevations. In the Cardston Plain glaciolacustrine and glaciofluvial deposits overlie till. Colluvium is found only along steep slopes and alluvium in incised valleys. The Drift thickness as determined from drill hole data varies from 25 to 175 ft (Walker, 1991).

4 Exploration Program

4.1 Field Sampling

The sample program was designed to sample stream, till and gravel samples in close proximity and down ice from four aeromagnetic targets in the block. Field samples were obtained by screening sediment to -2mm and washing to remove excess silt and clay. The sample was put in 20 liter plastic buckets for lab consignment.

There were 27 samples of the PB series sent for lab processing. Samples weigh +/- 40 Kg. The four till samples are designated with the T prefix and the two gravel samples are marked with the G prefix. The other 20 samples were from stream sediments.

4.2 Lab Processing

The laboratory process concentrates indicator minerals by density and magnetic susceptibility. The samples were not processed utilizing alkali fusion or x-ray fluorescence to recover diamond. Diamond would report in the non-magnetic heavy fraction.

Field samples were weighed and run through a wilfley table to produce coarse heavy mineral concentrates. The concentrates were dried under moderate heat then separated with heavy liquid utilizing acetylene tetrabromoethane (TBE) with a density of 2.96 g/cm^3. The heavy mineral separates were rinsed with acetone and the TBE recycled. The sample was sieved to + and - 28 mesh fractions. The -28 mesh fraction was then cleaned of magnetite with a hand magnet. Magnetic separation was done utilized a Frantz Isodynamic Magnetic Separator. Current settings of .4 and .6 Amps were used to produce .4 paramagnetic, .6 paramagnetic and non-magnetic heavy mineral separates.

Heavy mineral separates were picked at Loring Labs in Calgary and probed at the University of Calgary and University of Alberta. Electron microprobe analyses were analyzed at Loring Laboratory by computer using the criteria of Stephens and Dawson (1975 and 1977), Fipke et al. (1989) and Gurney (1985) for garnets, pyroxenes, and ilmenites.

5 Indicator Minerals

Indicator minerals are minerals which indicate to the presence of a kimberlite, lamproite or the potential for diamond in an intrusion. These minerals are characteristic of phases found in lamproites or kimberlites, minerals in the upper mantle or found as inclusions in diamonds. Some minerals commonly found in kimberlites and lamproites are also found in alkali basalts, carbonatites, lamprophyres and other rocks. Care should be taken to screen for minerals only of potential economic importance.

Diamond inclusion (DI) mineral chemistries are determined from syngenetic inclusions from diamonds. Diamond inclusion chromites typically have greater than 60 wt. % Cr_2O_3, Mg# greater than .6 and Al_2O_3 less than 10 wt. %. Eclogitic garnet containing greater than .07 wt. % Na_2O with elevated titanium (McCandless and Gurney, 1989 and Fipke et al.,1989) have been found as diamond inclusions.

Eclogites and peridotites are the two paragenetic sources of minerals from the upper mantle. They are found as xenocrysts and xenoliths in the primary source rocks. Peridotites are the source for peridotitic G1, G2, G7, G9, G10 and G11 garnets (Stephen and Dawson, 1975) and chrome diopside. Eclogitic rocks are formed from failed basaltic melts in the upper mantle or the ultrametamorphism of subducted oceanic crust. Eclogitic garnets are classes G3 and G5 garnets as defined by Stephen and Dawson (1975).

Minerals common to other rocks have compositions similar to minerals from kimberlites and lamproites. Chromium substitution in diopside increases with pressure and calcium depletion is correlative with increasing temperature. Chrome diopside is common

to lamprophyres, layered mafic intrusions and other rocks. Subcalcic chrome diopside with greater than 1 wt. % Cr_2O_3 is potentially derived from peridotite xenoliths (Mitchell, 1986). Uvarovitic garnets are often mistakenly classified as G7 (Stephen and Dawson, 1975) garnets. G7 garnets with greater than 5 wt % MgO and less than 26 wt % CaO are important to diamond exploration. The G7 garnet is interpreted to originate from the subduction and subsequent metamorphism of uvarovite bearing serpentinites (Schulze, 1989). Eclogitic G5 (Dawson and Stephen, 1975) garnet has been found by Fipke (1989) to overlap with regional metamorphic garnet compositions. Garnets containing less than 29.93 wt % FeO (Fipke et al., 1989) are potentially derived from eclogitic rocks. Picroilmenites are commonly found in carbonatites but are low in chromium. Ilmenites with greater than 9 wt. % MgO and 3 wt. % Cr_2O_3 is significant to diamond exploration.

Alkaline syenite complexes such as the Crowsnest Vulcanics are often associated with alkaline lamprophyres (Rock, 1987). Lamprophyres typically contain complexly zoned Al and Ti rich augite phenocrysts. Macrocrystal clinopyroxenes from kimberlites contain less than 1 wt. % Cr_2O_3 and TiO_2, less than 3 wt. % Al_2O_3 and less than 2 wt. % Na_2O (Mitchell, 1986).

Kimberlites contain a relatively greater variety and number indicator minerals as compared to lamproites. Because of the diversity of lamproites the only useful indicators are phenocryst and xenocryst chromites and xenocryst eclogitic garnets. Kimberlites contain a wide variety of distinctive phenocryst, macrocryst and xenolith minerals that includes eclogite garnets.

6 Table: Geochemical Sample Results

Sample	Indicator Minerals	Location
PB-1	-	South of Lynch Lakes
PB-2	-	Indianfarm Creek
PB-3	four G9's	Foothill Creek
PB-4	two G9's and two G11's	Foothill Creek
PB-5	-	Drywood Creek
PB-6	one G11	Drywood Creek trib.
PB-T6	-	Down Ice from Anomaly
PB-7	-	Drywood Creek
PB-G7	-	Pit SE of Mountain View
PB-T8	-	Down Ice from Anomaly
PB-8	-	Drywood Creek trib.
PB-9	-	Waterton Reservoir trib.
PB-10	one G11	Waterton Reservoir trib.
PB-T10	-	Down Ice from Anomaly
PB-T11	-	Down Ice from Anomaly
PB-12a	one G9 and one G11	Waterton Reservoir trib.
PB-12b	two G9's	Waterton River
PB-G12	-	Boundary Creek
PB-12c	two G9's	Waterton River
PB-14	one G9 one picroilmenite	Belly River
PB-17	one G1	Bullhorn Coulee
PB-19	one pricoilmenite	Lee Creek
PB-20	one G9 and one 11	Lee Creek
PB-21	-	Lee Creek trib.
PB-22	one G9	Boundary Creek
PB-23	three G9's and one G11	Boundary Creek
PB-25	-	St. Mary River

* not all samples were sent for lab processing and a complete description of sample sites are listed in Appendix 12.2 and electron microprobe results in Appendix 12.1.

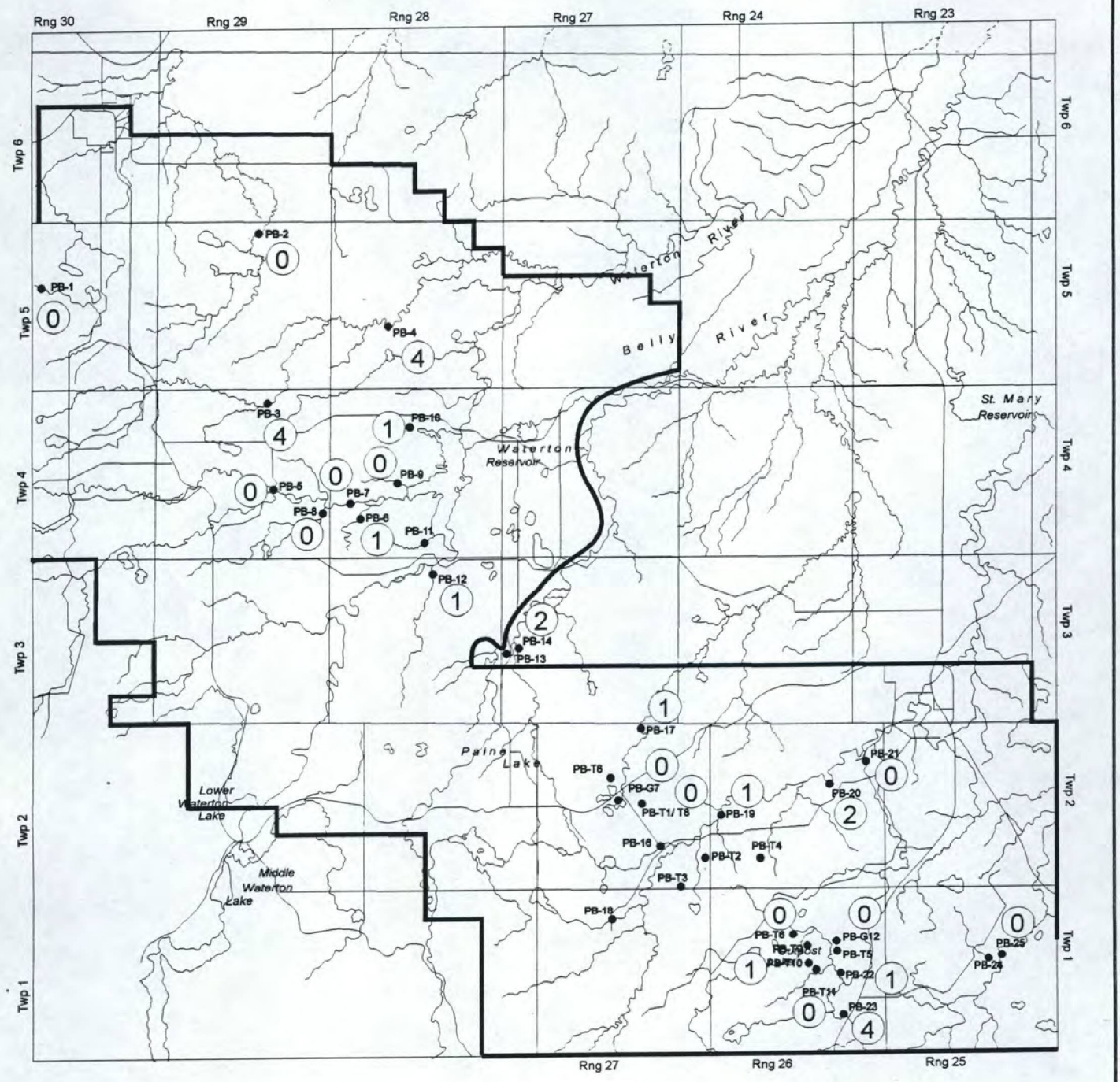

figure 1: Total Indicator Minerals

- Towns
- Lakes
- Roads
- Rivers
- 2 Total Indicator Minerals
- Property boundary
- Sample locations

0 10 km
scale

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7 Discussion

7.1 Electron microprobe Results

The prominent mineral found was G5 (Dawson and Stephen, 1975) magnesian almandine garnet. Fipke (1989) found regional metamorphic almandine compositions overlap with eclogitic G5 garnets compositions. An arbitrary upper limit of 29.94 wt. % FeO (Fipke, 1989) was set to screen for G5 garnets potentially derived from kimberlites and lamproites. This removed most of the G5 garnets classified by Dawson and Stephen (1975) criteria at Loring Labs from the final results.

The G4 garnets classified at Loring Labs are infact titanium andradite (melanite) garnets. Some of the melanite garnets were found to contain from 3.08 to 9.38 wt. % TiO_2 were found south of the Blood Indian Reserve. This indicates the potential for contamination as far south as the U.S. border from the Crowsnest Vulcanics.

The G6 garnets classified by computer contained low total MgO and as such can not be classified as G6 garnets. These garnets were not included in the final tabulation

Wehrlitic ferro-magnesian grossular (G7) is interpreted to originate from subduction and metamorphism of uvarovite bearing serpentinites. The two uvarovitic garnets found contain elevated CaO and fall slightly below the crustal garnet field (Schulze, 1989).

Peridotitic chrome-pyropes of the G9 and G11 are derived from deep seated peridotite xenoliths. The G9 chrome pyrope is associated with garnet lherzolites and is subordinate to garnets derived from harzburgite in diamond potential. The G1, G9, and G11 garnets have been identified in diamond inclusions and matrix from kimberlite but not from lamproite diamond inclusions. These garnets however have been identified in lamproite matrix (Fipke, 1989).

Ilmenites from alkali basalts are similar to kimberlite ilmenites with 3 to 7 wt. % MgO except they are low in chromium (Mitchell, 1986). Samples PB-14 and 19 contain ilmenite with greater than 8 wt % MgO and elevated chromium.

Phenocrystal clinopyroxenes from kimberlites show a linear relationship between CaO and Cr_2O_3 (Mitchell, 1986). The majority of the chrome rich clinopyroxenes found in this study do not show the linear relationship with calcium and chromium and may have been derived from another source (possibly the Crowsnest Vulcanics) and are not used as indicator minerals.

The nature and close proximity of the Crowsnest Vulcanics and the potential for contamination has leads to the conclusion that lherzolitie derived G1, G9 and G11 garnets and some select picroilmenites are the only good pathfinder mineral in the Pincher Block.

7.2 Potential Source Rocks

A map illustrating the distribution of sample locations and indicator minerals found is given in figure 1.

The till and gravel samples taken in close proximity to the aeromagnetic anomalies were barren. Stream samples taken down ice from aeromagnetic anomalies from streams running rectilinear to ice direction contained few indicator minerals. Stream samples southwest of Cardston contained one indicator while downstream five indicator minerals were found. This is similar to findings of Dummet (1986) for indicator mineral trains in streams. To the southeast two samples contained no indicator minerals along the St. Mary River.

The aeromagnetic anomaly near Mountain View contained indicator minerals on two streams running northeast and down ice from the anomaly. A till sample contained no indicator minerals.

South of the townsite of Pincher Creek and up ice from the two aeromagnetic anomalies near the gas plant two samples contained no indicator minerals. Streams down ice contained indicator minerals and streams west and upstream of the anomallies were barren.

Two samples north of the gas plant and up ice from the aeromabnetic targets contained indicators. The numbers of indicator minerals are low and show no correlation with the aeromagnetic anomallies. The indicators found may represent a regional background of indicator minerals.

7.3 Diamond Potential

No diamonds have been found to date in the Pincher Block. The number of indicator minerals found to date does not include minerals with diamond inclusion chemistries. The small number of indicator minerals gives no indication for potential diamond bearing source rocks in the Pincher Block.

8.0 Conclusion

The Pincher Block contains indicator minerals but indicator minerals do not source from the aeromagnetic anomallies. The indicator minerals may be due a regional background of indicator minerals.

9 Recomendations

The work to date indicates that there are no concentrations of indicator minerals correlating with the aeromagnetic anomalies. The suite of indicator minerals found gives no indication of diamond potential in the area. No further work should be planned in the block.

10 References

Dawson J.B. and Stephens W.E., 1975, Statistical Classification of Garnets from Kimberlite and Associated Xenoliths. Journal of geology, vol. 83 pp589-607.

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GSC, Map 9856G-Aeromagnetic Series, Pincher Creek, Alberta, NTS 82 H/5, scale 1:50000

GSC, Map 9860G-Aeromagnetic Series, Waterton Lakes, Alberta, NTS 82 H/4, scale 1:50000

GSC, Map 9861G-Aeromagnetic Series, Cardston, Alberta, NTS 82 H/3, scale 1:50000

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11 CERTIFICATE OF QUALIFICATION

I, Douglas I Sraega of [redacted] Edmonton, Alberta do hereby certify that:

1. I am a graduate of the University of Alberta, Edmonton with a B.Sc. in Science obtained in 1987.

2. I have a Special Certificate in Geology from the University of Alberta obtained in 1993.

3. I have not, nor do I expect to receive any interest directly or indirectly in the property or in the securities of Takla Star Resources Ltd.

Dated in Edmonton, Alberta, this 4th day of February, 1991

Certified Date

Appendix 12.1

Electron Microprobe Results

LORING LABORATORIES LTD.

629 Beaverdam Rd. N.E.
Calgary, Alberta T2K 4W7

Tel: (403) 274-2777
Fax: (403) 275-0541

To: Takla Star Resources

From: Daniel Beauchamp

Date: September 24, 1993

Subject: Sample Results

1. Introduction

Enclosed are the results of the processing of several of your samples numbered PB-6, PB-10, PB-17, PB-19, PB-21 and PB-25.

2. Minerals Probed

Of the 170 grains selected, 70 were probed. The results for the minerals probed are on the accompanying charts and tables.

Garnets have been classified by Dawson and Stephens (1975). Note that the garnets classified as G4 are actually schorlomite, a variant of andradite and should be reviewed with the type garnets in that article.

The garnets that grade in Gurney's G9-G10 classification are shown in the accompanying chart. None of the garnets have sufficient sodium to classify as eclogitic garnets as defined by Fipke (1989).

The pyroxenes have been classified according to Stephen and Dawson (1977) on the table enclosed. They are charted on the accompanying graph.

The one ilmenite grain that was analyzed is plotted on a graph.

3. Minerals identified by EDS

Of the minerals of interest, 28 garnets contain little magnesium and chrome, 24 others are schorlomite, and 25 pyroxenes contain little or no chrome.

The other minerals selected from these samples consist of four rutiles with minor niobium, two zircons, four amphiboles, five Mg-Al spinels, and eight ilmenite with little magnesium.

4. References

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1977: Statistical Comparison Between Pyroxenes from Kimberlites and their Associated Xenoliths. Journal of Geology, vol. 85, p. 433-449.

Loring Laboratories Limited

File No. : 35915

Microprobe Data

Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	FeO	MgO	CaO	Na2O	F	Cr2O3	ZnO	TOTAL	MINERAL	
	Location			Data in wt %									Data added to total			
PB- 6	20	B	4	38.55	0.02	21.34	28.81	3.75	7.93	0.00	0.03	0.01		100.44	garnet	
PB- 6	20	D	4	37.73	0.01	20.92	32.49	2.92	5.50	0.00	0.03	0.03		99.63	garnet	
PB- 6	20	E	4	37.89	0.00	21.34	32.72	4.51	3.30	0.00	0.03	0.01		99.80	garnet	
PB- 6	20	G	4	38.71	0.04	21.35	27.52	5.00	6.28	0.00	0.00	0.02		98.92	garnet	
PB- 6	20	H	4	38.32	0.00	21.84	36.80	5.13	0.97	0.00	0.04	0.04		103.14	garnet	
PB- 6	20	I	4	41.47	0.89	18.28	7.54	20.43	5.78	0.03	0.00	6.14		100.56	garnet	
PB- 6	20	B	5	37.66	0.02	21.19	33.02	5.48	2.14	0.00	0.07	0.12		99.70	garnet	
PB- 6	20	C	5	52.60	0.08	4.84	7.20	21.49	10.01	0.75	0.09	0.28		97.34	pyroxene	
PB- 6	20	F	5	52.15	0.48	7.51	2.83	15.28	19.76	1.74	0.00	0.99		100.74	pyroxene	
PB- 6	20	G	5	54.29	0.27	1.99	4.13	19.11	17.84	1.42	0.02	0.63		99.70	pyroxene	
PB- 6	20	I	5	53.46	0.13	3.84	2.28	17.36	21.98	0.86	0.00	1.03		100.94	pyroxene	
PB- 6	20	A	6	0.00	0.05	48.46	10.18	1.39	0.02	3.90	0.07	0.07	35.86	100.00	gahnite	
PB- 6	20	A	7	33.46	0.54	32.29	13.93	1.47	0.19	1.93	0.93	0.00		84.74	tourmaline	
PB-10	20	C	1	37.67	0.00	21.38	35.69	4.54	1.63	0.00	0.07	0.04		101.02	garnet	
PB-10	20	D	1	38.41	0.00	21.73	31.72	6.30	2.66	0.00	0.05	0.01		100.88	garnet	
PB-10	20	F	1	38.26	0.00	21.73	34.73	4.47	2.42	0.00	0.05	0.04		101.70	garnet	
PB-10	20	G	1	38.03	0.00	21.76	34.73	5.83	1.14	0.00	0.15	0.00		101.64	garnet	
PB-10	20	H	1	42.15	0.72	18.65	7.14	21.03	5.58	0.02	0.02	6.19		101.50	garnet	
PB-10	20	J	1	37.63	0.00	21.19	36.53	2.49	2.16	0.00	0.03	0.04		100.07	garnet	
PB-10	20	E	2	54.03	0.06	2.15	3.04	16.31	22.84	0.90	0.00	1.26		100.59	pyroxene	
PB-10	20	G	2	51.86	0.07	4.03	6.43	14.59	21.96	0.74	0.03	0.63		100.34	pyroxene	
PB-10	20	H	2	53.65	0.04	2.22	4.14	16.47	22.20	0.64	0.03	0.67		100.06	pyroxene	
PB-10	20	I	2	53.30	0.01	0.55	5.84	15.39	23.83	0.20	0.01	0.07		99.20	pyroxene	
PB-10	20	D	3	31.31	7.08	1.89	23.80	0.38	30.04	0.09	0.03	0.01		94.63	garnet	schorlomite
PB-17	20	D	8	38.14	0.02	21.62	32.02	6.07	3.06	0.00	0.07	0.06		101.06	garnet	
PB-17	20	H	8	42.37	0.65	19.85	8.28	20.15	5.16	0.00	0.02	3.65		100.13	garnet	
PB-17	20	A	9	42.80	0.28	19.52	7.19	21.42	5.30	0.01	0.00	5.43		101.95	garnet	
PB-17	20	C	9	0.00	0.05	49.31	9.60	1.79	0.02	3.73	0.01	0.03	35.46	100.00	gahnite	
PB-17	20	D	9	0.00	0.07	48.73	7.28	2.46	0.02	4.03	0.05	0.07	37.29	100.00	gahnite	
PB-17	20	F	9	37.70	0.00	21.67	36.22	4.30	0.89	0.00	0.09	0.01		100.88	garnet	
PB-17	20	H	9	27.37	0.75	55.13	14.14	2.04	0.00	0.00	0.01	0.05		99.49	staurolite?	
PB-17	20	I	9	55.81	0.05	2.29	4.31	22.26	11.77	0.58	0.06	0.37		97.50	pyroxene	
PB-17	20	J	9	52.31	0.09	5.59	3.77	21.78	11.69	0.90	0.10	1.50		97.73	pyroxene	
PB-17	20	A	10	53.54	0.07	2.09	5.71	15.41	22.20	0.80	0.00	0.15		99.97	pyroxene	
PB-17	20	F	10	53.42	0.14	2.48	5.56	15.60	22.45	0.53	0.02	0.35		100.55	pyroxene	
PB-17	24	B	1	34.91	3.85	1.70	24.90	0.31	32.03	0.06	0.07	0.00		97.83	garnet	schorlomite
PB-17	24	C	1	42.51	0.65	12.65	21.45	7.89	11.14	1.25	0.10	0.02		97.66	amphibole?	
PB-19	24	A	5	37.88	0.00	21.50	37.48	4.60	0.93	0.00	0.02	0.00		102.41	garnet	
PB-19	24	B	5	37.60	0.00	20.77	34.62	3.14	2.08	0.00	0.03	0.00		98.24	garnet	
PB-19	24	D	5	38.97	0.00	21.77	32.84	6.56	2.04	0.00	0.04	0.00		102.22	garnet	
PB-19	24	F	5	37.85	0.02	20.65	29.99	4.00	6.78	0.00	0.00	0.08		99.37	garnet	
PB-19	24	G	5	37.64	0.02	20.95	30.22	4.27	6.57	0.00	0.00	0.00		99.67	garnet	
PB-19	24	J	5	38.78	0.00	21.51	31.02	6.29	2.70	0.00	0.06	0.00		100.36	garnet	
PB-19	24	C	6	54.17	0.04	1.40	3.96	16.74	22.52	0.66	0.00	0.68		100.17	pyroxene	
PB-19	24	I	6	53.50	0.03	0.82	4.10	16.08	23.72	0.45	0.01	0.22		98.93	pyroxene	
PB-19	24	J	6	53.52	0.03	1.15	6.85	14.62	21.89	0.96	0.00	0.07		99.09	pyroxene	
PB-19	24	C	7	0.00	45.23	0.15	38.10	8.94	0.00	0.00	0.00	5.30		97.72	ilmenite	

