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# **MUR CLAIM GROUP** FORT ST. JAMES AREA **OMINECA MINING DIVISION**

by

## MURRAY S. MORRISON, B.Sc.



SURVEY BRANCH

**GEOLOGICA** 

CLAIMS: MUR 1-16 (16 units). LOCATION: The Mur Claim Group is situated on the southwest side of Murray Ridge, 10 km northeast of Fort St. James, B.C. Lat. 54° 30′ 30″; Long. 124° 10′; N.T.S. Map 93-K-9E OWNER: Doublestar Resources Ltd. and Murray Morrison Doublestar Resources Ltd. and Murray Morrison **OPERATOR:** June 5, 2001 DATE STARTED: June 7, 2001 DATE COMPLETED:

Kelowna, B.C.

August 25, 2001

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#### **SUMMARY**

The Mur Claim Group covers an area of 4 square kilometres on the eastern half of Murray Ridge, 10 km northeast of Fort St. James, B.C.

Murray Ridge is comprised of a layered ultrabasic body related to the Trembleur Intrusions of Post-Middle Permian Age (?) and the ridge was first staked by the writer in 1986 as a potential platinum group element (PGE) prospect. It was believed that the chromititic dunite layers of Murray Ridge have some features in common with the world-class PGE bearing chromititic dunite layers at the Bushveld Complex in South Africa and at the Stillwater Complex in Montana, U.S.A.

In 1986 & 87 mapping and sampling programs were conducted on Murray Ridge. Chromititic dunite layers were outlined and 30 samples were selected for chromium oxide, gold and PGE analyses. The results were poor with the best values being 2.13% chromium oxide, 19 parts per billion gold and 38 ppb platinum. The property was allowed to expire in 1988.

In June 2000, the Mur Claim Group was staked to the east of the 1986 property with the intention of covering some of the lower portions of the ultrabasic body. It was hoped that some of the lowermost chromititic dunite layers might contain better PGE values.

Doublestar Resources Ltd. of West Vancouver, B.C. financed the staking venture and earned a 50% interest in the Mur property.

This year's geological mapping program on a portion of the new property failed to locate any chromititic dunite layers and no samples were submitted for gold or PGE analyses.

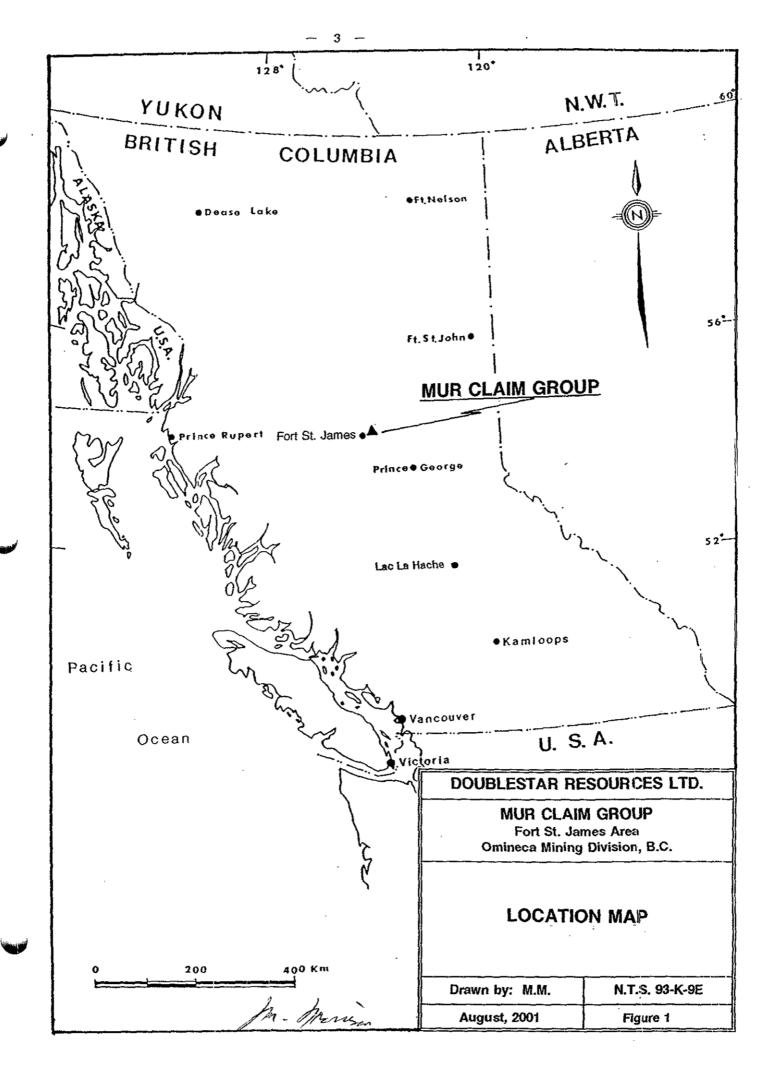
Disseminated chromite equals 1/2 to 2% on much of Murray Ridge, but it is not considered economic.

## SUMMARY continued

The main value of the Mur Claim Group appears to lie with the high concentration of olivine which is contained in the harzburgite and dunite that comprise the ultrabasic body of Murray Ridge. New technology is being developed which uses magnesium silicates to remove carbon dioxide pollution from thermal coal electric generating plants. The Murray Ridge olivine which lies just 3 km from tracks of the British Columbia Railway is well situated for development and shipment to thermal coal electric generating plants in Alberta and Saskatchewan.

Further research into the future requirements of magnesium silicates, and olivine in particular, is recommended.

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## **INTRODUCTION**

This report, written for government assessment work credits, discusses the results of a geological mapping program which was conducted over the MUR 9, 11 & 13 mineral claims by the writer in early June, 2001.

The MUR 9, 11 & 13 mineral claims are part of the Mur Claim Group that is comprised of 16, 2-post mineral claims which are located on the southwestern slope of Murray Ridge, 10 km northeast of Fort St. James, B.C.

The MUR 1-16 mineral claims were staked by the writer, M. Morrison of Kelowna, B.C., in June, 2000. The staking venture was financed by Doublestar Resources Ltd. of West Vancouver which earned a 50% interest in the property.

The Mur Claim Group was staked to cover the lower portions of a layered ultrabasic intrusive which forms Murray Ridge. Much of the ultrabasic is comprised of harzburgite with minor dunite layering. Some chromite occurs within the dunite layers and the property was staked as a potential platinum prospect based on the knowledge that some of the world's best platinum deposits are associated with chromititic horizons in layered ultrabasic intrusions.