Loring Laboratories Limited

File No. : 35915

Microprobe Data

Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	FeO	MgO	CaO	Na2O	F	Cr2O3	ZnO	TOTAL	MINERAL	
PB-19	24	E	7	0.03	0.11	55.73	10.69	21.22	0.00	0.00	0.00	10.72		98.50	spinel?	
PB-21	24	A	2	38.01	0.00	21.82	32.47	7.64	0.88	0.00	0.03	0.03		100.88	garnet	
PB-21	24	C	2	38.77	0.01	21.88	32.29	7.85	1.32	0.00	0.03	0.02		102.17	garnet	
PB-21	24	H	2	37.82	0.00	20.91	31.77	4.45	4.90	0.00	0.08	0.04		99.97	garnet	
PB-21	24	I	2	38.04	0.00	21.36	36.39	3.84	2.23	0.00	0.05	0.08		101.99	garnet	
PB-21	24	J	2	38.80	0.00	21.71	30.02	4.48	6.05	0.00	0.00	0.01		101.07	garnet	
PB-21	24	C	3	36.09	0.89	5.49	15.79	0.21	32.61	0.00	0.15	0.02		91.25	garnet	schorlomite
PB-21	24	D	3	26.87	0.45	55.17	14.41	1.75	0.00	0.00	0.03	0.02		98.70	staurolite?	
PB-21	24	E	3	53.12	0.28	3.37	2.45	17.31	20.85	0.98	0.00	1.27		99.63	pyroxene	
PB-21	24	F	3	53.49	0.07	3.60	2.19	17.21	21.67	0.89	0.01	1.23		100.36	pyroxene	
PB-21	24	G	3	53.12	0.09	1.41	4.64	16.20	22.05	0.52	0.00	0.60		98.63	pyroxene	
PB-21	24	H	3	53.52	0.07	1.95	5.91	16.22	22.14	0.47	0.00	0.68		100.96	pyroxene	
PB-21	24	A	4	53.34	0.01	1.14	7.59	13.51	24.42	0.17	0.00	0.96		101.14	pyroxene	
PB-25	24	A	8	37.47	0.18	20.52	31.68	3.12	6.80	0.00	0.02	0.00		99.79	garnet	
PB-25	24	E	8	37.29	0.00	20.43	37.46	3.77	1.15	0.00	0.00	0.01		100.11	garnet	
PB-25	24	J	8	39.23	0.00	22.30	27.20	10.90	0.75	0.00	0.06	0.02		100.46	garnet	
PB-25	24	B	9	38.62	0.16	21.00	23.12	5.73	11.48	0.00	0.06	0.01		100.18	garnet	
PB-25	24	C	9	37.40	0.04	20.43	30.63	3.49	6.40	0.00	0.02	0.01		98.42	garnet	
PB-25	24	E	9	45.37	0.10	15.21	8.08	16.10	11.57	1.73	0.00	0.39		98.55	pyroxene	
PB-25	24	F	9	52.99	0.21	3.79	2.18	17.39	21.72	0.76	0.00	1.01		100.05	pyroxene	
PB-25	24	G	9	53.91	0.05	3.28	4.33	21.59	12.61	0.66	0.05	0.67		97.15	pyroxene	
PB-25	24	J	9	53.82	0.05	0.81	5.45	15.23	23.14	0.54	0.00	0.29		99.33	pyroxene	
PB-25	24	C	10	29.85	1.45	12.53	15.23	1.69	11.26	0.03	0.45	0.14		72.63	???	EDS also shows Ce

File No. : 35915

Garnet Classification (after Dawson and Stephens, 1975)

Location				Data in wt %						Garnets Classification											
Sample #	P#	C#	R#	TiO2	Cr2O3	FeO	MgO	CaO	Na2O	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
PB- 6	20	B	4	0.02	0.01	28.81	3.75	7.93	0.00					5							
PB- 6	20	D	4	0.01	0.03	32.49	2.92	5.50	0.00					5							
PB- 6	20	E	4	0.00	0.01	32.72	4.51	3.30	0.00					5							
PB- 6	20	G	4	0.04	0.02	27.52	5.00	6.28	0.00					5							
PB- 6	20	H	4	0.00	0.04	36.80	5.13	0.97	0.00					5							
PB- 6	20	I	4	0.89	6.14	7.54	20.43	5.78	0.03											11	
PB- 6	20	B	5	0.02	0.12	33.02	5.48	2.14	0.00					5							
PB-10	20	C	1	0.00	0.04	35.69	4.54	1.63	0.00					5							
PB-10	20	D	1	0.00	0.01	31.72	6.30	2.66	0.00					5							
PB-10	20	F	1	0.00	0.04	34.73	4.47	2.42	0.00					5							
PB-10	20	G	1	0.00	0.00	34.73	5.83	1.14	0.00					5							
PB-10	20	H	1	0.72	6.19	7.14	21.03	5.58	0.02											11	
PB-10	20	J	1	0.00	0.04	36.53	2.49	2.16	0.00					5							
PB-10	20	D	3	7.08	0.01	23.80	0.38	30.04	0.09				4								
PB-17	20	D	8	0.02	0.06	32.02	6.07	3.06	0.00					5							
PB-17	20	H	8	0.65	3.65	8.28	20.15	5.16	0.00	1											
PB-17	20	A	9	0.28	5.43	7.19	21.42	5.30	0.01									9			
PB-17	20	F	9	0.00	0.01	36.22	4.30	0.89	0.00					5							
PB-17	24	B	1	3.85	0.00	24.90	0.31	32.03	0.06				4								
PB-19	24	A	5	0.00	0.00	37.48	4.60	0.93	0.00					5							
PB-19	24	B	5	0.00	0.00	34.62	3.14	2.08	0.00					5							
PB-19	24	D	5	0.00	0.00	32.84	6.56	2.04	0.00					5							
PB-19	24	F	5	0.02	0.08	29.99	4.00	6.78	0.00					5							
PB-19	24	G	5	0.02	0.00	30.22	4.27	6.57	0.00					5							
PB-19	24	J	5	0.00	0.00	31.02	6.29	2.70	0.00					5							
PB-21	24	A	2	0.00	0.03	32.47	7.64	0.88	0.00					5							
PB-21	24	C	2	0.01	0.02	32.29	7.85	1.32	0.00					5							
PB-21	24	H	2	0.00	0.04	31.77	4.45	4.90	0.00					5							
PB-21	24	I	2	0.00	0.08	36.39	3.84	2.23	0.00					5							
PB-21	24	J	2	0.00	0.01	30.02	4.48	6.05	0.00					5							
PB-21	24	C	3	0.89	0.02	15.79	0.21	32.61	0.00						6						
PB-25	24	A	8	0.18	0.00	31.68	3.12	6.80	0.00					5							
PB-25	24	E	8	0.00	0.01	37.46	3.77	1.15	0.00					5							
PB-25	24	J	8	0.00	0.02	27.20	10.90	0.75	0.00					5							
PB-25	24	B	9	0.16	0.01	23.12	5.73	11.48	0.00			3									
PB-25	24	C	9	0.04	0.01	30.63	3.49	6.40	0.00					5							
										---	---	---	---	---	---	---	---	---	---	---	---
Total Garnets									36	1	0	1	2	28	1	0	0	1	0	2	0
										G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12

File No. : 35915

Pyroxene Classification (after Stephens and Dawson, 1977)

Sample #	Location P#	C#	R#	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	Classification
PB- 6	20	C	5	0.08	4.84	0.28	7.20	21.49	10.01	0.75	CP-1
PB- 6	20	F	5	0.48	7.51	0.99	2.83	15.28	19.76	1.74	CP-3
PB- 6	20	G	5	0.27	1.99	0.63	4.13	19.11	17.84	1.42	CP-2
PB- 6	20	I	5	0.13	3.84	1.03	2.28	17.36	21.98	0.86	CP-5
PB-10	20	E	2	0.06	2.15	1.26	3.04	16.31	22.84	0.90	CP-5
PB-10	20	G	2	0.07	4.03	0.63	6.43	14.59	21.96	0.74	CP-2
PB-10	20	H	2	0.04	2.22	0.67	4.14	16.47	22.20	0.64	CP-2
PB-10	20	I	2	0.01	0.55	0.07	5.84	15.39	23.83	0.20	CP-2
PB-17	20	I	9	0.05	2.29	0.37	4.31	22.26	11.77	0.58	CP-1
PB-17	20	J	9	0.09	5.59	1.50	3.77	21.78	11.69	0.90	CP-1
PB-17	20	A	10	0.07	2.09	0.15	5.71	15.41	22.20	0.80	CP-2
PB-17	20	F	10	0.14	2.48	0.35	5.56	15.60	22.45	0.53	CP-2
PB-19	24	C	6	0.04	1.40	0.68	3.96	16.74	22.52	0.66	CP-2
PB-19	24	I	6	0.03	0.82	0.22	4.10	16.08	23.72	0.45	CP-2
PB-19	24	J	6	0.03	1.15	0.07	6.85	14.62	21.89	0.96	CP-2
PB-21	24	E	3	0.28	3.37	1.27	2.45	17.31	20.85	0.98	CP-5
PB-21	24	F	3	0.07	3.60	1.23	2.19	17.21	21.67	0.89	CP-5
PB-21	24	G	3	0.09	1.41	0.60	4.64	16.20	22.05	0.52	CP-2
PB-21	24	H	3	0.07	1.95	0.68	5.91	16.22	22.14	0.47	CP-2
PB-21	24	A	4	0.01	1.14	0.96	7.59	13.51	24.42	0.17	CP-2
PB-25	24	E	9	0.10	15.21	0.39	8.08	16.10	11.57	1.73	CP-1
PB-25	24	F	9	0.21	3.79	1.01	2.18	17.39	21.72	0.76	CP-5
PB-25	24	G	9	0.05	3.28	0.67	4.33	21.59	12.61	0.66	CP-1
PB-25	24	J	9	0.05	0.81	0.29	5.45	15.23	23.14	0.54	CP-2

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Mean Values of Type Garnets

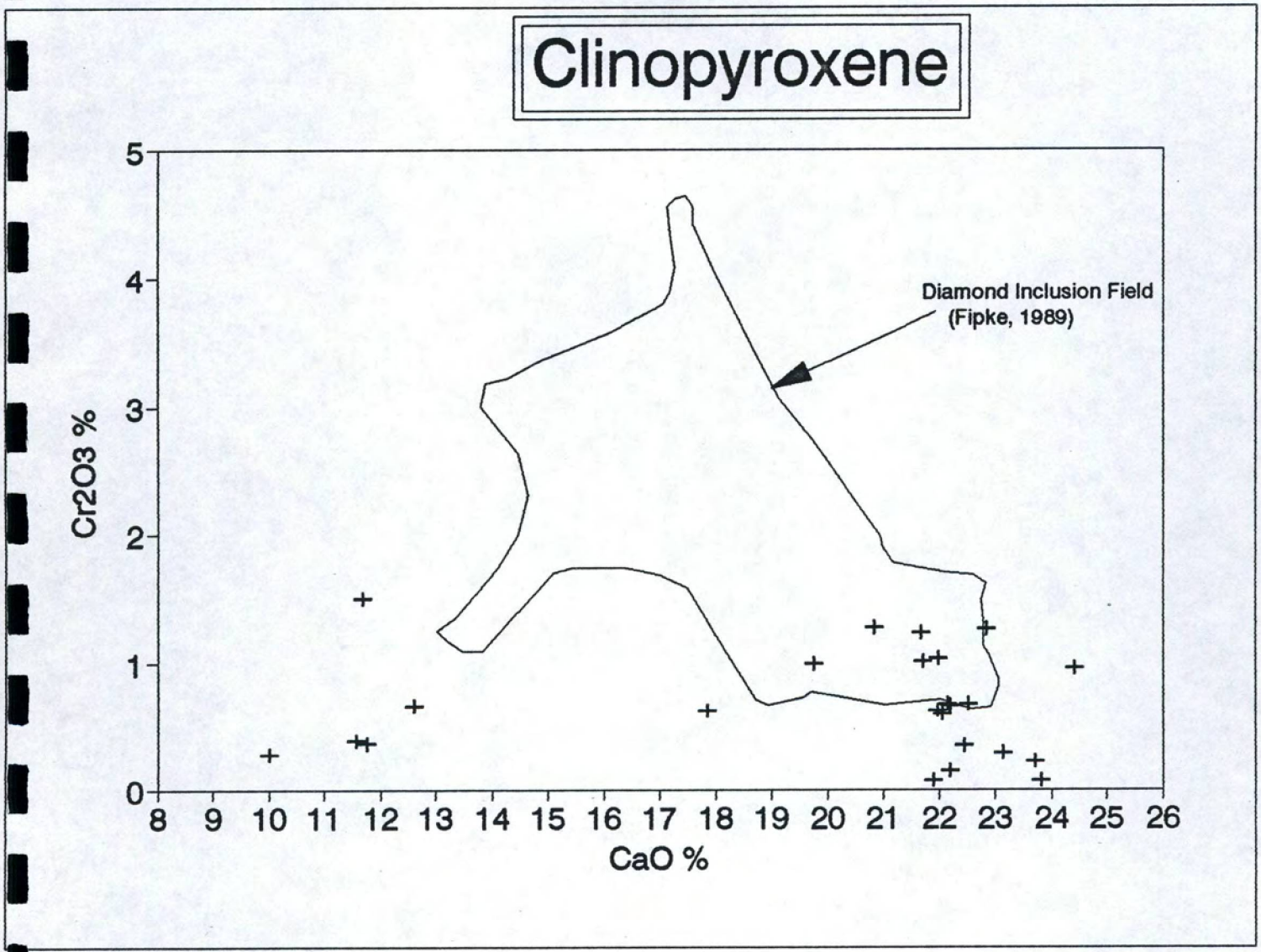
Garnet Classification (after Dawson and Stephens, 1975)

Sample #	P#	C#	R#	TiO2	Cr2O3	FeO	MgO	CaO	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
Titanian Pyrope				0.58	1.34	9.32	20.00	4.82	1											
High-Titanium Pyrope				1.09	0.91	9.84	20.30	4.52		2										
Calcic Pyrope-Almandine				0.31	0.30	16.49	13.35	6.51			3									
Ti-Ca-Mg Almandine				0.90	0.08	17.88	9.87	9.41				4								
Magnesian Almandine				0.05	0.03	28.33	7.83	2.44					5							
Pyrope-Grossular-Almandine				0.24	0.27	10.77	10.38	14.87						6						
Ferrian Uvarovite-Grossular				0.29	11.52	5.25	8.61	21.60							7					
Ferro-Magnesian Grossular				0.25	0.04	6.91	4.69	24.77								8				
Chrome Pyrope				0.17	3.47	8.04	20.01	5.17									9			
Low-Calcium Chrome-Pyrope				0.04	7.73	6.11	23.16	2.13										10		
Titanian Uvarovite-Pyrope				0.51	9.55	7.54	15.89	10.27											11	
Knorringitic Uvarovite-Pyrope				0.18	15.94	7.47	15.40	9.51												12
Total Garnets								12	1	1	1	1	1	1	1	1	1	1	1	1
									G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12

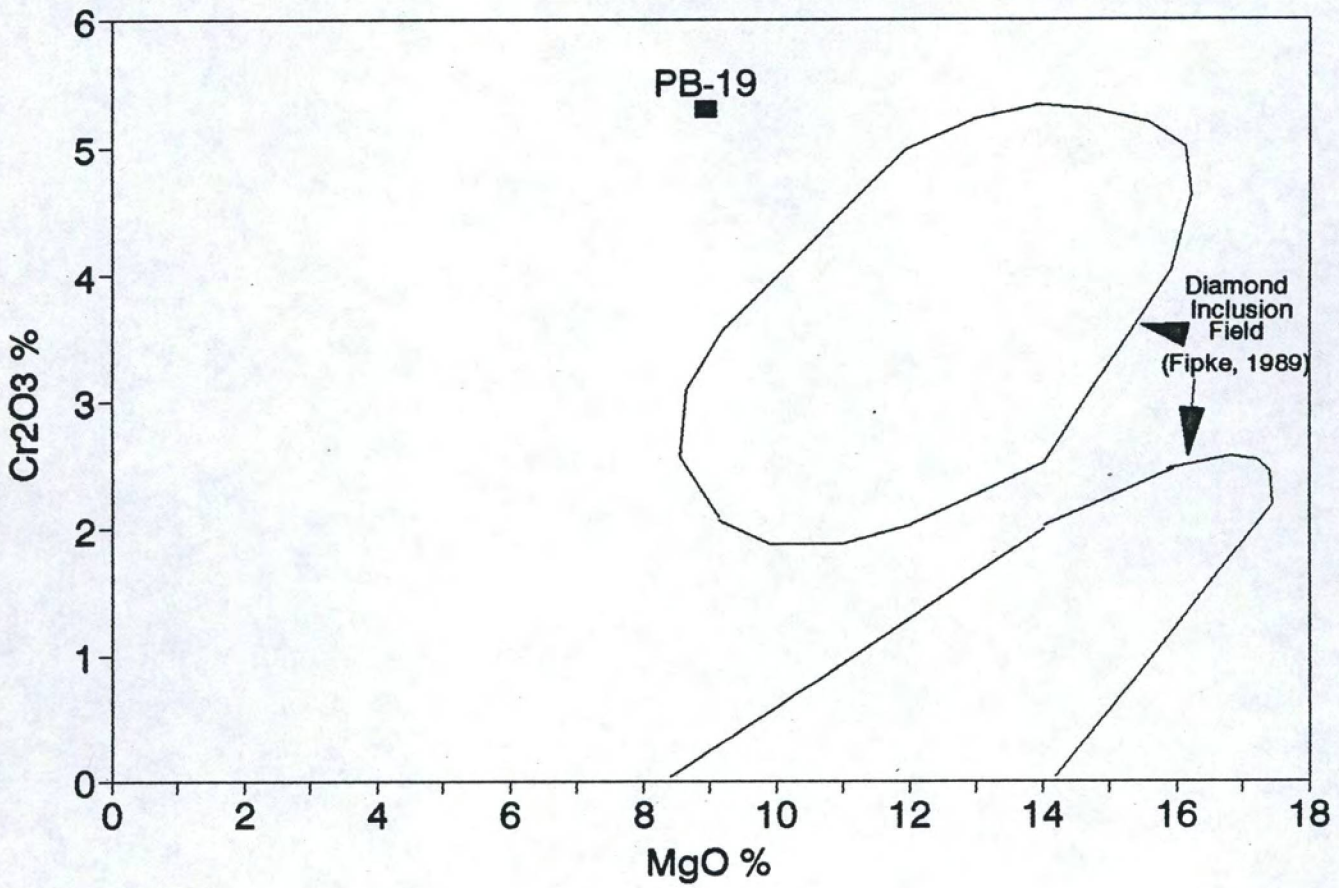
Mean values of type pyroxenes

Pyroxene Classification (after Stephens and Dawson, 1977)

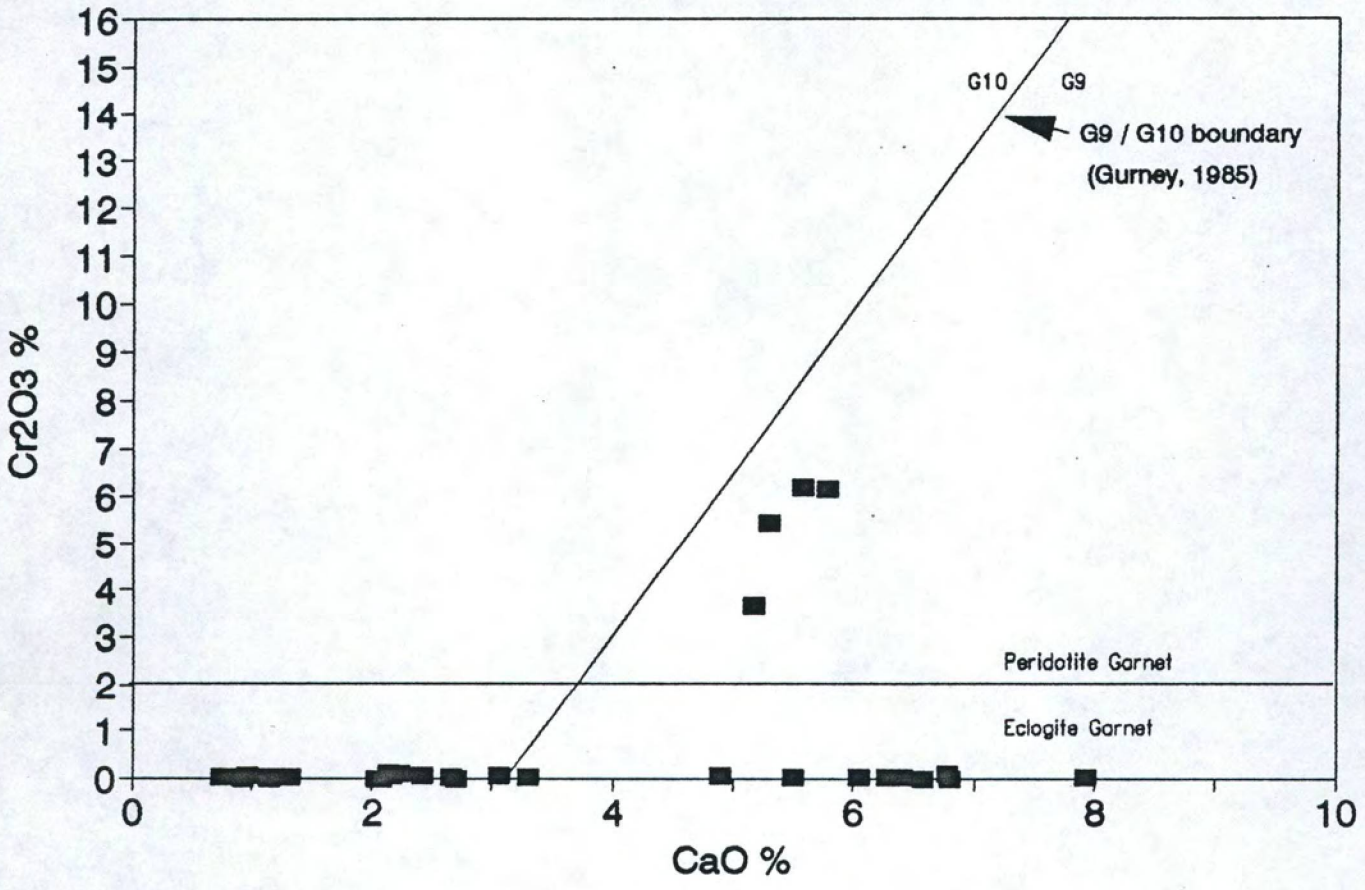
Sample #	P#	C#	R#	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	Classification
Orthopyroxene											
Enstatite				0.02	0.82	0.29	4.52	36.17	0.41	0.08	OP-1
Fe-Al Enstatite				0.02	2.83	0.65	4.90	35.21	0.60	0.03	OP-2
Fe-Ca Enstatite				0.14	1.45	0.32	5.31	33.78	1.42	0.43	OP-3
Ti Enstatite				0.14	0.93	0.25	5.98	34.51	0.71	0.17	OP-4
High-Ti Enstatite				0.19	1.06	0.10	8.64	32.17	1.07	0.22	OP-5
Clinopyroxene											
Sub-Calcic diopside				0.31	2.51	0.43	5.17	20.17	13.80	1.58	CP-1
Diopside				0.26	2.69	0.71	4.16	16.94	18.44	1.78	CP-2
Fe-Cr Diopside				0.80	3.86	1.02	2.61	15.99	19.51	1.94	CP-3
Low-Cr Diopside				0.50	3.19	0.09	5.86	16.88	17.55	1.85	CP-4
Ca Diopside				0.09	2.50	1.45	2.02	16.80	20.66	1.68	CP-5
Ureyitic Diopside				0.27	3.14	2.99	2.37	15.19	17.94	3.11	CP-6
High-Ureyitic Diopside				0.19	3.14	11.80	1.68	19.27	10.60	7.07	CP-7
Jadeitic Diopside				0.44	7.61	0.10	6.10	11.54	14.52	4.50	CP-8
Omphacite				0.27	11.34	0.15	3.29	10.35	14.62	5.09	CP-9
Diopsidic Jadeite				0.22	16.87	0.02	2.42	6.36	10.19	7.64	CP-10


Clinopyroxene
Diamond Inclusion Field
(Fipke, 1989)
Cr2O3 %
CaO %
0
1
2
3
4
5
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

Ilmenite Indicators



Pyrope Garnet Indicators



Mineral Location Diagram

Plug No. 20

	A	B	C	D	E	F	G	H	I	J	Mineral Grains
	X	orange Fe-garnet	orange garnet minor Mn (UN 61)	orange garnet minor Mn (UN 62)	orange almandine	orange garnet minor Mn. (UN 63)	orange garnet no Mn (UN 64)	orange Cr-garnet minor Mn. (UN 65)	spinel orange	orange garnet minor Mn (UN 66)	9
2	orange Ca-Fe garnet	green px no-Cr.	green px no-Cr.	green px no-Cr.	deep green Cr-Px (UN 67)	green px no-Cr.	green px (UN 68)	green px (UN 69)	green px (UN 70)	green spinel	16
3	green spinel	opaque ilmenite	opaque ilmenite.	?? opaque Eds = 0 (UN 71)	opaque as D3	opaque as D3	opaque as D3	opaque as D3.	opaque as D3	X	9
4	orange Fe-Ca garnet	orange garnet minor Mn. (UN 72)	orange garnet Fe-Ca.	orange garnet some-Mn. (UN 73)	orange garnet some-Mn (UN 74)	orange almandine	orange garnet some Mn (UN 75)	orange garnet no-Mn. (UN 76)	pink Cr-garnet (UN 77)	deep red rutile no Nb.	10
5	deep red rutile no Nb.	orange garnet (UN 78)	green px (UN 79)	green px no-Cr.	green px no-Cr.	green px (UN 80)	green px (UN 81)	green px no-Cr.	green px (UN 82)	green px no-Cr.	10
6	green gahnite (UN 83)	green spinel.	green spinel.	opaque ilmenite.	opaque ilmenite.	opaque as D3	opaque as D3	opaque ilmenite.	opaque ilmenite.	opaque amphibole.	10
7	deep brown Tourm. (UN 84)	X	X	X	X	X	X	X	X	X	1
8	orange Fe-Ca gt.	orange almandine	orange Fe-Mn garnet	orange gt. (UN 85)	orange almandine	orange almandine	orange Fe-Ca gt.	orange Cr-garnet (UN 86)	orange Fe-Ca garnet	orange Fe-Ca garnet	10
9	orange Cr-garnet (UN 87)	opaque as D3	green gahnite (UN 89)	green gahnite (UN 88)	opaque as D3.	orange garnet (UN 90)	orange rutile. No Nb.	orange STaur? (UN 91)	green px (UN 92)	green px (UN 93)	10
10	green px (UN 94)	green px no-Cr.	green px no-Cr.	green px no-Cr.	green px no-Cr.	green px (UN 95)	green px no-Cr.	opaque as D3	opaque as D3.	opaque as D3.	10

Total Grains 89

Mineral Location Diagram

Plug No. 24

	A	B	C	D	E	F	G	H	I	J	Mineral Grains
1	X	opaque ?? as D3 (UN96)	opaque garnet (UN97)	opaque as B1	opaque as B1	opaque rutile no Nb	opaque rutile some Nb	X	X	X	6
2	orange garnet no-Mn (UN98)	orange almandine	orange garnet (UN99)	orange almandine	opaque as B1	orange almandine	orange Ca-Fe garnet	orange garnet (UN100)	orange garnet (UN101)	orange garnet (UN102)	10
3	opaque as B1	Zircon.	orange ?? (UN103)	orange Staur.? (UN104)	green px (UN105)	green px (UN106)	green px (UN107)	green px (UN108)	green px no-Cr.	green px no-Cr.	10
4	green px (UN109)	green px no-Cr.	opaque as B1	opaque amphibole.	opaque as B1	X	X	X	X	X	5
5	orange gt (UN110)	orange gt (UN111)	orange Fe-Ca garnet	orange garnet (UN112)	opaque as B1	orange garnet (UN113)	orange garnet (UN114)	orange Fe-Ca garnet	orange almandine	orange gt. some Mn. (UN115)	10
6	orange Fe-Mn-Ca garnet	opaque as B1	green px (UN116)	green px no-Cr.	green px no-Cr.	green px no-Cr.	green px no-Cr.	green px no-Cr.	green px (UN117)	green px (UN118)	10
7	opaque amphibole	opaque ilmenite No Nb.	opaque Cr-Ulvo-spinel? (119)	deep red. as B1	opaque Chrome spinel? (UN120)	opaque as B1	/	X	X	X	6
8	orange gt (UN121)	orange Fe-Ca garnet	orange Fe-Ca garnet	orange almandine	green garnet (UN122)	orange Fe-Ca garnet	orange Fe-Ca garnet	orange almandine	opaque as B1	orange garnet (UN123)	10
9	Zircon.	orange garnet (UN124)	orange garnet (UN125)	opaque as B1	green px (UN126)	green px (UN127)	green px (UN128)	green px no-Cr.	green px no-Cr.	green px (UN129)	10
10	green px no Cr.	green px no-Cr.	brown. TRM? Eds = Ce (UN130)	opaque amphibole.	X	X	X	X	X	X	4

↑ alanite??

Total Grains 81

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Tel: (403) 274-2777
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To: Takla Star Resources

From: Daniel Beauchamp

Date: October 3, 1993

Subject: Results for samples PB-8, PB-12b, PB-12c, PB-13, PB-18, PB-22, PB-23

File #: 35915

1. Introduction

Enclosed are the results of the processing of several of your samples.

The data sheets represent the microprobe data as received from the technician. The oxides are presented in percent of the composition of the mineral.

We have identified the minerals selected using the EDS. To increase the turnaround time and decrease costs, we have probed only the grains containing oxides that are of use as indicators minerals.

Care must be taken in interpreting this data. Although some of these minerals may be found in kimberlite or lamproite, they may also be present in other rocks.

Following are a few notes on the mineral grains selected from your samples. Tables of results and charts are attached to this report.

2. Garnet

The garnets which were probed have been classified according to Dawson and Stephens' (1975) classification on the accompanying table. Of the 29 grains probed, 1 classifies as G3, 1 as G3, 16 as G5, 2 as G7, 8 as G9, and 1 as G11 (see table).

Two schorlomite garnet ($Ca_3(Ti,Fe)_2[(Si,Fe)O_4]_3$, also known as melanite, a variety of andradite) were probed and six others of similar composition were identified in these samples. These would normally classify as G4 on the Dawson and Stephens (1975) table, but they contain about three times as much calcium and titanium, and less than 1/30 as much magnesium as the type G4 garnet.

Because schorlomite does not fit into the Dawson and Stephens system, these minerals have not been graphed nor included in the tables for garnets. They contain 0.00-0.01% Cr_2O_3.

Of the 29 garnets, only one grain from PB-23 has more than 0.01% Na_2O. Because of the poor polish on the grain, the total for the elements is low and the analysis may be suspect. It is plotted on the accompanying graph.

The twelve garnets containing more than 2% Cr_2O_3 plot as G9 on Gurney's (1985) chart for pyrope garnets. The two G7 garnets plot off the chart to the right because of their high calcium content (see chart).

Twenty six other garnets were identified by scanning, and because they contain only very low quantities of magnesium, titanium or chrome, they were not probed.

3. Pyroxene

The 12 pyroxenes have been graded according to Stephen and Dawson's (1977) classification on the accompanying table. All but one classify as CP-3 (titanium-chrome diopside). The other is a CP-4, low chrome diopside.

On the Plot of CaO-Cr_2O_3 plot of Fipke, nine of the pyroxenes place within Fipke's (1989) area of interest.

Twenty other pyroxene grains were identified but because they contain low quantities of chrome, they were not probed.

4. Other Minerals

Other minerals probed include one gahnite (spinel group, one spinel and four tourmaline grains.

Several other minerals were identified by EDS in the suite of grains selected from these samples. They include one grain of rutile (no niobium), two of spinel, 22 grains of zircon, five allanite and 19 ilmenite with low magnesium. These minerals had been selected because they look very similar to diopside, garnet and other indicator minerals.

5. References

Dawson J.B. and W.E. Stephens

1975: Statistical Classification of Garnets from Kimberlite and Associated Xenoliths. Journal of Geology, vol. 83, p. 589-607.

Fipke, C. E. (ed.)

1989: The development of advanced technology to distinguish between diamondiferous and barren diatremes. Geol. Surv. of Canada, Open File Report 2124.

Gurney, J.J.

1985: A correlation between garnets and diamonds in kimberlites; in J.E. Glover and P.G. Harris (eds.), Kimberlite Occurrence and Origin: A basis for conceptual models in exploration, Geol. Dept. and Univ. Exten., Univ. W. Aust., Publ. No. 8, 143-166.

Stephens W.E. and J.B. Dawson

1977: Statistical Comparison Between Pyroxenes from Kimberlites and their Associated Xenoliths. Journal of Geology, vol. 85, p. 433-449.

Loring Laboratories Limited

File No. : 35915

Microprobe Data

Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	F	Total	Mineral	
				Location				Data in wt %							
PB- 8	31	F	4	39.28	0.00	21.98	0.02	33.36	6.05	1.69	0.00	0.04	102.42	garnet	
PB- 8	31	H	4	53.78	0.07	2.10	1.14	2.34	16.56	22.64	0.97	0.00	99.60	pyroxene	
PB- 8	31	I	4	52.89	0.35	3.94	1.45	2.49	16.26	22.52	0.86	0.00	100.76	pyroxene	
PB-12b	28	C	5	38.83	0.01	22.22	0.01	33.05	6.19	2.39	0.00	0.03	102.73	garnet	
PB-12b	28	D	5	41.62	0.01	21.43	4.11	7.63	19.77	5.75	0.00	0.02	100.34	garnet	
PB-12b	28	E	5	42.14	0.16	19.47	6.39	8.15	19.90	5.60	0.01	0.00	101.82	garnet	
PB-12b	28	F	5	35.29	3.15	6.05	0.00	21.66	0.27	30.44	0.04	0.06	96.96	garnet	schorlomite
PB-12b	28	G	5	38.76	0.01	21.85	0.00	31.27	7.64	1.43	0.00	0.04	101.00	garnet	
PB-12b	28	H	5	0.00	0.02	71.73	0.05	4.87	25.31	0.01	0.00	0.01	102.00	spinel	
PB-12c	31	A	6	39.02	0.05	21.43	0.01	28.40	5.46	5.82	0.00	0.07	100.26	garnet	
PB-12c	31	B	6	39.13	0.13	21.35	0.01	29.34	5.66	6.34	0.00	0.00	101.96	garnet	
PB-12c	31	D	6	38.48	0.00	22.03	0.00	33.96	6.15	1.14	0.00	0.02	101.78	garnet	
PB-12c	31	F	6	38.86	0.01	22.27	0.01	32.81	7.65	0.84	0.00	0.01	102.46	garnet	
PB-12c	31	H	6	34.73	3.53	4.28	0.01	22.92	0.20	30.58	0.04	0.02	96.31	garnet	schorlomite
PB-12c	31	I	6	42.13	0.25	21.57	3.15	8.46	20.89	4.64	0.01	0.03	101.13	garnet	
PB-12c	31	J	6	42.39	0.34	20.70	4.09	6.34	21.74	4.72	0.02	0.01	100.35	garnet	
PB-12c	31	B	7	40.98	0.04	23.56	0.04	16.52	12.98	7.56	0.00	0.01	101.69	garnet	
PB-12c	31	C	7	40.02	0.00	22.64	0.20	27.17	11.35	1.00	0.00	0.06	102.44	garnet	
PB-12c	31	D	7	54.70	0.04	2.69	0.70	6.69	20.49	11.76	0.38	0.21	97.66	pyroxene	
PB-12c	31	E	7	36.68	0.59	7.98	13.60	5.32	0.31	32.99	0.00	0.00	97.47	garnet	
PB-12c	31	F	7	52.15	0.05	1.79	0.66	8.16	14.97	20.72	0.45	0.00	98.95	pyroxene	
PB-13	28	B	7	38.10	0.01	22.16	0.02	32.36	6.12	1.23	0.00	0.05	100.05	garnet	
PB-13	28	D	7	38.03	0.00	21.52	0.02	34.73	5.46	1.46	0.00	0.08	101.30	garnet	
PB-13	28	F	7	38.38	0.10	20.91	0.00	32.06	3.65	6.81	0.00	0.02	101.93	garnet	
PB-13	28	I	7	37.93	0.01	22.24	0.03	36.61	4.99	0.95	0.00	0.04	102.80	garnet	
PB-13	28	C	8	0.00	0.12	49.55	0.11	10.67	1.66	0.05	3.47	0.09	65.72	gahnite	
PB-13	28	A	9	35.74	0.72	32.55	0.04	7.24	6.56	0.43	1.83	0.29	85.40	tourmaline	
PB-13	28	B	9	35.81	0.64	34.56	0.11	5.90	6.86	0.95	1.51	0.23	86.57	tourmaline	
PB-18	28	B	1	37.82	0.03	20.86	0.03	33.39	2.61	6.43	0.00	0.05	101.22	garnet	
PB-18	28	B	3	52.26	0.06	2.47	0.76	8.07	15.17	20.46	0.68	0.00	99.93	pyroxene	
PB-18	28	D	3	53.76	0.16	0.55	0.01	7.51	14.68	19.90	2.55	0.06	99.18	pyroxene	
PB-18	28	B	4	36.83	0.54	35.65	0.11	3.99	7.97	0.86	1.52	0.07	87.54	tourmaline	
PB-18	28	C	4	35.95	0.78	34.55	0.07	6.63	6.26	0.72	1.58	0.18	86.72	tourmaline	
PB-22	31	B	1	42.24	0.00	20.89	4.97	7.91	19.38	5.87	0.00	0.00	101.26	garnet	
PB-22	31	F	1	38.10	0.07	21.39	0.03	31.37	5.91	1.40	0.00	0.04	98.31	garnet	
PB-22	31	B	2	52.77	0.23	2.09	0.80	3.34	15.68	22.08	0.69	0.00	97.68	pyroxene	
PB-22	31	C	2	53.86	0.02	1.59	0.94	4.81	14.62	24.14	0.24	0.00	100.22	pyroxene	
PB-23	31	B	9	38.29	0.00	21.86	0.01	33.35	6.99	0.90	0.00	0.04	101.44	garnet	
PB-23	31	G	9	41.69	0.01	19.50	5.81	7.70	19.51	5.58	0.00	0.03	99.83	garnet	
PB-23	31	I	9	41.61	0.22	19.60	5.47	7.39	20.02	4.89	0.02	0.04	99.26	garnet	
PB-23	31	J	9	39.89	0.51	17.14	6.56	6.49	18.51	5.36	0.29	0.03	94.78	garnet	
PB-23	31	A	10	42.21	0.16	21.35	4.07	8.43	19.93	5.11	0.01	0.00	101.27	garnet	
PB-23	31	G	10	41.47	0.80	20.29	3.33	7.97	21.35	4.99	0.03	0.00	100.23	garnet	
PB-23	31	H	10	38.06	0.00	20.63	0.00	36.83	4.11	1.09	0.00	0.05	100.77	garnet	
PB-23	31	I	10	36.66	0.54	5.07	15.96	0.10	0.14	33.39	0.00	0.03	91.89	garnet	
PB-23	32	B	1	50.59	0.20	4.88	1.16	4.39	16.95	20.81	0.24	0.00	99.22	pyroxene	
PB-23	32	C	1	53.21	0.15	1.90	1.30	2.77	16.48	22.57	0.88	0.00	99.26	pyroxene	

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ile No. : 35915

icroprobe Data

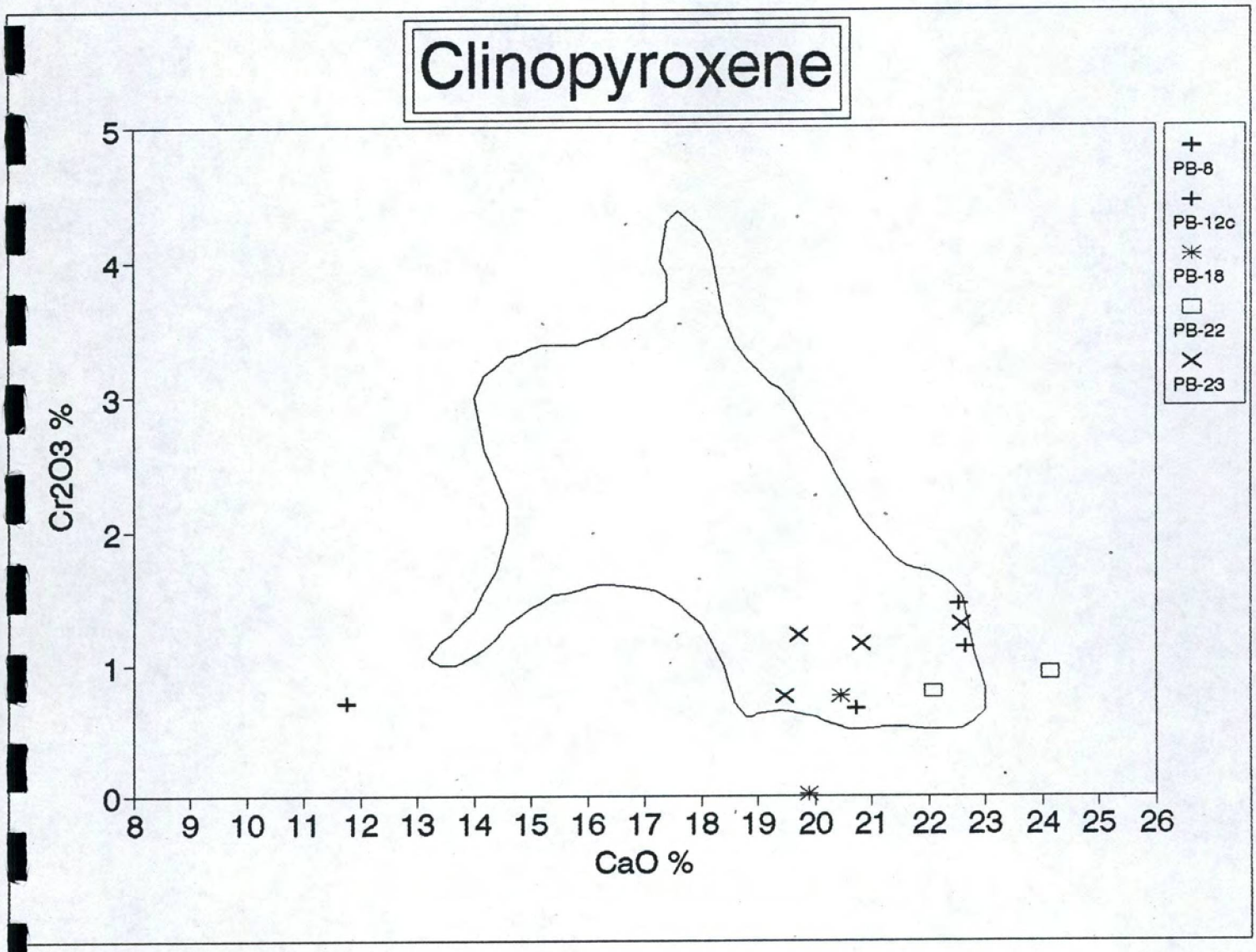
Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	F	Total	Mineral
	Location			Data in wt %										
PB-23	32	E	1	52.80	0.11	2.76	0.76	4.25	19.05	19.48	0.25	0.00	99.46	pyroxene
PB-23	32	F	1	51.63	0.20	3.28	1.22	5.00	17.94	19.71	0.17	0.01	99.16	pyroxene

Loring Laboratories Limited

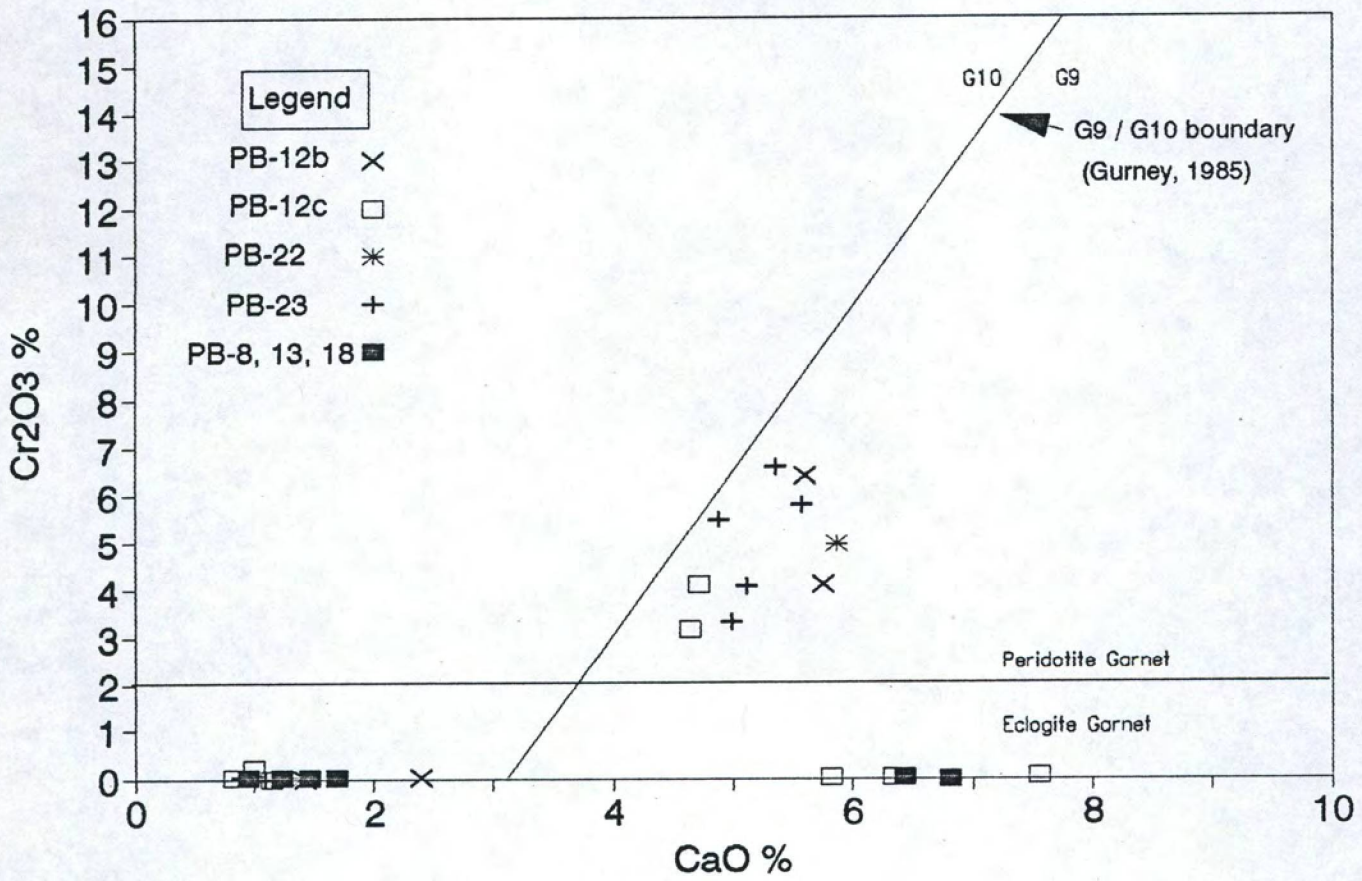
File No. : 35915

Pyroxene Classification (after Stephens and Dawson, 1977)

Sample #	Location P#	C#	R#	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	Classification
				Data in wt %							
PB- 8	31	H	4	2.10	2.10	1.14	2.34	16.56	22.64	0.97	CP-3
PB- 8	31	I	4	3.94	3.94	1.45	2.49	16.26	22.52	0.86	CP-3
PB-12c	31	D	7	2.69	2.69	0.70	6.69	20.49	11.76	0.38	CP-3
PB-12c	31	F	7	1.79	1.79	0.66	8.16	14.97	20.72	0.45	CP-3
PB-18	28	B	3	2.47	2.47	0.76	8.07	15.17	20.46	0.68	CP-3
PB-18	28	D	3	0.55	0.55	0.01	7.51	14.68	19.90	2.55	CP-4
PB-22	31	B	2	2.09	2.09	0.80	3.34	15.68	22.08	0.69	CP-3
PB-22	31	C	2	1.59	1.59	0.94	4.81	14.62	24.14	0.24	CP-3
PB-23	32	B	1	4.88	4.88	1.16	4.39	16.95	20.81	0.24	CP-3
PB-23	32	C	1	1.90	1.90	1.30	2.77	16.48	22.57	0.88	CP-3
PB-23	32	E	1	2.76	2.76	0.76	4.25	19.05	19.48	0.25	CP-3
PB-23	32	F	1	3.28	3.28	1.22	5.00	17.94	19.71	0.17	CP-3


Clinopyroxene
Cr2O3 %
CaO %
0
1
2
3
4
5
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
PB-8
PB-12c
PB-18
PB-22
PB-23

Pyrope Garnet Indicators



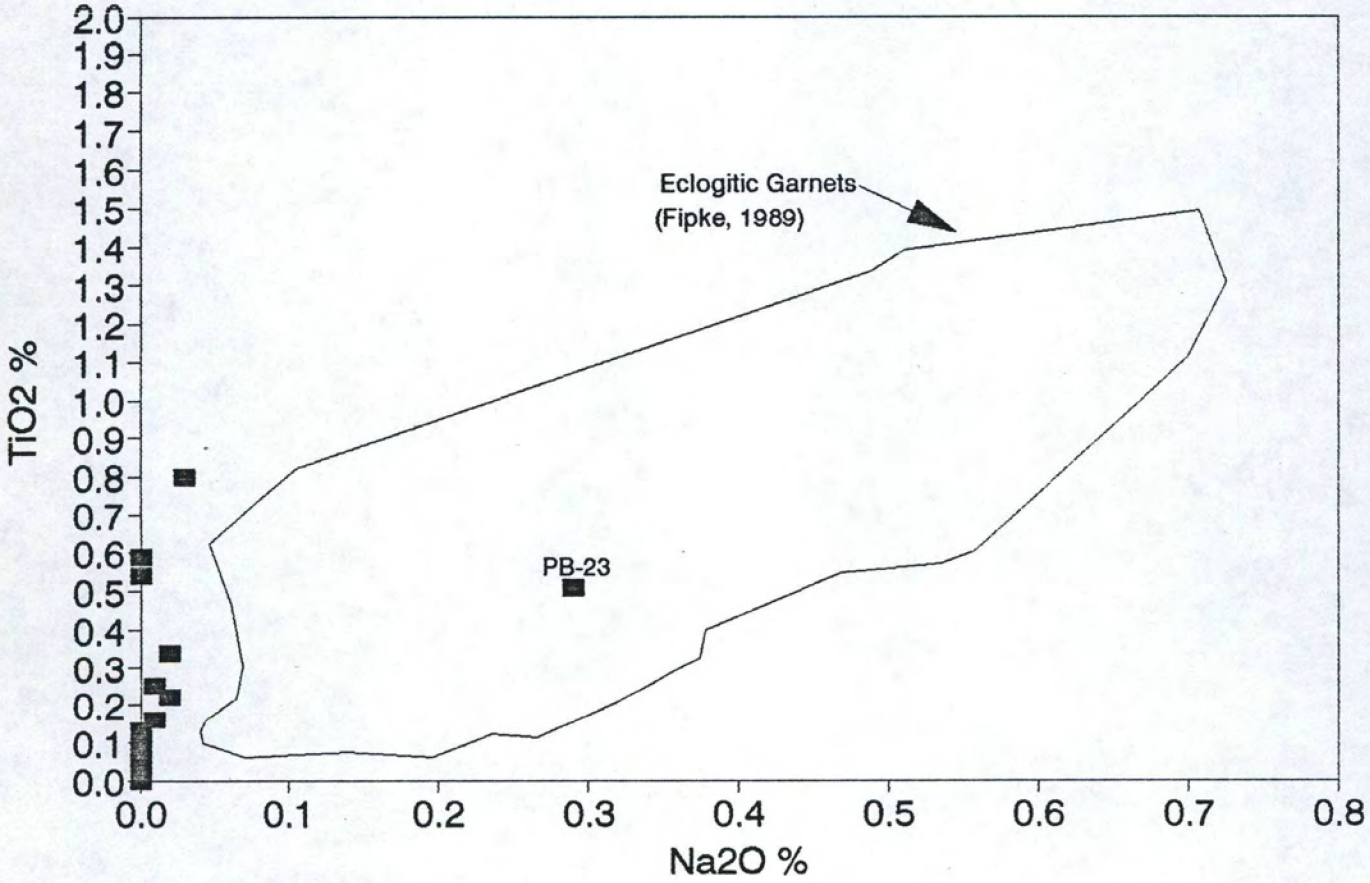
Loring Laboratories Limited

File No. : 35915

Garnet Classification (after Dawson and Stephens, 1975)

Location			Data in wt %						Garnets Classification											
Sample #	P#	C#	R#	TiO2	Cr2O3	FeO	MgO	CaO	Na2O	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
PB- 8	31	F	4	0.00	0.02	33.36	6.05	1.69	0.00					5							
PB-12b	28	C	5	0.01	0.01	33.05	6.19	2.39	0.00					5							
PB-12b	28	D	5	0.01	4.11	7.63	19.77	5.75	0.00									9			
PB-12b	28	E	5	0.16	6.39	8.15	19.90	5.60	0.01									9			
PB-12b	28	G	5	0.01	0.00	31.27	7.64	1.43	0.00					5							
PB-12c	31	A	6	0.05	0.01	28.40	5.46	5.82	0.00					5							
PB-12c	31	B	6	0.13	0.01	29.34	5.66	6.34	0.00					5							
PB-12c	31	D	6	0.00	0.00	33.96	6.15	1.14	0.00					5							
PB-12c	31	F	6	0.01	0.01	32.81	7.65	0.84	0.00					5							
PB-12c	31	I	6	0.25	3.15	8.46	20.89	4.64	0.01									9			
PB-12c	31	J	6	0.34	4.09	6.34	21.74	4.72	0.02									9			
PB-12c	31	B	7	0.04	0.04	16.52	12.98	7.56	0.00			3									
PB-12c	31	C	7	0.00	0.20	27.17	11.35	1.00	0.00					5							
PB-12c	31	E	7	0.59	13.60	5.32	0.31	32.99	0.00							7					
PB-13	28	B	7	0.01	0.02	32.36	6.12	1.23	0.00					5							
PB-13	28	D	7	0.00	0.02	34.73	5.46	1.46	0.00					5							
PB-13	28	F	7	0.10	0.00	32.06	3.65	6.81	0.00					5							
PB-13	28	I	7	0.01	0.03	36.61	4.99	0.95	0.00					5							
PB-18	28	B	1	0.03	0.03	33.39	2.61	6.43	0.00					5							
PB-22	31	B	1	0.00	4.97	7.91	19.38	5.87	0.00									9			
PB-22	31	F	1	0.07	0.03	31.37	5.91	1.40	0.00					5							
PB-23	31	B	9	0.00	0.01	33.35	6.99	0.90	0.00					5							
PB-23	31	G	9	0.01	5.81	7.70	19.51	5.58	0.00									9			
PB-23	31	I	9	0.22	5.47	7.39	20.02	4.89	0.02									9			
PB-23	31	J	9	0.51	6.56	6.49	18.51	5.36	0.29											11	
PB-23	31	A	10	0.16	4.07	8.43	19.93	5.11	0.01									9			
PB-23	31	G	10	0.80	3.33	7.97	21.35	4.99	0.03	1											
PB-23	31	H	10	0.00	0.00	36.83	4.11	1.09	0.00					5							
PB-23	31	I	10	0.54	15.96	0.10	0.14	33.39	0.00							7					
Total Garnets									29	1	0	1	0	16	0	2	0	8	0	1	0

Eclogite Garnet Indicators



Mineral Location Diagram

Plug No. 28

#2 ↓ #1 ↓

	A	B	C	D	E	F	G	H	I	J	Mineral Grains
	X	orange garnet (UN 61)	orange Fe-Ca GT	orange Fe-Ca-Mn gT	orange Fe-Ca gT	zircon.	zircon.	zircon	zircon.	zircon.	9
2	zircon.	zircon.	zircon.	zircon.	zircon.	zircon	zircon.	zircor	zircon	green px no-cr.	10
	green px no-cr.	green px (UN 62)	green px no-Cr.	green px (UN 63)	green px No-Cr.	opaque ilmenite no-mg.	opaque. Allanite	opaque, or very dark green Allanite	Allanite	Allanite	10
	Allanite	deep brown TRM. (UN 64)	deep Br. TRM (UN 65)	X	X	X	X	X	X	X	3
5	orange Fe-Ca gT	orange Fe-Ca gT	color? gT (UN 66)	pink Cr-garnet (UN 67)	pink Cr-gT (UN 68)	opaque ?? Eds = 0 (UN 69)	orange gT minor Mn. (UN 70)	light brown ?? eds = 0 (UN 71)	green px no-Cr.	green px no-Cr.	10
	green px no-Cr.	opaque Ilmenite no-mg	opaque Ilmenite no-mg.	X	X	X	X	X	X	X	2
7	opaque as F5	deep brown. gT (UN 72)	orange Fe-Ca gT	deep brown gT (UN 73)	orange Fe-Ca gT	orange gT (UN 74)	orange gT Fe-Mn	zircon.	deep brown gT (UN 75)	orange Fe-Ca gT	10
8	light green ?? as H5	green px no-Cr.	green gahnite (UN 76)	green px no-~~px~~ cr	green px no-cr	green px no-Cr.	green px no-Cr.	opaque Ilmenite no-mg.	opaque Ilmenite no-ng.	rutile no-Nb	10
	brown TRM (UN 77)	brown TRM (UN 78)	X	X	X	X	X	X	X	X	2
											0

Total Grains 61

Mineral Location Diagram

Plug No. 31

Trans. #2

Transm. #1

	A	B	C	D	E	F	G	H	I	J	Mineral Grains
1	X	pink Cr-gT very poor polish UN 79	orange Fe-Ca gT	orange Fe-Ca gT	opaque as F5 M28	orange gT UN 80	orange Fe-Mn gT.	orange Fe-Ca gT.	Zircon	Zircon	9
2	pink as H5 M28	green px UN 81	green px UN 82	green px no-Cr	green px no-Cr.	opaque Ilmenite no-mg.	opaque Ilmenite no-mg.	opaque Ilmenite no-mg.	opaque Ilmenite no-mg.	opaque as. F5 M28	10
3	green px no-Cr.	X	X	X	X	X	X	X	X	X	1
4	orange Fe-gT.	opaque as F5 M28	orange Fe-Ca gT.	Orange Fe-Ca-Mn gT.	orange Fe-Ca gT	orange gT UN 83	green px no-Cr.	green px UN 84	green px UN 85	green px no-Cr.	10
5	opaque Ilmenite no-mg.	opaque Ilmenite no-mg.	opaque Ilmenite no-mg	opaque Ilmenite no-mg.	X	X	X	X	X	X	4
6	orange gT (M) UN 86	orange gT UN 87	orange Fe-gT.	orange gT UN 88	orange Fe-Ca gT	brown gT UN 89	orange Fe-Ca gT	opaque ?? F5 as M28 UN 90	pink Cr-gT UN 91	pink Cr-gT UN 92	10
7	Zircon	Clear gT UN 93	pink gT UN 94	green px UN 95	green Cr-px UN 96	green px UN 97	green px no-Cr.	green px No-Cr.	opaque Ilmenite no-mg.	opaque Ilmenite no-mg	10
8	opaque Ilmenite no-mg	X	X	X	X	X	X	X	X	X	1 Poor Polish
9	orange Fe-gT	orange gT UN 98	orange Fe-gT.	Orange Fe-gT.	orange Fe-gT.	orange Mn-gT	pink Cr-gT UN 99	opaque as F5 M28.	pink Cr-gT UN 100	pink Cr-gT UN 101	10
10	pink Cr-gT UN 102	Zircon.	orange Ca-gT.	Zircon.	Zircon.	Zircon	orange Cr-gr UN 103	orange gT. UN 104	green Cr-px UN 105		10

Total Grains 75

- very poor polish
- very deep green

No Polish, Eds says
- Si > Ca > Al

Mineral Location Diagram

Plug No. 32

#2 ↓ #1 ↓

	A	B	C	D	E	F	G	H	I	J
1	X	green px UN106	green px UN107	green px no-Cr.	green px UN108	green px UN109	opaque Ilmenite no-mg.	opaque Ilmenite no-mg.	opaque Ilmenite no-mg.	X
2										
5										
7										
8										

Mineral Grains

6 0 0 0 C C E E 0 6 0 2

Total Grains 8

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Calgary, Alberta T2K 4W7

LORING LABORATORIES LTD.

Tel: (403) 274-2777
Fax: (403) 275-0541

To: Takla Star Resources

From: Daniel Beauchamp

Date: September 16, 1993

Subject: Results for samples PB-1, PB-3, PB-4

File #: 35915

1. Introduction

Enclosed are the results of the processing of several of your samples.

The data sheets represent the microprobe data as received from the technician. The oxides are presented in percent of the composition of the mineral.

We have identified the minerals selected using the EDS. To increase the turnaround time and decrease costs, we have probed only the grains containing oxides that are of use as indicators minerals.

Care must be taken in interpreting this data. Although some of these minerals may be found in kimberlite or lamproite, they may also be present in other rocks.

Following are a few notes on the mineral grains selected from your samples. Tables of results and charts are attached to this report.

2. Garnet

The garnets have been classified according to Dawson and Stephens' (1975) classification on the accompanying table. Of the 10 grains probed, 2 classify as G5, 6 as G9, and 2 as G11.

The G5 (magnesian almandine) are considered by Dawson and Stephens to be of high pressure origin. Fipke (1989) views those containing less than an arbitrary value of 29.94% total FeO as being magnesian almandine with kimberlitic affinity. One G5 garnet from sample PB-1 (19-G-1) qualifies for Fipke's kimberlitic G5 group.

The six G9 (chrome pyrope) are from samples PB-3 and PB-4. They fit well within the composition for this group and contain

2.41-7.51% Cr_2O_3. Grain 19-D-8 contains more titanium (0.63% TiO_2) than the type G9 garnet.

The two G11 (titanian uvarovite-pyrope) contain more magnesium and less calcium than Dawson and Stephen's (1975) type G11 garnet.

Of the 10 garnets, four have more than 0.01% Na_2O (0.01-0.03% Na_2O). Three of these plot near Fipke's (1989) eclogitic garnet field: one from PB-3 and two from PB-4 (see chart). Because the sodium content is near detection limit of the microprobe, the values must be interpreted with caution.

All six of the G9 and G11 garnets (Dawson and Stephens, 1975) plot in the G9 area of Gurney's diagram for pyrope garnet indicators (see chart).

One schorlomite garnet ($Ca_3(Ti,Fe)_2[(Si,Fe)O_4]_3$, also known as melanite) was probed and eight others of similar composition were identified in samples PB-1, PB-3 and PB-4. These would normally classify as G4 on the Dawson and Stephens (1975) table, but they contain about three times as much calcium and titanium, and less than 1/30 as much magnesium as the type G4 garnet.

These schorlomite garnets are more closely associated to andradite ($Ca_3Fe_2(SiO_4)_3$). Because they do not fit into the Dawson and Stephens system, they have not been graphed nor included in the tables for garnets.

Nine other garnets were identified by scanning, and because they contain only very low quantities of magnesium, titanium or chrome, they were not probed.

3. Pyroxene

The 3 pyroxenes have been graded according to Stephen and Dawson's (1977) classification on the accompanying table.

One pyroxene from PB-4 contains 0.11% Cr_2O_3 and is classified as a CP-2 (diopside). The pyroxene from PB-1 classifies as a CP-5 (chrome diopside) and one grain from PB-3 is a CP-6 (ureyitic diopside). The CP-5 and CP-6 compare well with type garnets except for CP-6 which contains slightly more calcium and less sodium.

The CP-5 and CP-6 pyroxenes plot in the diamond inclusion field of Fipke (1989) (see chart).

Sixteen other pyroxene grains were identified but because they contained low quantities of chrome, they were not probed.

4. Ilmenite

Eleven grains of ilmenite were selected. Under the EDS, these were observed to contain negligible amounts of magnesium and were therefore not probed. One grain of hematite was also selected.

5. Other Minerals

Several other minerals were identified in the suite of grains selected from these samples. They include 4 probable amphiboles, corundum, muscovite, two grains of rutile, seven spinels, staurolite, three grains of zircon and one unknown which contains calcium and zirconium. These minerals had been selected because they look very similar to diopside, garnet and other indicator minerals.

6. References

Dawson J.B. and W.E. Stephens
1975: Statistical Classification of Garnets from Kimberlite and Associated Xenoliths. Journal of Geology, vol. 83, p. 589-607.

Fipke, C. E. (ed.)
1989: The development of advanced technology to distinguish between diamondiferous and barren diatremes. Geol. Surv. of Canada, Open File Report 2124.

Stephens W.E. and J.B. Dawson
1977: Statistical Comparison Between Pyroxenes from Kimberlites and their Associated Xenoliths. Journal of Geology, vol. 85, p. 433-449.

Loring Laboratories Limited

File No. : 35915

Microprobe Data

Location				Data in wt %									
Sample#	P#	C#	R#	CaO	TiO2	Cr2O3	NaO	SiO2	Al2O3	FeO	MgO	F	Total	Mineral
PB-1	19	B	1	5.93	0.00	0.02	0.00	37.73	20.30	32.11	3.40	0.00	99.49	garnet minor manganese
PB-1	19	C	1											garnet
PB-1	19	D	1											garnet
PB-1	19	E	1											garnet
PB-1	19	F	1											rutile
PB-1	19	G	1	7.10	0.04	0.04	0.00	38.57	21.02	26.02	7.10	0.04	99.93	garnet
PB-1	19	H	1											pyroxene
PB-1	19	I	1											muscovite
PB-1	19	J	1	21.54	0.13	1.32	1.00	53.11	2.93	2.14	17.22	0.00	99.39	pyroxene
PB-1	19	A	2											pyroxene
PB-1	19	B	2											pyroxene
PB-1	19	C	2											pyroxene
PB-1	19	D	2											pyroxene
PB-1	19	E	2											pyroxene
PB-1	19	F	2											garnet: schorlomite
PB-1	19	G	2	30.11	3.04	0.01	0.02	34.44	5.45	21.06	0.29	0.07	94.49	garnet: schorlomite
PB-1	19	H	2											ilmenite
PB-1	19	I	2											ilmenite
PB-1	19	J	2											ilmenite
PB-1	19	A	3											amphibole?
PB-1	19	B	3											amphibole?
PB-1	19	C	3											amphibole?
PB-1	19	D	3											hematite
PB-1	19	E	3											amphibole?
PB-3	19	A	8											staurolite
PB-3	19	B	8											garnet
PB-3	19	C	8											garnet
PB-3	19	D	8	5.09	0.63	4.81	0.03	42.03	19.36	6.88	21.62	0.00	100.45	garnet
PB-3	19	E	8	6.73	0.00	6.39	0.00	41.50	19.35	7.83	19.04	0.04	100.88	garnet
PB-3	19	F	8	5.44	0.08	4.36	0.00	40.49	19.42	7.94	18.46	0.00	96.19	garnet
PB-3	19	G	8											zircon
PB-3	19	H	8											zircon
PB-3	19	I	8	6.51	0.13	7.51	0.00	40.95	17.84	8.13	18.56	0.02	99.65	garnet
PB-3	19	J	8											spinel
PB-3	19	A	9	21.00	0.22	1.93	1.94	53.66	3.37	3.58	15.05	0.00	100.75	pyroxene
PB-3	19	B	9											pyroxene no chrome
PB-3	19	C	9											pyroxene no chrome
PB-3	19	D	9											pyroxene no chrome
PB-3	19	E	9											pyroxene no chrome
PB-3	19	F	9											pyroxene no chrome
PB-3	19	G	9											spinel
PB-3	19	H	9											ilmenite no magnesium
PB-3	19	I	9											ilmenite no magnesium
PB-3	19	J	9											ilmenite no magnesium
PB-3	19	A	10											ilmenite no magnesium
PB-3	19	B	10											garnet: schorlomite
PB-3	19	C	10											garnet: schorlomite

Loring Laboratories Limited

File No. : 35915

Microprobe Data

Location				Data in wt %									
Sample#	P#	C#	R#	CaO	TiO2	Cr2O3	NaO	SiO2	Al2O3	FeO	MgO	F	Total	Mineral
PB-3	19	D	10											garnet: schorlomite
PB-3	19	E	10											garnet: schorlomite
PB-4	19	A	4											garnet
PB-4	19	B	4											garnet
PB-4	19	C	4											garnet
PB-4	19	D	4	6.15	0.69	9.25	0.02	41.23	16.18	5.80	20.73	0.00	100.05	garnet
PB-4	19	E	4	4.74	0.11	4.28	0.01	41.26	20.61	7.89	20.56	0.00	99.46	garnet
PB-4	19	F	4											zircon
PB-4	19	G	4											corundum
PB-4	19	H	4											spinel
PB-4	19	I	4	5.19	0.69	5.39	0.02	41.71	18.88	6.42	21.49	0.01	99.80	garnet
PB-4	19	J	4											rutile
PB-4	19	A	5											garnet
PB-4	19	B	5	4.47	0.12	2.41	0.00	41.74	21.50	8.83	20.58	0.02	99.67	garnet
PB-4	19	C	5											spinel
PB-4	19	D	5											?? calcium & zirconium
PB-4	19	E	5	23.85	0.02	0.11	0.46	53.49	0.90	6.54	14.00	0.00	99.37	pyroxene
PB-4	19	F	5											pyroxene
PB-4	19	G	5											pyroxene
PB-4	19	H	5											pyroxene
PB-4	19	I	5											spinel
PB-4	19	J	5											spinel
PB-4	19	A	6											pyroxene
PB-4	19	B	6											ilmenite
PB-4	19	C	6											ilmenite
PB-4	19	D	6											ilmenite
PB-4	19	E	6											ilmenite
PB-4	19	F	6											garnet: schorlomite
PB-4	19	G	6											garnet: schorlomite
PB-4	19	H	6											garnet: schorlomite
PB-4	19	I	6											pyroxene
PB-4	19	J	6											spinel

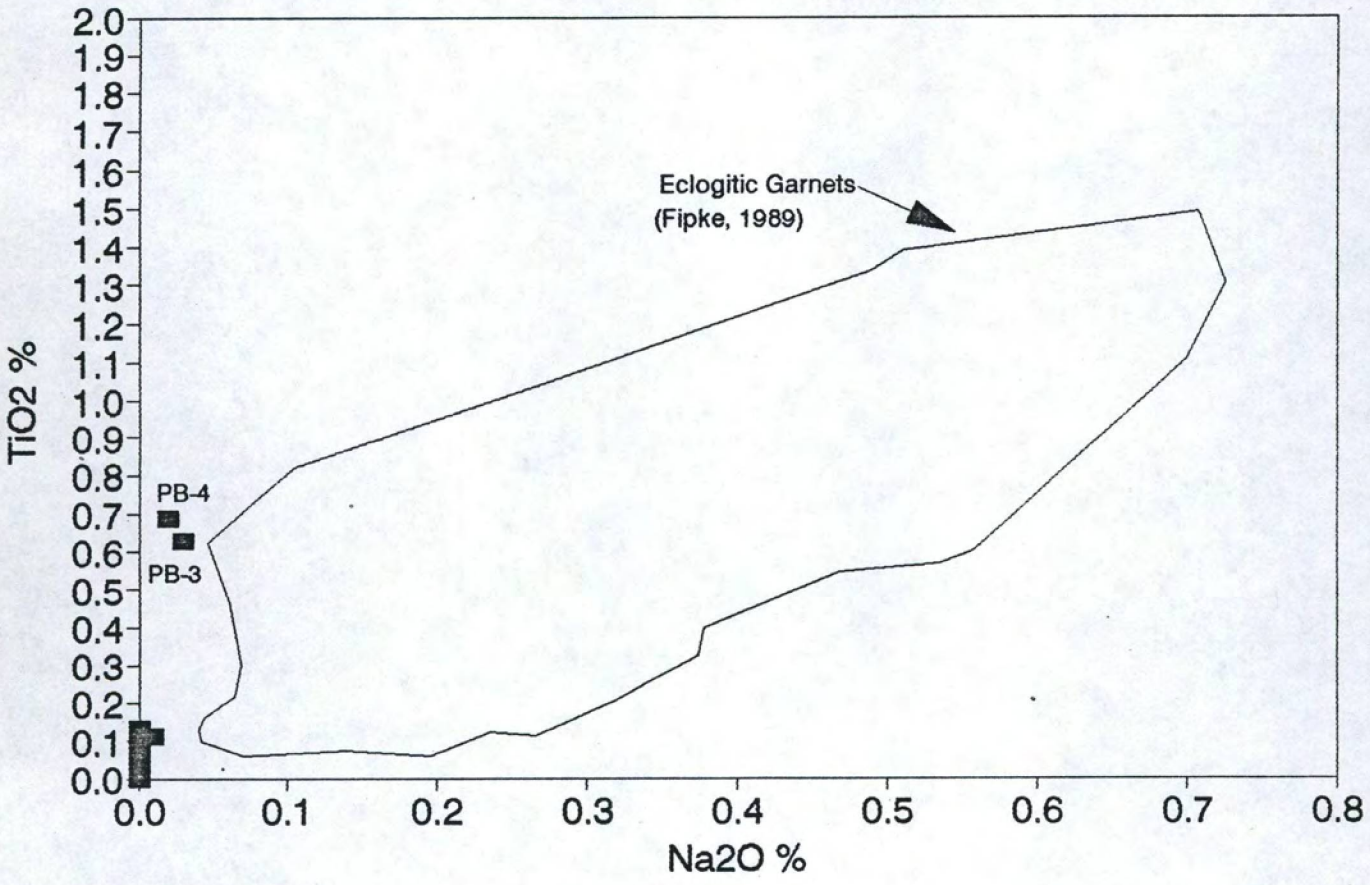
Loring Laboratories Limited

File No. : 35915

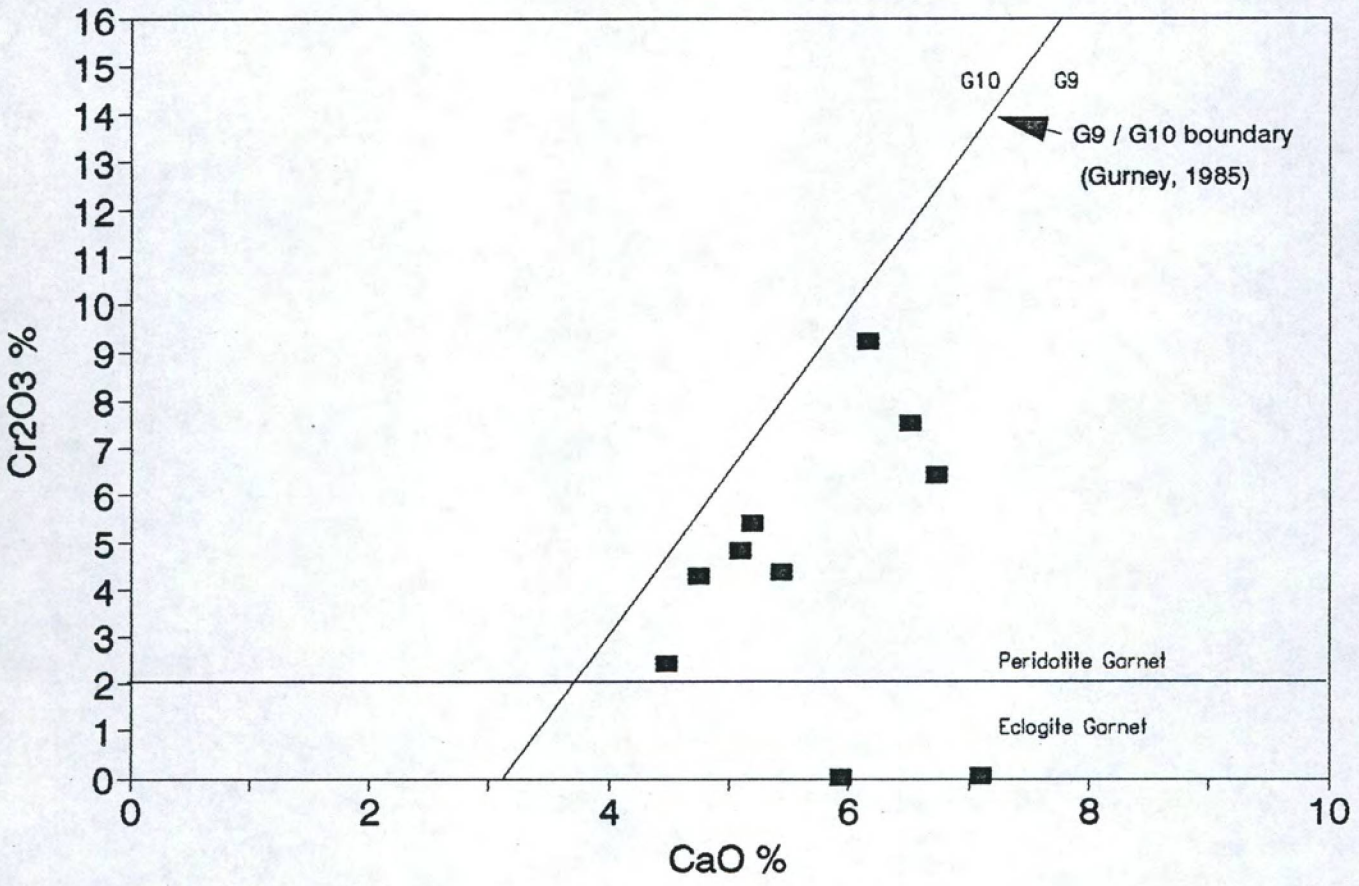
Garnet Classification (after Dawson and Stephens, 1975)

Sample #	Location P#	C#	R#	Data in wt % TiO2	Cr2O3	FeO	MgO	CaO	Na2O	Garnets Classification G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
PB-1	19	B	1	0.00	0.02	32.11	3.40	5.93	0.00	.	.	.	.	5	.	.	.	.	.	.	.
PB-1	19	G	1	0.04	0.04	26.02	7.10	7.10	0.00	.	.	.	.	5	.	.	.	.	.	.	.
PB-3	19	D	8	0.63	4.81	6.88	21.62	5.09	0.03	.	.	.	.	.	.	.	.	9	.	.	.
PB-3	19	E	8	0.00	6.39	7.83	19.04	6.73	0.00	.	.	.	.	.	.	.	.	9	.	.	.
PB-3	19	F	8	0.08	4.36	7.94	18.46	5.44	0.00	.	.	.	.	.	.	.	.	9	.	.	.
PB-3	19	I	8	0.13	7.51	8.13	18.56	6.51	0.00	.	.	.	.	.	.	.	.	9	.	.	.
PB-4	19	D	4	0.69	9.25	5.80	20.73	6.15	0.02	.	.	.	.	.	.	.	.	.	.	11	.
PB-4	19	E	4	0.11	4.28	7.89	20.56	4.74	0.01	.	.	.	.	.	.	.	.	9	.	.	.
PB-4	19	I	4	0.69	5.39	6.42	21.49	5.19	0.02	.	.	.	.	.	.	.	.	.	.	11	.
PB-4	19	B	5	0.12	2.41	8.83	20.58	4.47	0.00	.	.	.	.	.	.	.	.	9	.	.	.
										10	0	0	0	0	2	0	0	0	6	0	2	0

Eclogite Garnet Indicator



Pyrope Garnet Indicators

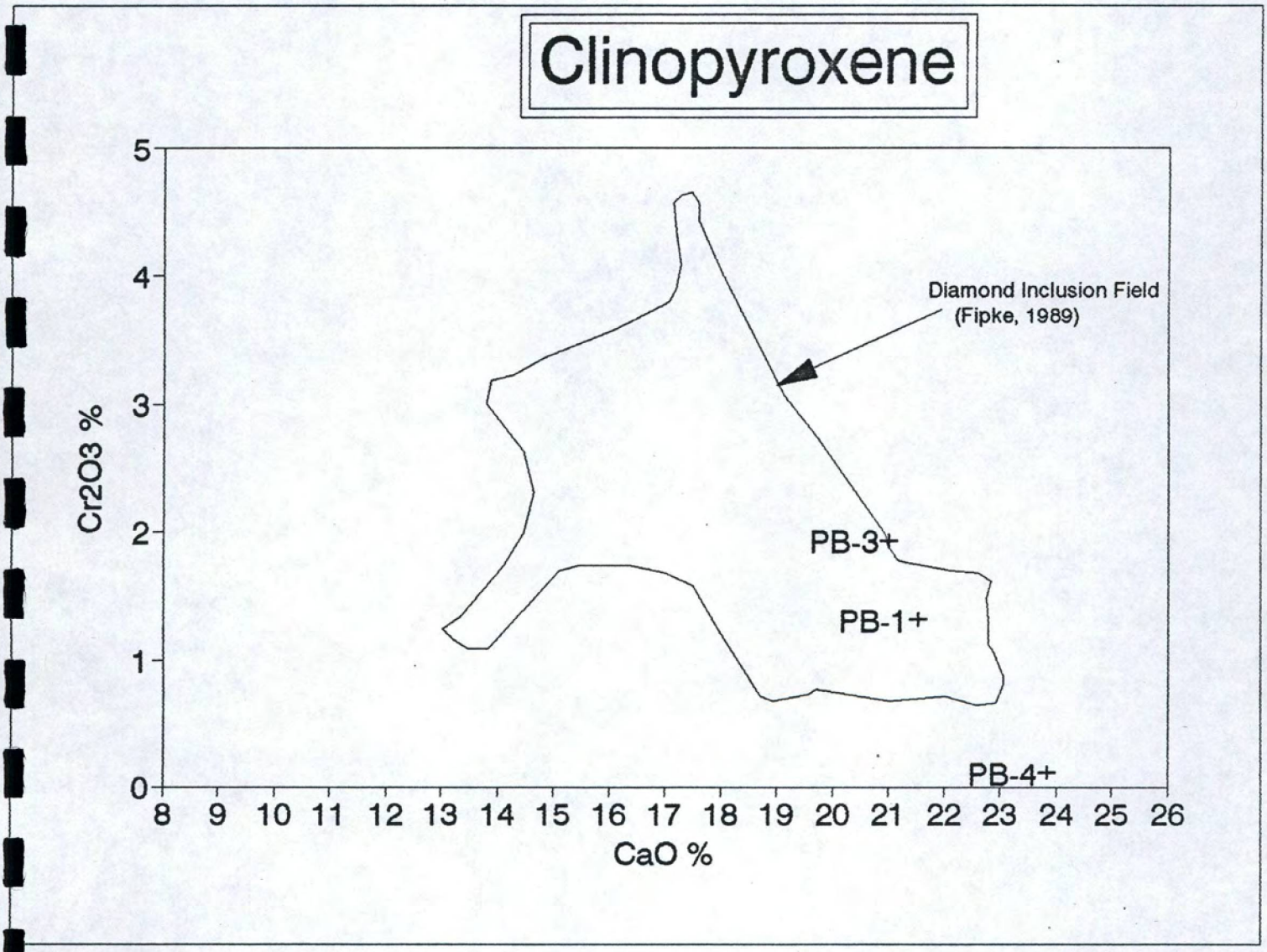


Loring Laboratories Limited

File No. : 35916

Pyroxene Classification (after Stephens and Dawson, 1977)

Location			Data in wt %							
Sample #	P#	C#	R#	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	Classification
PB-4	19	E	5	0.02	0.90	0.11	6.54	14.00	23.85	0.46	CP-2
PB-1	19	J	1	0.13	2.93	1.32	2.14	17.22	21.54	1.00	CP-5
PB-3	19	A	9	0.22	3.37	1.93	3.58	15.05	21.00	1.94	CP-6


Clinopyroxene
Diamond Inclusion Field
(Fipke, 1989)
PB-3+
PB-1+
PB-4+
Cr2O3 %
CaO %
0
1
2
3
4
5
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

M E M O R A N D U M

To: Takla Star Resources

From: Daniel Beauchamp

Date: September 26, 1993

Subject: Sample Results

Enclosed are copies of the results that you requested.

The data sheets entitled G16_17.XLS represent the adjusted microprobe data as received from the technician.

Refer to the following table for sample locations:

PB-5	Plug 16 spot B1	to C4
PB-12a	Plug 16 spot A5	to I7
PB-7	Plug 16 spot A10	to J10
PB-14	Plug 17 spot B1	to J3
PB-20	Plug 17 spot A5	to I7
PB-2	Plug 17 spot A9	to H10

The oxides are presented in percent of the composition of the mineral. The spots or locations are as on the enclosed mineral location diagram.

The Mineral column names are as follows: Grt-garnet, St-staurolite, Cpx-pyroxene, Hbl-hornblende, Gah-gahnite, Pic-Ilm-picroilmenite, Rt-rutile, Ilm-ilmenite. Others are self-explanatory. In the Spot column, R means that the probe was taken at rim, C means at the core and M means in the middle of the grain.

Data for samples PB-1, PB-3 and PB-4 are on the enclosed sheet. Locations refer to the mineral location diagram number 19.

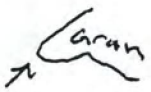
If you require further information or if you have any comments on the reports or procedure, give me a call.

Mineral Location Diagram

Plug No. 16

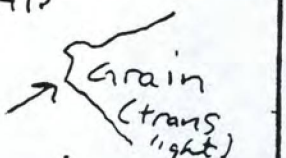
LR / LP

HR



UL / L.P

HP



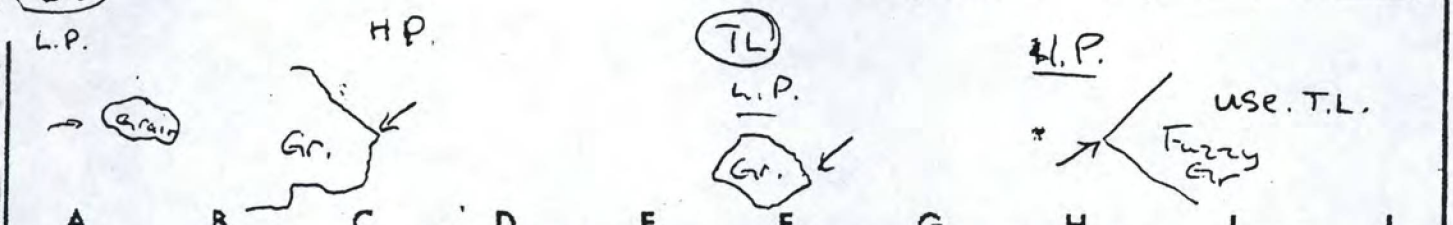
	A	B	C	D	E	F	G	H	I	J	Mineral Grains
	X	Grt B1R 1 B1C 2	Grt C1R 3 C1C 4	Grt D1C 5	Grt E1C 6	Grt F1C 7	Grt G1C 8	Grt H1C 89	Grt I1C 10	~~Cpx~~ St J1C 11	9
2	~~Cpx~~ St A2C 21	Grt B2C 20	Cpx C2C 19	Cpx D2C 18	Cpx E2C 17	Cpx F2C 16	Cpx G2C 15	Cpx GARNET?? H2C 14 Ti-rich?	Cpx I2C 13	Cpx J2C 12	10
3	Cpx A3C 22	Cpx B3C 23	Cpx C3C 24	Cpx D3C 25	?? E3C 26 Ti Grt?	?? F3C 27 Ti Grt?	?? G3C 28 Ti Grt	Ilm H3C 29 to 31	?? I3C 32	?? J3C 33	10
4	A4C 36 Ilm	B4C 35 Ilm	~~Rutile~~ C4C 34 Ilm	X	X	X	X	X	X	X	3
5	A5C 37 A5R 38 Grt	B5C 39 B5R 40 Grt	C5C 41 Grt	D5R 44 D5C 42 Grt Chrome!	E5C 43 Grt.	F5C 45 Grt	G5C 46 Grt	H5C 47 Grt	I5C 48 Grt	J5C 49 ~~Grt~~ St	10
6	Chrome A6R 60 A6C 59 Grt	B6C 58 Cpx	C6C 57 Cpx	D6C 56 Cpx	E6C 55 Cpx	F6C 54 Cpx	G6C 53 Cpx	Grt H6C 52 ~~Cpx~~	I ~~H~~6C 51 Cpx	J6C 50 Cpx	10
7	Lots of Zn A7C 61 A7R 63 ~~St~~ ??	B7C 62 Hem	C7R 64 Hem	~~??~~ D7C 65 D7R 66 Hbl	?? E7C 67 Ca-Ti. Grt	F7C 68 Hbl	G7C 69 Rutile	H7C 70 Rt	I7C 71 Rt	X	9
8	~~Grt~~ ~~A8C 80~~	B8C 8?	C8C 79 Grt	D8C 78 Grt	E8C 77 Grt	F8C 76 Grt	G8C 75 Grt	H8C 74 Grt	I8C 73 Grt	J8C 72 Grt	10
9	A9C 82 Grt	B9C 83 Grt	C9C 84 Grt	~~*~~ ? D9C 85 Grt.	~~St~~ E9C 86 ~~Grt~~	F9C 87 Grt	Cpx G9C 88 ~~Grt~~	H9C 89 Cpx	I9C 90 Cpx	J9C 91 Cpx	10
10	A10C 100 Cpx	Cpx B10C 99	C10C 98 Cpx	D10C 97 Cpx	E10C 96 Cpx	F10C 95 Hem	G10C 94 Grt	~~Hbl~~ H10C 93 Hbl	Hbl I10C 92 ~~Grt~~	J10C 92 Hem	10

Total Grains 91

Mineral Location Diagram

BR

Plug No. 17



	A	B	C	D	E	F	G	H	I	J	Mineral Grains
	X	B1C 102 B1R 103 Grt	C1C 104 Grt	D1C 105 Grt	E1C 106 Grt	F1C 107	G1C 108	H1C 109 → Grt	I1C 110 Grt	St J1C 111	9
2	A2C 123 St	St B2C 122	C2C 120 Grt	D2C 121 Same as E	Zn-rich E2C 118 Gahnite 119 ?? Green	?? CR. F2C 117 GARNET	?? Spinel G2C 115 116	H2C 114 Cpx	I2C 113 Cpx	J2C 112 Cpx	10
3	A3C 124 Cpx	B3C 125 Ilm/Hem	?? C3C 126 Ca-T. Grt	D3C 127 Hbl & Ca-T. Grt	?? E3C 128 Ca-T. Grt	?? F3C 129 Ca-T. Grt	?? G3C 130 Ca-T. Grt	Cr+Mg too H3C 131 Ilm	I3C 132 Hem	Al_2SiO_5 J3C 133 Kyanite	10
4	X	X	X	X	X	X	X	X	X	X	0
5	A5C 143 Grt	B5C 142 Grt	C5C 141 Grt	D5C 140 St	E5C 139 St	F5C 135 St	G5C 137 Grt	Chrome! H5C 138 Grt	Chrome! I5C 135 Grt	Zn-rich ?? J5C 134 Gahnite	10
6	?? Zn A6C 144 Gahnite	?? B6C 145 Gahnite ??Zn	C6C 146 Cpx	D6C 147 Cpx	E6C 148 Cpx	?? Zn F6C 149 Gahnite	??Zn G6C 150 Gahnite	?? Zn H6C 151 Gahnite	I6C 152 Hbl	?? Ca J6C 153 Ca-T. Grt	10
7	?? Ca-Ti Grt A7C 163	?? Ca-Ti Grt B7C 162	?? Ca-Ti Grt C7C 161	?? Ca-T. Grt D7C 160	E7C 159 Ilm	F7C 158 Ilm	G7C 157 Ilm	H7C 156 Hem	?? Ca I7C 155 Ca-T. Grt	J7C 154 Hbl	10
8	X	X	X	X	X	X	X	X	X	X	0
9	A9C 164 Grt	B9C 165 Grt	?? Ca Grt C9C 166 Grt	D9C 167 St	E9C 168 Spinel	F9C 169 F9C 170 Cpx	Cpx G9C 170	Cpx H9C 171	Cpx I9C 172	Grt J9C 173 Grt	10
10	?? Ca-T. Grt A10C	?? Ca-T. Grt B10C 180	?? Ca-T. Grt C10C 179	?? Ca-T. Grt D10C 178	E10C 177 Hbl	F10C 176 Hem.	G10C 175 Rutile	10 H8C 174 Ilm	X	X	8

Total Grains 7

G16

Plugs 16, 17
Sept. 1, 1993

Gah- Gahnite (Zn spinel)
Low totals in some Grt due to high Fe3+

Plug	Spot	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	F	Cr2O3	Total	Mineral
G16	B1R	38.00	0.01	21.60	30.30	0.73	7.33	2.50	0.00	0.00	0.03	0.06	100.50	Grt
G	B1C	36.71	0.00	21.05	30.38	0.74	7.55	2.55	0.00	0.00	0.07	0.04	99.05	Grt
G	C1R	38.11	0.00	21.83	31.15	0.31	7.99	1.17	0.00	0.00	0.05	0.02	100.60	Grt
G16	C1C	37.97	0.00	21.94	31.24	0.33	7.82	1.22	0.00	0.00	0.01	0.00	100.53	Grt
G	D1C	36.34	0.05	19.97	35.04	0.86	0.52	6.96	0.00	0.00	0.06	0.00	99.81	Grt
G	E1C	36.84	0.02	20.15	32.27	1.98	2.66	5.42	0.00	0.00	0.01	0.04	99.35	Grt
G16	F1C	36.19	0.00	20.22	37.22	1.48	2.47	1.35	0.00	0.00	0.02	0.00	98.95	Grt
G	G1C	37.81	0.00	21.53	29.26	0.74	8.83	1.26	0.00	0.00	0.05	0.02	99.49	Grt
G	H1C	35.93	0.00	20.46	38.47	0.96	2.45	1.07	0.00	0.00	0.04	0.00	99.37	Grt
G16	I1C	36.32	0.00	20.39	35.74	0.83	3.19	2.14	0.00	0.00	0.06	0.01	98.67	Grt
G	J1C	26.50	0.64	54.64	14.17	0.11	1.82	0.00	0.00	0.00	0.05	0.00	97.93	St
G	J2C	53.16	0.03	0.84	6.17	0.17	14.70	22.73	0.44	0.00	0.00	0.09	98.24	Cpx
G	I2C	52.83	0.00	1.03	6.04	0.13	14.22	22.43	0.72	0.00	0.00	0.19	97.40	Cpx
G	H2C	35.49	4.88	18.71	15.84	0.09	0.00	21.95	0.00	0.00	0.00	0.02	96.96	Grt
G	G2C	51.02	0.01	0.66	10.77	0.18	11.88	22.45	0.56	0.00	0.01	0.00	97.54	Cpx
G	F2C	51.26	0.06	1.81	9.06	0.17	12.60	23.26	0.17	0.00	0.01	0.10	98.40	Cpx
G16	E2C	51.02	0.13	1.94	9.55	0.21	13.37	20.83	0.66	0.00	0.01	0.15	97.72	Cpx
G	D2C	52.43	0.12	3.91	5.27	0.10	14.59	22.43	0.73	0.00	0.00	0.28	99.57	Cpx
G	C2C	53.69	0.10	1.16	5.22	0.15	16.23	22.43	0.46	0.00	0.01	0.30	99.44	Cpx
G	B2C	38.81	0.20	21.78	24.37	0.43	8.21	7.21	0.00	0.00	0.01	0.00	101.02	Grt
G	A2C	27.15	0.57	55.20	14.60	0.06	1.81	0.00	0.00	0.00	0.02	0.03	99.41	St
G	A3C	53.52	0.00	1.24	6.19	0.22	14.95	23.41	0.52	0.00	0.04	0.02	100.11	Cpx
G16	B3C	52.83	0.04	1.26	8.94	0.22	14.55	21.38	0.50	0.00	0.00	0.03	99.73	Cpx
G	C3C	52.30	0.13	1.99	8.70	0.23	13.18	23.33	0.40	0.00	0.01	0.28	100.27	Cpx
G	D3C	48.65	2.35	4.29	12.19	0.17	11.83	20.77	0.41	0.00	0.09	0.01	100.75	Cpx
G	E3C	34.79	3.23	5.88	21.07	0.82	0.29	30.45	0.03	0.00	0.02	0.00	96.57	Grt
G	F3C	31.23	9.82	0.92	24.91	0.39	0.47	30.79	0.16	0.00	0.02	0.01	98.72	Grt
G	G3C	35.00	4.21	4.07	23.63	0.78	0.31	31.54	0.03	0.00	0.03	0.01	99.61	Grt
G	H3C	22.16	38.46	3.46	14.32	0.73	3.49	15.07	0.00	0.01	0.40	0.38	98.48	Ti-Oxide
G	H3C	20.15	43.23	3.14	17.37	0.10	2.72	13.62	0.00	0.01	0.40	0.29	101.03	Ti-Oxide
G	H3C	11.27	44.33	1.60	31.53	2.85	1.38	8.01	0.00	0.01	0.29	0.29	101.56	Ti-Oxide
G	I3C	36.61	2.01	7.50	20.95	1.00	0.28	30.98	0.02	0.00	0.02	0.02	99.39	Grt
G16	C4C	0.13	60.60	0.54	30.89	0.37	0.25	0.11	0.00	0.00	0.01	0.09	92.99	Ti-Oxide
G	B4C	1.28	61.85	0.70	25.67	0.78	0.37	0.16	0.00	0.09	0.00	0.01	90.91	Ti-Oxide
G	A4C	0.33	60.11	0.34	30.25	0.47	0.34	0.16	0.00	0.00	0.00	0.05	92.05	Ti-Oxide
G16	A5C	36.96	0.00	21.22	34.61	0.55	5.57	0.78	0.00	0.00	0.04	0.02	99.74	Grt
G	A5R	37.08	0.00	21.40	35.89	0.68	4.86	0.72	0.00	0.00	0.03	0.01	100.67	Grt
G	B5C	37.28	0.01	20.83	33.25	2.10	4.24	2.58	0.00	0.00	0.01	0.00	100.31	Grt
G16	B5R	37.87	0.01	21.33	33.43	2.05	4.23	2.66	0.00	0.00	0.03	0.02	101.63	Grt
G	C5C	37.68	0.04	20.66	28.47	5.36	1.99	6.84	0.00	0.00	0.04	0.01	101.09	Grt
G	D5C	41.21	1.00	18.54	7.60	0.23	20.77	5.82	0.04	0.00	0.01	5.67	100.89	Grt
G16	E5C	37.80	0.02	20.86	29.68	2.66	4.11	5.91	0.00	0.00	0.03	0.02	101.09	Grt
G	F5C	37.90	0.01	21.22	29.32	1.14	4.55	7.14	0.00	0.00	0.03	0.01	101.32	Grt
G	G5C	37.07	0.00	21.14	35.27	2.74	2.35	3.12	0.00	0.00	0.06	0.02	101.77	Grt
G16	H5C	38.02	0.03	21.04	28.99	1.20	4.72	6.93	0.00	0.00	0.04	0.04	101.01	Grt
G	I5C	38.35	0.06	21.38	26.55	0.55	6.71	6.56	0.00	0.00	0.05	0.00	100.21	Grt

Plugs 16, 17
Sept. 1, 1993 G16

Gah- Gahnite (Zn spinel)
Low totals in some Grt due to high Fe3+

Plug	Spot	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	F	Cr2O3	Total	Mineral
G16	J5C	27.12	0.42	55.67	14.71	0.04	1.83	0.00	0.00	0.00	0.05	0.00	99.84	St
G	J6C	51.63	0.06	3.20	7.31	0.17	14.32	21.83	0.65	0.00	0.02	0.32	99.51	Cpx
G	I6C	51.06	0.34	4.63	7.77	0.13	13.46	21.33	1.07	0.00	0.03	0.16	99.98	Cpx
G16	H6C	36.92	0.03	21.18	15.46	0.03	0.03	21.10	0.00	0.03	0.03	0.01	94.82	Grt
G	G6C	52.28	0.03	0.69	11.21	0.30	12.12	22.39	0.30	0.00	0.05	0.01	99.38	Cpx
G	F6C	52.34	0.06	2.22	10.99	0.17	11.47	21.56	1.41	0.00	0.00	0.01	100.23	Cpx
G16	E6C	52.90	0.06	1.55	8.03	0.24	14.42	21.70	0.64	0.00	0.02	0.10	99.66	Cpx
G16	D6C	52.47	0.13	3.70	7.25	0.19	14.16	21.40	1.00	0.00	0.00	0.09	100.39	Cpx
G	C6C	52.46	0.00	0.85	9.25	0.38	12.44	24.04	0.07	0.00	0.00	0.01	99.50	Cpx
G16	B6C	53.30	0.04	0.92	8.64	0.20	13.66	20.77	1.60	0.00	0.00	0.05	99.18	Cpx
G16	A6C	41.30	0.55	19.79	7.41	0.22	21.32	5.10	0.01	0.00	0.03	4.21	99.94	Grt
G	A7C	0.00	0.06	52.95	11.15	0.32	2.51	0.02	0.00	0.00	0.04	0.05	67.10	Gah
G16	B7C	0.17	0.10	0.26	87.17	0.05	0.01	0.00	0.00	0.00	0.09	0.04	87.89	Fe-Oxide
G16	A7R	0.00	0.04	52.67	10.82	0.30	2.57	0.02	0.00	0.00	0.04	0.05	66.51	Gah
G	C7R	0.12	0.07	0.20	86.91	0.20	0.05	0.00	0.00	0.00	0.10	0.04	87.69	Fe-Oxide
G	B7C	0.17	0.10	0.26	87.17	0.05	0.01	0.00	0.00	0.00	0.09	0.04	87.89	Fe-Oxide
G16	D7C	41.10	1.48	11.66	27.36	0.38	4.77	10.67	1.55	1.48	0.21	0.00	100.66	Hbl
G	D7C	40.65	1.50	11.72	27.21	0.37	4.76	10.70	1.65	1.54	0.23	0.00	100.33	Hbl
G	E7C	34.29	5.83	6.23	18.93	0.58	0.50	31.09	0.01	0.00	0.01	0.01	97.48	Grt
G16	F7C	41.65	1.11	11.77	21.33	0.35	8.59	11.19	1.45	1.50	0.23	0.00	99.17	Hbl
G	G7C	0.00	98.36	0.01	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.06	99.92	Rt
G	H7C	0.00	101.54	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.22	101.95	Rt
G16B	I7C	0.00	98.96	0.34	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.02	99.45	Rt
G	J8C	37.68	0.00	21.73	32.89	0.65	7.17	0.88	0.00	0.00	0.01	0.00	101.01	Grt
G	I8C	37.14	0.00	21.01	36.33	4.24	2.31	1.13	0.00	0.00	0.08	0.03	102.27	Grt
G16	H8C	38.05	0.05	20.76	30.57	0.80	3.71	7.63	0.00	0.00	0.04	0.01	101.62	Grt
G16	G8C	36.82	0.00	20.06	37.21	3.75	1.17	2.36	0.00	0.00	0.07	0.01	101.45	Grt
G	F8C	38.36	0.00	21.61	32.37	0.91	7.16	1.76	0.00	0.00	0.02	0.01	102.20	Grt
G16	E8C	37.93	0.00	21.75	33.33	1.07	5.06	3.08	0.00	0.00	0.02	0.03	102.27	Grt
G16	D8C	37.41	0.00	20.96	34.82	1.44	4.21	2.32	0.00	0.00	0.07	0.01	101.24	Grt
G	C8C	38.01	0.00	21.75	31.67	2.71	6.54	0.96	0.00	0.00	0.03	0.00	101.67	Grt
G16	A8C	36.55	0.00	20.23	31.53	8.24	0.60	2.85	0.00	0.00	0.10	0.00	100.10	Grt
G16	B8C	37.24	0.00	20.91	37.67	1.73	2.46	1.81	0.00	0.00	0.02	0.00	101.84	Grt
G	A9C	38.65	0.00	21.78	31.65	1.42	7.41	1.43	0.00	0.00	0.00	0.02	102.36	Grt
G	C9C	37.20	0.00	20.79	37.58	0.62	3.60	1.33	0.00	0.00	0.04	0.00	101.16	Grt
G16	D9C	26.72	0.42	55.42	15.12	0.04	1.75	0.00	0.00	0.00	0.01	0.03	99.51	St
G	E9C	27.05	0.43	54.07	14.44	0.08	1.92	0.00	0.00	0.00	0.05	0.02	98.06	St
G	F9C	37.93	0.00	21.23	33.90	0.28	6.35	1.01	0.00	0.00	0.06	0.03	100.79	Grt
G16	G9C	53.83	0.07	3.64	2.85	0.05	17.54	19.60	1.37	0.00	0.00	1.47	100.42	Cpx
G16	H9C	53.38	0.48	3.15	2.28	0.06	17.01	20.76	1.22	0.00	0.07	1.54	99.95	Cpx
G16	I9C	53.11	0.14	4.11	2.38	0.06	17.09	21.56	0.99	0.00	0.05	1.08	100.57	Cpx
G16	J10C	0.14	0.07	0.19	87.51	0.22	0.04	0.01	0.00	0.00	0.10	0.02	88.30	Fe-Oxide
G16	I10C	41.72	1.36	11.76	20.92	0.36	8.64	11.27	1.36	1.44	0.25	0.02	99.10	Hbl
G16	H10C	34.66	2.53	4.16	22.69	0.93	0.23	30.54	0.01	0.00	0.07	0.01	95.83	Grt
G16	G10C	37.08	0.19	20.81	31.09	3.65	2.01	5.81	0.00	0.00	0.01	0.00	100.65	Grt
G16	F10C	0.09	0.05	0.06	88.00	0.09	0.01	0.00	0.00	0.00	0.12	0.08	88.50	Fe-Oxide

Plugs 16, 17 G16
Sept. 1, 1993

Gah- Gahnite (Zn spinel)
Low totals in some Grt due to high Fe3+

Plug	Spot	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	F	Cr2O3	Total	Mineral
G16	E10C	53.51	0.06	1.24	7.08	0.17	14.49	22.92	0.62	0.00	0.02	0.13	100.24	Cpx
G16	D10C	52.55	0.10	1.65	9.19	0.61	13.09	22.52	0.46	0.00	0.03	0.02	100.22	Cpx
G16	C10C	50.26	0.31	4.42	11.82	0.21	11.90	19.95	0.74	0.00	0.05	0.01	99.67	Cpx
G16	B10C	52.57	0.26	3.99	2.30	0.04	16.77	21.37	0.91	0.00	0.03	1.19	99.43	Cpx
G16	A10C	38.05	0.00	25.35	11.37	0.03	0.09	22.63	0.00	0.00	0.01	0.00	97.53	Grt
G16	B1C	38.66	0.00	21.66	35.23	0.14	5.67	1.92	0.00	0.00	0.06	0.00	103.34	Grt
G17	B1R	38.20	0.00	21.11	34.22	0.23	5.61	1.89	0.00	0.00	0.07	0.01	101.34	Grt
G17	C1C	37.87	0.00	21.48	35.30	0.38	5.44	1.10	0.00	0.00	0.07	0.01	101.65	Grt
G16	D1C	38.10	0.00	21.90	33.87	1.40	5.80	1.09	0.00	0.00	0.03	0.02	102.21	Grt
G17	E1C	38.24	0.33	21.60	34.49	0.26	6.19	1.08	0.00	0.00	0.06	0.04	102.29	Grt
G17	F1C	37.42	0.02	20.90	30.90	3.76	2.80	5.29	0.00	0.00	0.03	0.00	101.12	Grt
G16	G1C	37.73	0.03	20.86	29.96	1.10	3.53	7.02	0.00	0.00	0.06	0.07	100.36	Grt
G17	H1C	39.53	0.05	21.83	24.53	1.01	8.13	6.24	0.00	0.00	0.02	0.01	101.35	Grt
G17	I1C	37.95	0.01	21.43	29.64	4.00	3.98	4.16	0.00	0.00	0.05	0.03	101.25	Grt
G16	J1C	27.29	0.49	55.07	14.59	0.07	1.89	0.00	0.00	0.00	0.07	0.01	99.48	St
G16	J2C	50.78	0.29	3.95	9.99	0.23	12.59	21.61	0.57	0.00	0.00	0.05	100.06	Cpx
G17	H2C	53.91	0.09	2.41	6.68	0.14	14.68	21.94	0.74	0.00	0.00	0.13	100.72	Cpx
G16	G2C	0.00	0.00	72.03	9.80	0.34	21.06	0.00	0.00	0.00	0.02	0.06	103.31	Spinel
G16	G2C	0.00	0.00	70.16	9.79	0.33	21.57	0.00	0.00	0.00	0.02	0.06	101.93	Spinel
G17	F2C	36.86	0.37	8.80	4.86	0.50	0.31	30.35	0.00	0.00	0.03	14.03	96.11	Grt
G16	E2C	0.00	0.05	51.97	9.44	0.22	1.27	0.02	0.00	0.00	0.05	0.05	63.07	Gah
G16	E2C	0.00	0.05	51.14	9.34	0.23	1.25	0.02	0.00	0.00	0.05	0.03	62.11	Gah
G17	D2C	0.00	0.03	54.29	11.16	0.18	2.65	0.02	0.00	0.00	0.04	0.05	68.42	Gah
G17	C2C	41.57	0.02	20.37	8.10	0.30	20.07	5.21	0.00	0.00	0.00	4.56	100.20	Grt
G16	B2C	27.47	0.33	54.82	14.70	0.08	1.83	0.00	0.00	0.00	0.03	0.00	99.26	St
G17	A2C	25.77	0.29	56.46	15.22	0.07	1.57	0.00	0.03	0.00	0.04	0.03	99.48	St
G17	A3C	52.75	0.12	3.82	6.41	0.12	14.47	21.91	1.04	0.00	0.01	0.09	100.74	Cpx
G16	B3C	0.00	13.00	0.23	79.75	0.07	0.05	0.00	0.00	0.00	0.09	0.01	93.20	Fe-Ti Ox.
G17	C3C	34.44	4.33	6.50	19.77	0.62	0.28	30.41	0.02	0.00	0.05	0.00	96.42	Grt
G17	D3C	43.72	0.60	10.72	22.88	0.56	7.54	10.58	1.26	0.88	0.07	0.18	98.99	Hbl
G16	E3C	35.06	2.45	4.01	23.59	0.96	0.22	30.27	0.02	0.00	0.06	0.00	96.64	Grt
G16	F3C	32.30	6.54	1.32	24.51	0.41	0.39	30.19	0.09	0.00	0.00	0.01	95.76	Grt
G17	G3C	35.67	5.70	8.49	17.41	0.57	0.31	31.20	0.02	0.00	0.01	0.01	99.39	Grt
G16	H3C	0.00	48.21	0.02	37.13	0.31	9.85	0.01	0.00	0.00	0.01	3.02	98.56	Pic. Ilm
G16	I3C	1.30	1.01	0.89	85.17	0.00	0.02	0.03	0.02	0.06	0.10	0.03	88.63	Fe-Oxide
G17	J3C	37.20	0.01	65.03	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.03	102.35	Kyanite
G17	J5C	0.00	0.03	53.79	13.63	0.26	1.90	0.02	0.00	0.00	0.04	0.03	69.70	Gah
G16	I5C	41.23	0.92	16.10	7.09	0.24	19.80	6.40	0.02	0.00	0.00	8.67	100.47	Grt
G17	H5C	41.50	0.20	20.26	7.93	0.31	20.29	5.07	0.00	0.00	0.02	4.82	100.40	Grt
G17	G5C	38.04	0.04	21.28	31.30	0.47	5.29	4.92	0.00	0.00	0.03	0.02	101.39	Grt
G16	F5C	27.50	0.41	55.55	14.38	0.06	1.89	0.00	0.01	0.00	0.03	0.00	99.83	St
G17	E5C	27.26	0.39	55.38	14.28	0.17	1.50	0.00	0.00	0.00	0.01	0.00	98.99	St
G17	D5C	26.53	0.41	56.97	15.04	0.08	1.68	0.00	0.00	0.00	0.05	0.00	100.76	St
G16	C5C	37.54	0.01	20.39	32.11	2.49	2.27	5.61	0.00	0.00	0.06	0.00	100.48	Grt
G17	B5C	37.05	0.00	20.50	32.58	7.13	1.43	2.17	0.00	0.00	0.05	0.00	100.91	Grt
G17	A5C	37.31	0.00	21.20	36.08	4.49	2.17	0.84	0.00	0.00	0.03	0.01	102.13	Grt

G 17

Plugs 16, 17
Sept. 1, 1993

Gah- Gahnite (Zn spinel)
Low totals in some Grt due to high Fe3+

Plug	Spot	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	F	Cr2O3	Total	Mineral
G17	A6C	0.00	0.04	53.79	14.80	0.46	1.49	0.02	0.00	0.00	0.01	0.10	70.71	Gah
G	B6C	0.00	0.05	53.81	12.43	0.30	2.31	0.02	0.00	0.00	0.03	0.04	68.99	Gah
G	C6C	51.53	0.13	2.30	15.01	0.23	10.91	19.88	0.50	0.00	0.00	0.04	100.53	Cpx
G17	D6C	53.74	0.07	2.52	6.82	0.16	14.97	21.30	0.96	0.00	0.10	0.16	100.80	Cpx
G	E6C	51.54	0.13	1.51	13.81	0.32	11.93	20.37	0.39	0.00	0.01	0.01	100.02	Cpx
G	F6C	0.00	0.04	53.94	10.09	0.13	2.96	0.02	0.00	0.00	0.02	0.11	67.31	Gah
G17	G6C	0.01	0.06	50.69	9.49	0.08	0.96	0.02	0.00	0.01	0.05	0.09	61.46	Gah
G	H6C	0.00	0.04	53.86	13.81	0.10	2.09	0.02	0.00	0.01	0.05	0.05	70.03	Gah
G	J6C	32.65	6.47	1.13	24.51	0.53	0.35	30.23	0.12	0.00	0.01	0.01	96.01	Grt
G17	J7C	41.69	2.09	12.77	20.13	0.24	7.99	10.85	1.46	1.36	0.09	0.03	98.70	Hbl
G17	I7C	34.80	3.02	4.74	21.66	0.34	0.35	30.98	0.01	0.00	0.02	0.00	95.92	Grt
G	H7C	1.63	1.33	1.01	83.02	0.00	0.03	0.01	0.00	0.15	0.12	0.11	87.41	Fe-Oxide
G17	G7C	0.05	18.77	0.07	73.80	0.26	0.04	0.01	0.00	0.00	0.07	0.06	93.13	Fe-Ti Ox.
G17	F7C	0.24	55.78	0.18	34.04	3.82	0.12	0.09	0.00	0.00	0.02	0.00	94.29	Ilm
G	E7C	0.00	21.15	0.12	72.61	1.40	0.10	0.00	0.00	0.00	0.08	0.04	95.50	Fe-Ti Ox.
G	D7C	34.85	3.29	6.91	19.31	0.88	0.32	30.09	0.02	0.00	0.06	0.01	95.74	Grt
G17	C7C	31.66	8.70	2.35	22.38	0.50	0.42	29.93	0.07	0.00	0.01	0.01	96.03	Grt
G	B7C	34.32	3.84	5.10	21.81	0.82	0.32	30.01	0.02	0.00	0.03	0.01	96.28	Grt
G	A7C	34.17	3.42	4.60	21.97	0.88	0.27	29.88	0.02	0.00	0.03	0.00	95.24	Grt
G17	A9C	36.97	0.07	20.03	34.31	0.93	1.11	6.85	0.00	0.00	0.01	0.01	100.29	Grt
G	B9C	36.81	0.03	19.83	34.15	0.70	0.81	7.72	0.00	0.00	0.03	0.01	100.09	Grt
G	C9C	37.91	0.21	17.47	13.42	0.13	0.08	28.28	0.00	0.00	0.01	0.00	97.51	Grt
G17	D9C	27.98	0.53	54.74	14.33	0.00	1.84	0.00	0.00	0.00	0.03	0.00	99.45	St
G	E9C	0.00	0.00	69.54	13.90	0.28	19.03	0.00	0.00	0.00	0.02	0.02	102.79	Spinel
G	F9C	51.85	0.04	4.16	5.52	0.12	14.87	22.24	0.61	0.00	0.00	0.24	99.65	Cpx
G17	G9C	52.94	0.05	1.67	8.04	0.53	14.10	22.33	0.40	0.00	0.00	0.01	100.07	Cpx
G17	H9C	51.49	0.20	3.47	8.78	0.21	13.26	21.85	0.54	0.00	0.00	0.20	100.00	Cpx
G	I9C	54.11	0.09	1.16	8.55	0.08	14.03	21.26	1.32	0.00	0.00	0.02	100.62	Cpx
G17	J9C	36.79	0.01	23.82	6.68	0.09	2.11	21.86	0.01	0.00	0.07	0.00	91.44	Grt
G17	H10C	0.09	59.04	0.08	31.46	0.51	0.31	0.05	0.00	0.00	0.02	0.05	91.61	Ilm
G	G10C	0.00	98.46	0.01	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.06	100.01	Rt
G17	F10C	1.49	1.64	0.90	84.19	0.00	0.02	0.02	0.00	0.11	0.10	0.07	88.54	Fe-Oxide
G17	E10C	42.27	1.47	14.31	12.00	0.08	13.29	11.53	1.99	0.65	0.13	0.07	97.79	Hbl
G	D10C	34.52	6.19	6.94	19.19	0.79	0.27	30.00	0.05	0.00	0.00	0.00	97.95	Grt
G	C10C	33.33	6.75	2.46	23.21	0.59	0.37	30.25	0.14	0.05	0.05	0.01	97.21	Grt
G17	B10C	36.41	1.94	8.79	17.94	0.60	0.28	31.54	0.00	0.00	0.02	0.00	97.52	Grt
G	A10C	30.39	10.79	1.85	22.49	0.45	0.65	29.82	0.09	0.00	0.00	0.00	96.53	Grt

Mineral Location Diagram

LRING2

Glen DePaoli

Plug No. 19.

Mineral Grains

	A	B	C	D	E	F	G	H	I	J	
1		orange gT minor Mn UN 78	orange Fe-Ca garnet	orange Fe-Mn garnet	orange Fe-Ca garnet	orange Rutile	orange garnet UN 79	green diopsid	muscovite	green px? cr UN 80	9
2	green px	green px	green px	green px	green px	opaque Am? Si=Ca>Fe mg-Ti Al	opaque Am? as F2 UN 81	opaque Ilmenite No mg	opaque Ilmenite No mg	opaque Ilmenite No mg.	10
3	deep red as G2 Uniform Eds required	deep red as G2	deep red as G2	opaque hematite	light orange ?? Si, Al minor Fe	X	X minor Mn.	X	X	X	5
4	orange Fe-Mn garnet	orange Fe-Ca garnet	orange Fe garnet	pink Cr-garnet UN 82	pink Cr-garnet UN 83	pink Zircon Not garnet	pink Corundum	pink spinel Al, Mg, minor Fe	pink Cr-garnet UN 84	deep red rutile	10
5	orange Fe-garnet	pink Cr-garnet UN 85	light green Spinel Al, Mg, minor Fe.	?? Ca+Zr light green	light green. px UN 86	light gr. px	light gr. px	light gr. px	light gr. Spinel Al, Mg. minor Fe.	light gr. Spinel Al, Mg. minor Fe.	10
6	green px	Ilmenite no mg	Ilmenite no mg.	Ilm no mg.	Ilm no mg.	opaque as. G2	opaque as G2	opaque as G2	green px	green Spinel Mg, Al, minor Fe minor Zr	10
7	X	X	X	X	X	X	X	X	X	X	
8	orange Staurolite	orange Fe-Ca garnet	orange Fe-Ca garnet	orange Cr-garnet UN 87	pink Cr-garnet UN 88	pink Cr-garnet zone Mn? UN 89	Zircon. pink	Zircon. pink	pink Cr-garnet UN 90	pink. Spinel Al, Mg minor Fe.	10
9	green px UN 91	green px	green px	green px	green px	green px	green Spinel Al, Mg, minor Fe	opaque. Ilmenite	Ilmenite	Ilmenite	10
10	Ilmenite	opaque anph? Si, Al, Ca, Fe, Mg, K.	AS G2	AS G2	AS G2	X	X	X	X	X	5

Total Grains 79

Loring Laboratories Limited

[redacted]le No. : 35915

Microprobe Data

Location				Data in wt %									
Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	NaO	F	Total	Mineral
PB-1	19	B	1	37.73	0.00	20.30	0.02	32.11	3.40	5.93	0.00	0.00	5.93	garnet
PB-1	19	G	1	38.57	0.04	21.02	0.04	26.02	7.40	7.10	0.00	0.04	7.14	garnet
PB-1	19	J	1	53.11	0.13	2.93	1.32	2.14	17.22	21.54	1.00	0.00	22.54	pyroxene
PB-1	19	G	2	34.44	3.04	5.45	0.01	21.06	0.29	30.11	0.02	0.07	30.20	amphibole?
PB-3	19	D	8	42.03	0.63	19.36	4.81	6.88	21.62	5.09	0.03	0.00	5.12	garnet
PB-3	19	E	8	41.50	0.00	19.35	6.39	7.83	19.04	6.73	0.00	0.04	6.77	garnet
PB-3	19	F	8	40.49	0.08	19.42	4.36	7.94	18.46	5.44	0.00	0.00	5.44	garnet some manganese
PB-3	19	I	8	40.95	0.13	17.84	7.51	8.13	18.56	6.51	0.00	0.02	6.53	garnet
PB-3	19	A	9	53.66	0.22	3.37	1.93	3.58	15.05	21.00	1.94	0.00	22.94	pyroxene
PB-4	19	D	4	41.23	0.69	16.18	9.25	5.80	20.73	6.15	0.02	0.01	6.18	garnet
PB-4	19	I	4	41.71	0.69	18.88	5.39	6.42	21.49	5.19	0.02	0.01	5.22	garnet
PB-4	19	E	5	41.26	0.11	20.61	4.28	7.89	20.56	4.74	0.01	0.00	4.75	garnet
PB-4	19	B	5	41.74	0.12	21.50	2.41	8.83	20.58	4.47	0.00	0.02	4.49	garnet
PB-4	19	E	5	53.49	0.02	0.90	0.11	6.54	14.00	23.85	0.46	0.00	24.31	pyroxene

629 Beaverdam Rd. N.E.
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LORING LABORATORIES LTD.

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LORING LABORATORIES LTD.

Tel: (403) 274-2777
Fax: (403) 275-0541

To: Takla Star Resources

From: LORING LABORATORIES LTD.

Date: November 2, 1993

Subject: Sample Results

File: 36011

1. Introduction

Enclosed are the results of the processing of samples PB-T6, PB-T8, PB-9, PB-T10, PB-T11, PB-G7 and PB-G12. location?

The data sheets enclosed represent the adjusted microprobe data as received from the technician. On the tables and charts attached to this report, the oxides are presented in weight percent of the composition of the mineral and -- indicates that the oxide was not analyzed in the mineral (see Microprobe Data table)

The minerals selected have been identified using the EDS. The minerals believed to contain oxides useful in indicators minerals were analyzed by electron microprobe.

Care must be taken in interpreting this data. Although some of these minerals may be found in kimberlite or lamproite, they may also be present in other rocks.

Following are a few notes on the mineral grains picked from your samples.

2. Garnet

The garnets have been categorized according to Dawson and Stephens' (1975) classification. Of the 51 grains selected for probing 3 rank as G3, 1 ranks as a G4 and 33 rank as G5. (see Garnet Classification tables).

No garnets plot in the Eclogitic Field from Fipke.(1989) (see Eclogite Garnet Indicators chart).

Almandine and grossular garnet with low quantities of

chrome, magnesium or titanium was identified in 6 other grains selected from these samples. These grains were not probed.

3. Pyroxene

The 12 pyroxenes that were probed have been graded according to Stephen and Dawson's (1977) classification on the accompanying table. One ranks as a CP-1(Subcalcic Diopside), seven rank as CP-2 (diopside) and 3 as CP-4 (low-chrome diopside) and 1 as CP-5 (chrome diopside) (see Pyroxene Classification table).

Two other grains thought to have been pyroxenes are identified as amphiboles and were not probed.

Several pyroxenes plot in or near the chrome pyroxene indicator mineral region (Fipke, 1989) (see Clinopyroxene chart).

Pyroxene with negligible quantities of chrome was identified in 15 other grains in these samples.

4. Ilmenite

Ilmenite was identified in 13 grains from these samples. One of these was probed and the analyses returned negligeable MgO

5. Other Minerals

Four grains of an unidentified Ca-Fe Silicate were identified on E.D.S. One grain of zircon were identified, as well as one grain of Rutile and one of Sphene. These had been selected because they look very similar to potential indicator minerals.

6. References

Dawson J.B. and W.E. Stephens
1975: Statistical Classification of Garnets from Kimberlite and Associated Xenoliths. Journal of Geology, vol. 83, p. 589-607.

Fipke, C. E. (ed.)
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Gurney, J. J.
1985: A correlation between garnets and diamonds in Kimberlites; in J.E. Glover and P.G. Harris (eds.), Kimberlite Occurrence and Origin: A basis for conceptual models in exploration, Geol. Dept. and Univ. Exten., Univ. W. Aust., Publ. No. 8,

143-166.

Stephens W.E. and J.B. Dawson
1977: Statistical Comparison Between Pyroxenes from Kimberlites and their Associated Xenoliths.
Journal of Geology, vol. 85, p. 433-449.

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File #36011
Client: Takla Star

Microprobe Data

Location				Data in wt %													
Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	Na2O	K2O	V2O5	ZnO	Nb2O5	Total	Mineral
PB - T6	48	A	5	38.49	0.03	22.07	0.02	28.91	0.66	6.38	3.46	0.01	-	-	-	-	100.03	Garnet
PB - T6	48	B	5	37.92	0.01	22.57	0.00	32.45	0.38	6.63	0.86	0.02	-	-	-	-	100.84	Garnet
PB - T6	48	C	5	39.13	0.00	22.88	0.01	26.12	1.77	10.07	1.13	0.00	-	-	-	-	101.11	Garnet
PB - T6	48	D	5	37.48	0.00	22.51	0.00	31.02	4.02	5.16	0.85	0.00	-	-	-	-	101.04	Garnet
PB - T6	48	E	5	38.18	0.02	22.11	0.02	33.54	0.89	5.12	0.26	0.03	-	-	-	-	101.17	Garnet
PB - T6	48	F	5	52.91	0.11	6.37	0.49	6.90	0.11	19.70	11.56	0.65	0.11	-	-	-	98.91	Pyroxene
PB - T6	48	G	5	54.04	0.05	1.38	0.00	6.06	0.41	15.42	22.66	1.14	0.00	-	-	-	101.16	Pyroxene
PB - T6	48	H	5	54.00	0.04	1.15	0.13	6.66	0.23	15.19	22.81	0.60	0.00	-	-	-	100.81	Pyroxene
PB - T6	48	J	5	54.55	0.14	1.90	0.87	3.36	0.17	16.71	22.63	0.81	0.00	-	-	-	101.14	Pyroxene
PB - T6	48	A	6	52.29	0.11	4.06	0.24	6.28	0.18	14.45	21.88	0.91	0.00	-	-	-	100.40	Pyroxene
PB - T8	48	A	7	37.08	0.06	21.98	0.05	34.53	1.44	4.53	0.48	0.01	-	-	-	-	100.16	Garnet
PB - T8	48	B	7	36.68	0.01	21.64	0.03	35.97	0.45	4.32	0.92	0.01	-	-	-	-	100.03	Garnet
PB - T8	48	C	7	37.05	0.03	21.30	0.00	28.27	9.54	3.97	1.18	0.01	-	-	-	-	99.35	Garnet
PB - T8	48	D	7	36.97	0.02	21.54	0.01	36.83	1.52	2.53	1.00	0.06	-	-	-	-	100.48	Garnet
PB - T8	48	E	7	0.00	100.87	0.07	0.18	0.42	0.00	0.03	-	-	-	-	0.00	0.19	101.76	Rutile
PB - T8	48	F	7	37.37	0.00	21.61	0.03	30.44	2.11	3.26	4.94	0.02	-	-	-	-	99.78	Garnet
PB - T8	48	H	7	53.52	0.02	1.98	0.22	5.33	0.11	16.19	22.82	0.43	0.00	-	-	-	100.62	Pyroxene
PB - 9	48	A	9	37.56	0.01	22.37	0.01	32.95	0.55	6.41	0.92	0.05	-	-	-	-	100.83	Garnet
PB - 9	48	E	9	39.95	0.00	23.26	0.00	22.51	0.45	13.74	0.84	0.02	-	-	-	-	100.77	Garnet
PB - 9	48	F	9	38.02	0.00	21.47	0.05	35.17	1.92	2.01	2.72	0.05	-	-	-	-	99.41	Garnet
PB - T10	49	B	1	37.78	0.00	21.77	0.00	35.62	0.55	3.90	1.80	0.03	-	-	-	-	101.45	Garnet
PB - T10	49	C	1	38.67	0.04	22.32	0.17	28.57	1.49	8.81	0.97	0.01	-	-	-	-	101.05	Garnet
PB - T10	49	D	1	37.43	0.00	21.73	0.00	30.47	1.17	4.17	4.88	0.03	-	-	-	-	99.88	Garnet
PB - T10	49	E	1	37.36	0.01	21.95	0.04	32.69	1.03	4.96	1.89	0.01	-	-	-	-	99.94	Garnet
PB - T10	49	F	1	37.76	0.00	21.97	0.03	33.38	0.83	5.62	1.04	0.02	-	-	-	-	100.65	Garnet
PB - T10	49	I	1	53.92	0.04	1.13	0.00	7.86	0.24	14.17	23.08	0.57	0.00	-	-	-	101.01	Pyroxene
PB - T10	49	A	2	54.26	0.14	1.70	0.46	6.22	0.12	16.10	21.70	0.56	0.00	-	-	-	101.26	Pyroxene
PB - T10	49	D	2	0.03	51.63	0.12	0.00	47.71	1.92	0.45	-	-	-	-	0.00	0.15	102.01	Ilmenite
PB - T11	49	A	3	37.72	0.02	21.89	0.09	31.65	0.35	6.38	1.79	0.02	-	-	-	-	99.91	Garnet
PB - T11	49	B	3	39.54	0.03	23.00	0.12	23.41	0.45	11.37	3.09	0.02	-	-	-	-	101.03	Garnet
PB - T11	49	C	3	39.12	0.00	22.66	0.01	26.52	1.01	10.00	1.74	0.04	-	-	-	-	101.10	Garnet
PB - T11	49	D	3	38.75	0.00	22.44	0.02	25.50	0.64	10.70	1.29	0.03	-	-	-	-	99.37	Garnet
PB - T11	49	E	3	38.54	0.04	22.34	0.12	28.52	0.45	8.41	2.46	0.00	-	-	-	-	100.88	Garnet
PB - T11	49	F	3	39.06	0.01	22.55	0.02	28.67	0.91	8.75	1.63	0.01	-	-	-	-	101.61	Garnet
PB - T11	49	B	4	53.98	0.20	1.83	0.04	6.86	0.21	14.26	23.06	0.77	0.00	-	-	-	101.21	Pyroxene
PB - G7	49	A	5	38.02	0.00	22.24	0.07	31.52	0.51	6.66	1.53	0.02	-	-	-	-	100.57	Garnet
PB - G7	49	B	5	37.46	0.04	22.04	0.02	31.69	0.54	6.31	1.58	0.00	-	-	-	-	99.68	Garnet
PB - G7	49	C	5	37.38	0.00	21.88	0.00	33.53	0.39	4.82	2.23	0.03	-	-	-	-	100.26	Garnet
PB - G7	49	D	5	37.79	0.05	21.72	0.00	23.72	1.05	6.69	7.09	0.00	-	-	-	-	98.11	Garnet
PB - G7	49	F	5	36.21	0.01	21.76	0.02	32.34	0.55	4.56	0.96	0.00	-	-	-	-	96.41	Garnet
PB - G7	49	G	5	37.76	0.00	22.34	0.03	32.05	0.31	6.47	0.89	0.01	-	-	-	-	99.86	Garnet
PB - G7	49	H	5	37.60	0.00	22.03	0.00	28.88	0.17	8.65	1.10	0.04	-	-	-	-	96.47	Garnet
PB - G7	49	I	5	52.77	0.21	4.30	0.69	5.18	0.05	17.64	19.77	0.27	0.00	-	-	-	100.88	Pyroxene
PB - G12	49	B	7	37.79	0.03	22.01	0.01	31.38	0.42	6.59	1.23	0.00	-	-	-	-	99.46	Garnet
PB - G12	49	C	7	37.59	0.01	21.48	0.02	29.56	2.77	4.24	4.77	0.00	-	-	-	-	100.44	Garnet
PB - G12	49	D	7	37.88	0.00	21.91	0.06	31.07	0.76	6.35	1.96	0.03	-	-	-	-	100.02	Garnet
PB - G12	49	E	7	39.26	0.02	21.36	0.00	28.29	0.47	7.15	2.29	0.06	-	-	-	-	98.90	Garnet
PB - G12	49	F	7	54.61	0.04	1.65	0.12	5.86	0.16	15.02	23.03	0.59	0.00	-	-	-	101.08	Pyroxene
PB - G12	49	G	7	55.09	0.05	1.07	0.05	4.41	0.15	16.28	23.02	0.55	0.00	-	-	-	100.77	Pyroxene
PB - G12	49	J	7	37.81	0.02	23.09	0.07	29.98	1.55	7.30	1.00	0.07	-	-	-	-	100.89	Garnet
PB - G12	49	A	8	34.67	2.75	5.17	0.02	24.45	1.09	0.27	31.04	0.07	-	-	-	-	99.53	Garnet

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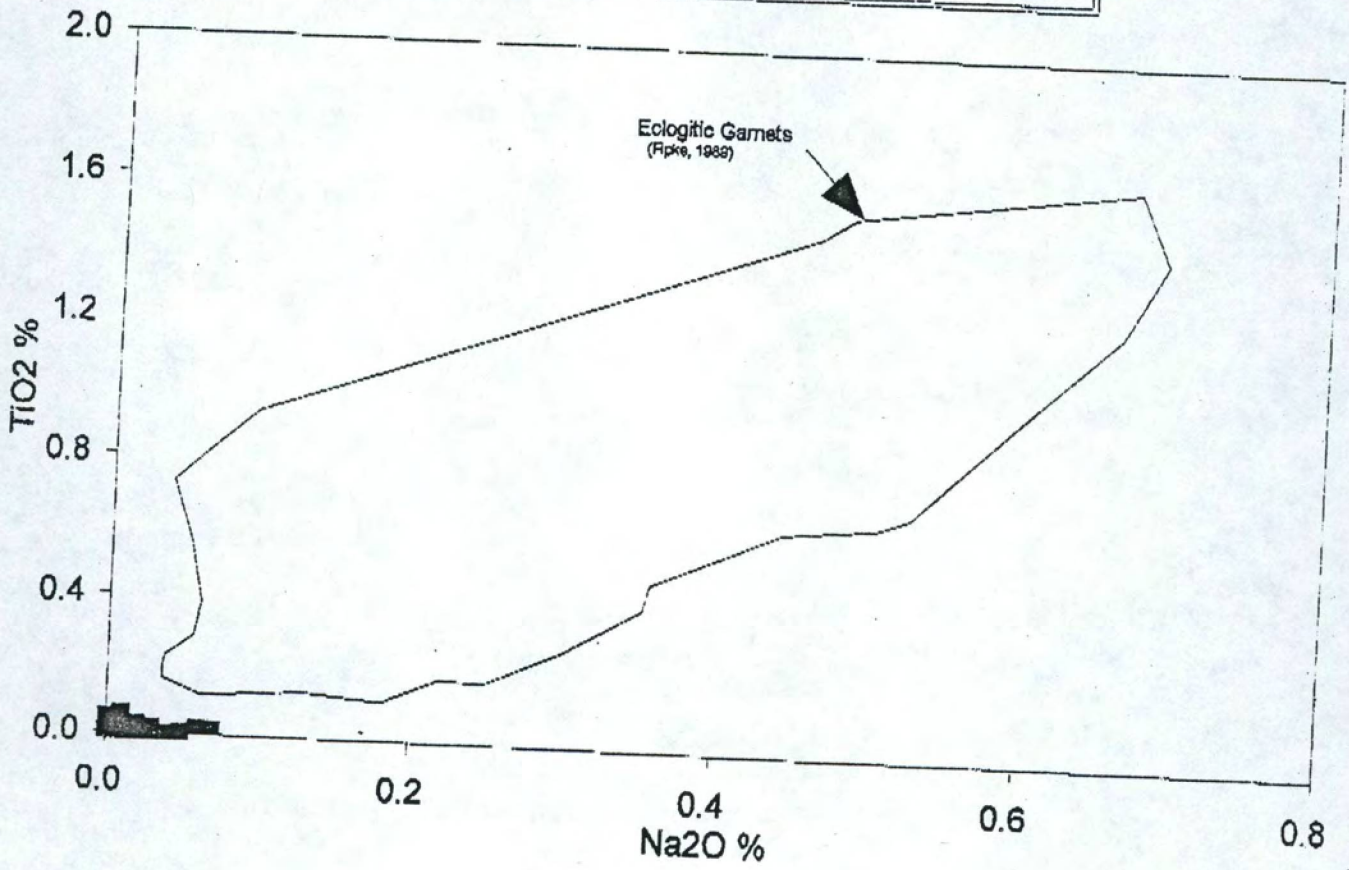
File #36011
Client: Takla Star

Garnet Classification (after Dawson and Stephens, 1975)

Sample #	Location P#	C#	R#	Data in wt % TiO2	Cr2O3	FeO	MgO	CaO	Na2O	Garnets Classification G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
PB - T6	48	A	5	0.03	0.02	28.91	6.38	3.46	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - T6	48	B	5	0.01	0.00	32.45	6.63	0.86	0.02	..	..	..	..	5	..	..	..	..	..	..	..
PB - T6	48	C	5	0.00	0.01	26.12	10.07	1.13	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - T6	48	D	5	0.00	0.00	31.02	5.16	0.85	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - T8	48	E	5	0.02	0.02	33.54	6.12	0.26	0.03	..	..	..	..	5	..	..	..	..	..	..	..
PB - T8	48	A	7	0.06	0.05	34.53	4.53	0.48	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - T8	48	B	7	0.01	0.03	35.97	4.32	0.92	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - T8	48	C	7	0.03	0.00	26.27	3.97	1.18	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - T8	48	D	7	0.02	0.01	36.83	2.53	1.00	0.06	..	..	..	..	5	..	..	..	..	..	..	..
PB - 9	48	F	7	0.00	0.03	30.44	3.26	4.94	0.02	..	..	..	..	5	..	..	..	..	..	..	..
PB - 9	48	A	9	0.01	0.01	32.95	6.41	0.92	0.05	..	..	..	..	5	..	..	..	..	..	..	..
PB - 9	48	E	9	0.00	0.00	22.51	13.74	0.84	0.02	..	..	3	..	..	..	..	..	..	..	..	..
PB - T10	48	F	9	0.00	0.05	35.17	2.01	2.72	0.05	..	..	..	..	5	..	..	..	..	..	..	..
PB - T10	49	B	1	0.00	0.00	35.62	3.90	1.80	0.03	..	..	..	..	5	..	..	..	..	..	..	..
PB - T10	49	C	1	0.04	0.17	28.57	8.81	0.97	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - T10	49	D	1	0.00	0.00	30.47	4.17	4.88	0.03	..	..	..	..	5	..	..	..	..	..	..	..
PB - T10	49	E	1	0.01	0.04	32.69	4.96	1.89	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - T11	49	F	1	0.00	0.03	33.38	5.62	1.04	0.02	..	..	..	..	5	..	..	..	..	..	..	..
PB - T11	49	A	3	0.02	0.09	31.65	6.38	1.79	0.02	..	..	..	..	5	..	..	..	..	..	..	..
PB - T11	49	B	3	0.03	0.12	23.41	11.37	3.09	0.02	..	..	3	..	..	..	..	..	..	..	..	..
PB - T11	49	C	3	0.00	0.01	26.52	10.00	1.74	0.04	..	..	..	..	5	..	..	..	..	..	..	..
PB - T11	49	D	3	0.00	0.02	25.50	10.70	1.29	0.03	..	..	..	..	5	..	..	..	..	..	..	..
PB - T11	49	E	3	0.04	0.12	28.52	8.41	2.46	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - G7	49	F	3	0.01	0.02	28.67	8.75	1.63	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - G7	49	A	5	0.00	0.07	31.52	6.66	1.53	0.02	..	..	..	..	5	..	..	..	..	..	..	..
PB - G7	49	B	5	0.04	0.02	31.69	6.31	1.58	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - G7	49	C	5	0.00	0.00	33.53	4.82	2.23	0.03	..	..	..	..	5	..	..	..	..	..	..	..
PB - G7	49	D	5	0.05	0.00	23.72	6.69	7.09	0.00	..	..	3	..	..	..	..	..	..	..	..	..
PB - G7	49	F	5	0.01	0.02	32.34	4.56	0.96	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - G7	49	G	5	0.00	0.03	32.05	6.47	0.89	0.01	..	..	..	..	5	..	..	..	..	..	..	..
PB - G12	49	H	5	0.00	0.00	26.88	8.65	1.10	0.04	..	..	..	..	5	..	..	..	..	..	..	..
PB - G12	49	B	7	0.03	0.01	31.38	6.59	1.23	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - G12	49	C	7	0.01	0.02	29.56	4.24	4.77	0.00	..	..	..	..	5	..	..	..	..	..	..	..
PB - G12	49	D	7	0.00	0.06	31.07	6.35	1.96	0.03	..	..	..	..	5	..	..	..	..	..	..	..
PB - G12	49	E	7	0.02	0.00	28.29	7.15	2.29	0.06	..	..	..	..	5	..	..	..	..	..	..	..
PB - G12	49	J	7	0.02	0.07	29.98	7.30	1.00	0.07	..	..	..	..	5	..	..	..	..	..	..	..
	49	A	8	2.75	0.02	24.45	0.27	31.04	0.07	..	..	..	4	..	..	..	..	..	..	..	..
Total Garnets									37	0	0	3	1	33	0	0	0	0	0	0	0
										G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12

Eclogite Garnet Indicators



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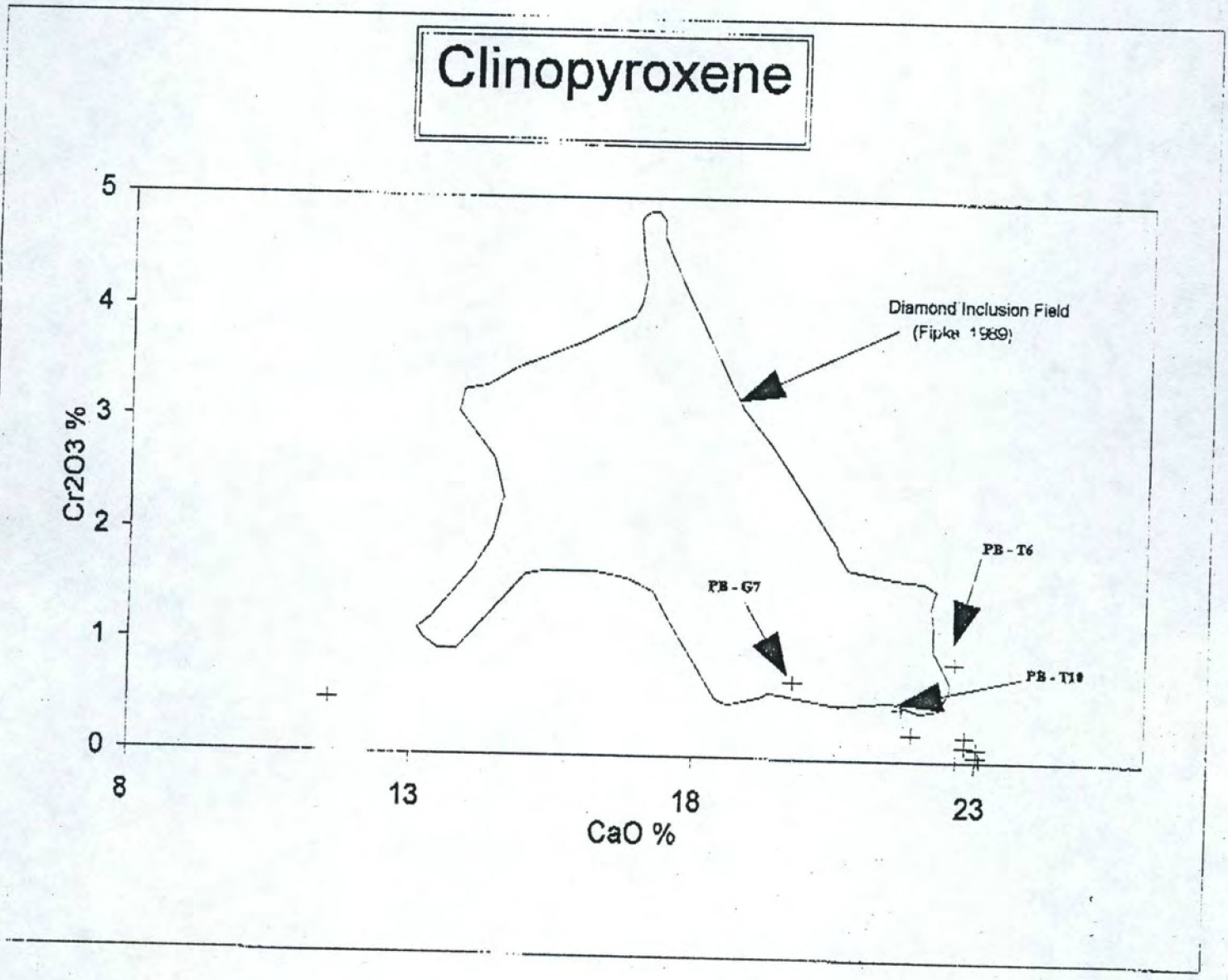
File #36011
Client: Takla Star

Pyroxene Classification (after Stephens and Dawson, 1977)

Sample #	Location P#	C#	R#	Data in wt % TiO2	Al2O3	Cr2O3	FeO	MgO	CaO	Na2O	Classification
PB - T6	48	F	5	0.11	6.37	0.49	6.90	19.70	11.56	0.65	CP-1
PB - T6	48	G	5	0.05	1.38	0.00	6.06	15.42	22.66	1.14	CP-2
PB - T6	48	H	5	0.04	1.15	0.13	6.66	15.19	22.81	0.60	CP-2
PB - T6	48	J	5	0.14	1.90	0.87	3.38	16.71	22.63	0.81	CP-2
PB - T6	48	A	6	0.11	4.06	0.24	6.25	14.45	21.88	0.91	CP-5
PB - T8	48	H	7	0.02	1.96	0.22	5.33	16.19	22.82	0.43	CP-2
PB - T10	49	I	1	0.04	1.13	0.00	7.88	14.17	23.08	0.57	CP-2
PB - T10	49	A	2	0.14	1.70	0.46	6.22	16.10	21.70	0.56	CP-4
PB - T11	49	B	4	0.20	1.83	0.04	6.58	14.28	23.08	0.77	CP-2
PB - G7	49	I	5	0.21	4.30	0.69	5.18	17.64	19.77	0.27	CP-4
PB - G12	49	F	7	0.04	1.65	0.12	5.58	15.02	23.03	0.59	CP-4
PB - G12	49	G	7	0.05	1.07	0.05	4.41	16.28	23.02	0.65	CP-2
											CP-2



Status of panned heavy mineral samples from Takla Star claim blocks explored during May to August, 1993

Pincher Block

An orientation (stream sediment sampling) survey was carried out in the Pincher Block, southwestern Alberta to investigate diamond potential, through the observation of diamond indicator minerals. Stream sediment samples, sieved to 2mm size and ~ 40 kg weight were collected for analysis and a panned concentrate sample also collected. The sampling keyed on creeks draining geophysical anomalies . Two significant geophysical anomalies became apparent. 1). the positive aeromag anomalywest of Bullhorn Ck. and 2). the negative aeromag anomaly north of Boundary Creek.

Water well data was examined to determine depths to bedrock as well as to observe possible geological inferences. From the water well drilling, depth to bedrock varied from 150 feet to ~25 feet. Bedrock is observed in much of the area, with Upper Cretaceous Brazeau sandstone exposed in southeast trending ridges in the Mountain View area and minor coal locally.

Till and/or gravel samples were taken down ice from the aeromag anomalies and in the initial work in June only panned concentrate samples were taken at these localities. A description of the samples as well as location and specifics is given below;

Sample #	Location	Microscope Work
PB-1	114° 03'W; 49°22'20"N drains minor aeromag anomaly south of Lynch Lakes; NTS 82H/5	No significant minerals seen -no mineral separation techniques done.
PB-1A	a panned concentrate sample was taken south of of the road, avoiding possible contamination. -farmer indicated that road material was taken from a gravel pit shown on 1:50,000 topo map ~ 5km to the SE.	no separation work done.
PB-2	113°49'20"W;49°26'N -taken on Indianfarm Creek Sample taken from gravel bar.	No significant minerals seen - no mineral separation techniques performed.
PB-3	113°49'20"W;49°20'45"N Sampled on Foothill Creek	No significant minerals seen -no mineral separation techniques done.
PB-4	113°43'30"W; 49°22'30"N -sampled downstream on Foothill Ck from PB-3	no significant minerals seen
PB-5	113°48'30"W;49°17'40"N Sampled on Drywood Creek, taken from gravel bar on north side of creek. -Sample drains geophysical anomalies in the Drywood area (although they are probably cultural).	a heavy liquid separation should be done on this sample.

PB-6,7,8	PB-6 & 8 sample minor creeks draining into Drywood Ck while PB-7 further samples Drywood Creek.	Nothing of significance observed.
PB-9	113°43'15"W; 49°18'N -only a panned sample was taken here in a clay rich, minor creek.	No further work
PB-10	113°43'W; 49°20'N Creek draining into Waterton Reservoir. -good stream flow and sample taken from gravel rich section of active stream.	No separation tests done.
PB-11	113°41'30'W; 49°16'20"N only a panned concentrate sample was taken here -very minor flow in essentially a spring within a Hutterite Colony farm.	Nothing of significance observed.
Sample #	Location	Microscope work
PB-12A	113°41'12"W; 49°15'23N Sample taken on minor creek draining into Waterton River.	No sig. minerals seen.
PB-12B	Sample taken on Waterton River along gravel bar; taken on the south side of the river.	sample should be separated using heavy liquid techniques, (ATB)
PB-12C	Sample was taken ~ 2.5km SW of PB-12B. See airphoto AS4293-13 LN-7 for plot.	From panning a large concentration of garnets was observed.
PB-13	113°37'30"W; 49°13'15"N Mami Creek, within Blood Indian Reserve.	No heavy liquid tests done.
PB-14	113°37'55"W; 49°13'20"N Sampled on Belly River.	" " "
PB-15	113°40'45"W; 49°01'45"N Minor creek draining into Belly river (found to be dry. -creek drained weak geophysical anomaly, which may be attributed to topographic features at the eastern edge of Waterton Park. -panned sample only.	
PB-15A	113°42'W; 49°02'45"N sampled on Belly River; panned sample only.	

PB-16	113°30'30"W; 49°06'N sampled at point where two lesser creeks meet, just west of secondary road. -down ice ~ 6km from geophysical anomaly.	A heavy liquid separation using ATB was used. -interesting pyroxene minerals including one with 0.66 wt % Cr was found in scanning electron microscope work at U. of A.
Pb-17	113°31'30"W; 49°10'15"N Sampled on Bullhorn Coulee. -drains geophysical anomaly to NE. -a lot of garnets seen from panning.	A heavy liquid separation was done using ATB, (acetylene tetra bromide).
PB-18	113°32'30"W; 49°04'30"N Sampled on Tough Ck. -sample would be too far west to contain indicator minerals from the main geophysical anomaly.	Sample should be treated with ATB for comparison.
PB-19	113°28'W; 49°08'N Sample taken on Lee Ck., NE of Beazer.	panned sample was first treated by Franz magnetic susceptibility separation and the non magnetic fraction was treated with ATB.

*From this sample several interesting grains have been observed.
1).(30-june-93-08:19) -a chrome spinel gave a wt % of 62.58 Cr. This compares with a chrome spinel from Udachny, Siberia with 61.79 wt. % Cr. from scanning electron microscope work at U.of A.
2). (25-june-93-14:11) - agrain thought to be pyroxene was analyzed giving 0.65 wt. % Cr.

PB-20	113°23'W; 49°08'45"N -sample taken on Lee Ck. downstream from PB-19.	A heavy liquid separation was done. -almandine garnets tend to mask every-else here.
Pb-21	113°21'10"W; 49°09'30"N Creek drains north into Lee Ck.	Heavy liquid separation was done.

Pb-22	113°23'W; 49°02'30"N sample taken on Boundary Creek ~ 1km south of bridge. Gravel bottom found due to assistance from farmer. -sample plotted on airphoto AS4291-127 -panned concentrate indicated lots of almandine garnets, magnetite and coal which rancher pointed out o/c's to the west ~ 2km distance, suggesting minimal overburden cover. ** Most encouraging (pyroxene) grain to date scanned at the U. of A. indicated 1.75 wt % Cr. ✓	The sample was first treated by Franz separation and later by heavy liquid separatiuon of the non-magnetic fraction.
PB-23	113°22'W; 49°01'N Sample taken just west of Highway 2 downstream from sample PB-22 on Boundary Ck.	A heavy liquid separation was done.
PB-24	113°15'10"W; 49°02'45"N -sample taken on lower portion of Coal Canyon Ck. ~ 100metres from St Mary River.	No mineral separation techniques done.
PB-25	113°15'W; 49°02'48"N -Sample takenon St. Mary River in active part of river. -lots of garnets seen from panning. -mainly sedimentary rocks noted in cs. fraction	Recommend heavy liquid separation be done to more fully evaluate down ice dispersion.
PB-26	Stream sediment taken on highway 22 ~ 11km north of Crowsnest Highway. (NW of claim block)	No separation methods done on sample.
Sample#	Location	Microscope work
PB-27	Stream sediment on Lee Ck taken below bridge, near Beazer.	Only a panned conc sample was taken. - a heavy liquid separation was done.
Oldman River	Sample taken on oldman R. on highway 22, ~ 40km north of the Crowsnest Highway.	No work was done on a panned conc.
PB-T1	113°31'30"W; 49°07'N -till sample taken just east of secondary road. -panned sample taken only.	Sample has not been treated by heavy liquid separation.
PB-T2	till sample taken below Piney Ridge, in thin sediment cover (4-5 cm only) directly over Brazeau sandstone.	A heavy liquid should be performed.

PB-T3	West of Wynder Coulee, also beside road. sandstone and minor coal found in till from panning. -a panned conc sample was taken only.	As above (PB-T2)
PB-T4	Similar to PB-T2, sample was taken in thin sediment cover directly over o/c with a 5-6 cm thick sediment layer.	As above.
PB-T5	actual gravel sample taken east of Boundary Ck.	A Franz separation was completed on the sample and a heavy liquid separation was done on the non-magnetic fraction. -only a panned conc. sample was taken. *Sample PB-G12 was later taken at this location for lab analysis.
PB-T6	-till sample taken ~ 1km southeast of main geophysical anomaly.	Sample panned.
Pb-G7	Gravelsample taken from gravel pit,~ 4km east of Mountain View. -pit lies just south of highway 5.	
Pb-T8	Till sample taken for analysis; same position as PB-T1.	
PB-T9-11	Till samples taken down ice from negative geo-physical anomaly. -see airphoto for location	Samples were taken for lab analysis only.
PB-G12	Sample taken at same location as Pb-T5; sample taken for lab analysis.	

Appendix II

Description of Location of Permits

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040033

AGGREGATE AREA:

9 184.284 HECTARES

DESCRIPTION OF LOCATION:

4-26-001: 2;4;5NWP;6NP,SEP;7SEP;10-12;14;16;18;20;22;24;26NE;27NE;
28-30;31NE;32;34;36
PORTION(S) DESIGNATED AS OUTPOST LAKE..
4-26-002: 2;4;6;10
4-27-001: 1SW;2;3;10-12;13N,SE;14;15;22;23N,SE;24;26NE;27S;34S,NE;
35SW,NE;36

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040042

AGGREGATE AREA:

9 174.472 HECTARES

DESCRIPTION OF LOCATION:

4-24-001: 2;4;6;7S;10;11;14;16;18;20;22
4-25-001: 2;4;5NP,SWP;6;9SP,NP;10-12;14;15NP,SWP;16;18;20;22;
23NP,SWP;24;25NP,SWP;26NE,SEP;28-30;32;34;36N,SW,SEP
PORTION(S) DESIGNATED AS ST. MARY RIVER.
4-25-002: 2;4;5SEP;6;10-12;14
PORTION(S) DESIGNATED AS LAKE NO. 1.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040043

AGGREGATE AREA:

9 215.2 HECTARES

DESCRIPTION OF LOCATION:

4-26-002: 18
4-27-001: 4-9;16-21;28-32;33S,NW;34NW
4-27-002: 2;4;6;9SEP;10-12;14L1,L2;16E
PORTION(S) SHOWN AS LAKE.
4-28-001: 1;2;11-14;23-25;26NE;36

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040044

AGGREGATE AREA:

9 187.37 HECTARES

DESCRIPTION OF LOCATION:

4-26-002: 30
4-26-003: 6;7NP
PORTION(S) LYING TO THE SOUTH OF BLOOD INDIAN RESERVE NO. 148.
4-27-002: 14N,SW,L7,L8;16W;18;20;21SP,NE,NWP;22;24;26NE;28-30;
32-34;36
PORTION(S) SHOWN AS LAKES.
4-27-003: 2;4;6;7NP;8NP;9NP;10S,NP;11S,NP;12S,NP
PORTION(S) LYING TO THE SOUTH OF THE SAID RESERVE.
4-28-001: 33WP
PORTION(S) DESIGNATED AS BELLY RIVER.
34W,EP
4-28-002: 1SEP;2;4;10SP,NWP;11NE,SEP,NWP;12;14;16N,SW,SEP
PORTION(S) LYING OUTSIDE THE RESTRICTED AREA OF THE CASTLE RIVER
INTEGRATED RESOURCE PLAN.
21NP,SWP;22;24;26NE;28SEP;32NE;34;35NP,SWP;36
4-28-003: 1EP;2;4;6
PORTION(S) DESIGNATED AS THE SAID RIVER.
12S,NEP
PORTION(S) LYING OUTSIDE THE SAID RESERVE.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040045

AGGREGATE AREA:

9 201.25 HECTARES

DESCRIPTION OF LOCATION:

4-25-002: 16;18;20;22;24;26NE;28-30;32;34;36
4-25-003: 2;4S,NE,NWP;5E;6
PORTION(S) DESIGNATED AS LEE CREEK.
8SE,NEP;9S,NP;10S,NP;11S,NP;12S,NP
PORTION(S) LYING OUTSIDE BLOOD INDIAN RESERVE NO. 148.
4-26-002: 11;12;14;16;19SP,NEP;20;21NP,SWP;22;23L13P;24;25NWP;26NE;
27SP;28;29;32;34;35SEP;36
PORTION(S) DESIGNATED AS THE SAID CREEK.
4-26-003: 2;4;8NP;9NP;10S,NP;11S,NP;12S,NP
PORTION(S) LYING OUTSIDE THE SAID RESERVE.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040046

DESCRIPTION OF LOCATION:

34S,NP;36
PORTION(S) LYING TO THE SOUTH OF THE LEFT BANK OF THE SAID WATERTON RIVER.
4-28-004: 2WP;3EP
PORTION(S) DESIGNATED AS THE SAID WATERTON RIVER.
7NE,NWP
PORTION(S) DESIGNATED AS DRYWOOD RIVER.
10EP
PORTION(S) DESIGNATED AS THE SAID WATERTON RIVER.
14WP
PORTION(S) LYING TO THE WEST OF THE RIGHT BANK OF THE SAID WATERTON RIVER.
15NP
PORTION(S) DESIGNATED AS THE SAID DRYWOOD RIVER.
SEP
PORTION(S) DESIGNATED AS THE SAID WATERTON RIVER.
16;17SP;18;20;22
PORTION(S) DESIGNATED AS THE SAID DRYWOOD RIVER.
23WP;26NEP;27L1,L2,L7,L8S;28-30;32;34;35NEP,L1P,L2EP,L2NW, L3NE,L7P,L8P
PORTION(S) DESIGNATED AS THE SAID WATERTON RIVER.
4-29-004: 2;4;10-12;13S;14;16;22;24

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040046

AGGREGATE AREA:

9 165.68 HECTARES

DESCRIPTION OF LOCATION:

4-27-003: 18NWP
PORTION(S) LYING TO THE NORTH AND WEST OF THE RIGHT BANK OF THE BELLY RIVER.
19NP,SWP
PORTION(S) DESIGNATED AS THE SAID RIVER.
28NWP
PORTION(S) LYING TO THE NORTH AND WEST OF THE RIGHT BANK OF THE SAID RIVER.
29NP,SWP
PORTION(S) DESIGNATED AS THE SAID RIVER.
30W,EP;32W,EP
PORTION(S) LYING TO THE NORTH AND WEST OF THE RIGHT BANK OF THE SAID RIVER.
33NP,SWP
4-27-004: 3NP,SWP;4SEP
PORTION(S) DESIGNATED AS THE SAID RIVER.
7EP
PORTION(S) SHOWN AS LAKE.
10EP;15SP,NWP;21EP;22SWP;28EP
PORTION(S) DESIGNATED AS THE SAID RIVER.
29WP;30EP
PORTION(S) DESIGNATED AS COCHRANE LAKE.
34SP,NEP;35NP;36NP
PORTION(S) DESIGNATED AS THE SAID RIVER.
4-28-003: 7WP;10
PORTION(S) DESIGNATED AS WATERTON RIVER.
12NWP
PORTION(S) LYING OUTSIDE BLOOD INDIAN RESERVE NO. 148.
13SP,NP;14;16-18
PORTION(S) DESIGNATED AS THE SAID BELLY RIVER AND THE R.C.M.P. RESERVE.
19WP;20;22;24;26NE;28-30;32SP;33SP,NEP
PORTION(S) DESIGNATED AS THE SAID WATERTON RIVER.

CONTINUED...

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040076

AGGREGATE AREA:

9 129.02 HECTARES

DESCRIPTION OF LOCATION:

4-29-003: 6
4-30-003: 1;2E;11S,NW;12S;13N,SE;14N,SW,L7,L8;23-25;26NE;35;36
4-30-004: 1-4;5EF;9-12;13S;14-16;17EF;20EF;21-24;26NE;27;28;29EF;
32EF;33;34
5-01-004: 36
5-01-005: 12N;13NP
PORTION(S) DESIGNATED AS PINCHER CREEK.
24S,NE,L11,L12,L13S,L14S,L14NP
PORTION(S) LYING TO THE EAST OF THE LEFT BANK OF THE SAID CREEK.
25WP;36
PORTION(S) DESIGNATED AS THE SAID CREEK.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040077

AGGREGATE AREA:

9 002.05 HECTARES

DESCRIPTION OF LOCATION:

4-27-005: 18NWP;19SP,NEP
PORTION(S) DESIGNATED AS WATERTON RIVER.
20NP
PORTION(S) LYING TO THE NORTH OF THE RIGHT BANK OF THE SAID RIVER.
4-28-005: 1WP;2;10;11
PORTION(S) DESIGNATED AS THE SAID RIVER.
12WP
PORTION(S) LYING TO THE WEST OF THE RIGHT BANK OF THE SAID RIVER.
13SP,NEP,L11P;14;16;20;22;24;27S,NE;28-30;32;34
PORTION(S) DESIGNATED AS THE SAID RIVER.
4-28-006: 4;5NP;6
PORTION(S) DESIGNATED AS LAKE NO. 1.
7SWP
PORTION(S) SHOWN AS LAKE.
8SWP
PORTION(S) DESIGNATED AS THE SAID LAKE NO. 1.
4-29-006: 2;3S,NW;4;6;7;10-12;13NP;14;16S,NE;18
PORTION(S) BEING A SURVEYED ROADWAY ADJOINING THE SOUTH BOUNDARY OF PEIGAN INDIAN RESERVE NO. 147.
4-30-006: 2;3SW,L2,L7;4;8NEF;9NW;10S,L11S,L12,L15N,L16;11;12;14N,SW;15E;16NE,NWP,L4,L5,L7;20EF;21SEP;22SP,NP
PORTION(S) DESIGNATED AS PINCHER CREEK.
23W,NEP
PORTION(S) LYING TO THE NORTH AND WEST OF THE RIGHT BANK OF THE SAID CREEK.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040078

AGGREGATE AREA:

9 197.54 HECTARES

DESCRIPTION OF LOCATION:

4-28-005: 4;6;9SWP;18
PORTION(S) SHOWN AS LAKE.
4-29-005: 2;4;6;10-12;14;16S;18;20;21S;22;24;28-30;31L1P;32;34N;
35;36
PORTION(S) DESIGNATED AS LAKE NO. 2.
4-30-004: 35S,NW
4-30-005: 2;4;10-12;14;16N,SE,L5,L6;20EF;22;23SWP;24;28;29EF;32EF;
33SE,NW,L3N,L4N,L5,L6,L10W,L15W;34S,NE,L11,L12E,L13E,L14;
36
PORTION(S) SHOWN AS LAKE.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393040079

AGGREGATE AREA:

9 193.32 HECTARES

DESCRIPTION OF LOCATION:

4-29-002: 20;21SP,NEP;22;26NE;28-30;32;34;36
4-29-003: 1EP,L3P;2;4;10-12;13L1P;14;16;18;20;22;24;25L1P;26NE;
28-30;32;34;36
PORTION(S) DESIGNATED AS WATERTON RIVER.
4-29-004: 6;18;20;26NE;28-30;32;34S,NW;35NW;36
4-30-004: 36

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

Appendix III

Statement of Expenditures

TAKLA STAR RESOURCES LTD.
STATEMENT OF EXPENDITURES
DECEMBER 31, 1994
PINCHER CREEK BLOCK

	PINCHER CREEK
GEOPHYSICAL SURVEY COSTS	
FIELD STAFF EXPENSES	
ACCOUNTING FEES	
SUPPLIES	
COMMUNICATIONS	
DELIVERY AND FREIGHT	
TRAVEL AND ACCOMODATION	
AUTOMOTIVE EXPENSE	
CONSULTING FEES	
GEOPHYSICAL CONTRACTS	
EQUIPMENT EXPENSE	
EQUIPMENT RENTAL	
MEALS/ENTERTAINMENT/SUSTENANCE	
REFERENCE MATERIALS	
ASSAYING	
FIELD STAFF WAGES	
MANAGEMENT SALARIES	
SUBTOTAL	0.00
OVERHEAD COMPONENT - 15%	0.00
TOTAL GEOPHYSICAL SURVEY COSTS	**0.00**
GEOCHEMICAL SURVEY COSTS	
FIELD STAFF EXPENSES	1,723.13
ACCOUNTING FEES	240.00
SUPPLIES	2.97
COMMUNICATIONS	47.61
DELIVERY AND FREIGHT	0.00
TRAVEL AND ACCOMODATION	3.93
AUTOMOTIVE EXPENSE	536.87
CONSULTING FEES	0.00
GEOPHYSICAL CONTRACTS	0.00
EQUIPMENT EXPENSE	1,871.08
EQUIPMENT RENTAL	0.00
MEALS/ENTERTAINMENT/SUSTENANCE	24.85
REFERENCE MATERIALS	3.20
ASSAYING	18,849.35
FIELD STAFF WAGES	11,100.86
MANAGEMENT SALARIES	3,704.00
	38,107.85
OVERHEAD COMPONENT - 15%	5,716.18
TOTAL GEOCHEMICAL SURVEY COSTS	**43,824.03**
GRAND TOTALS	**43,824.03**

Compiled by L.R. Abrams, CMA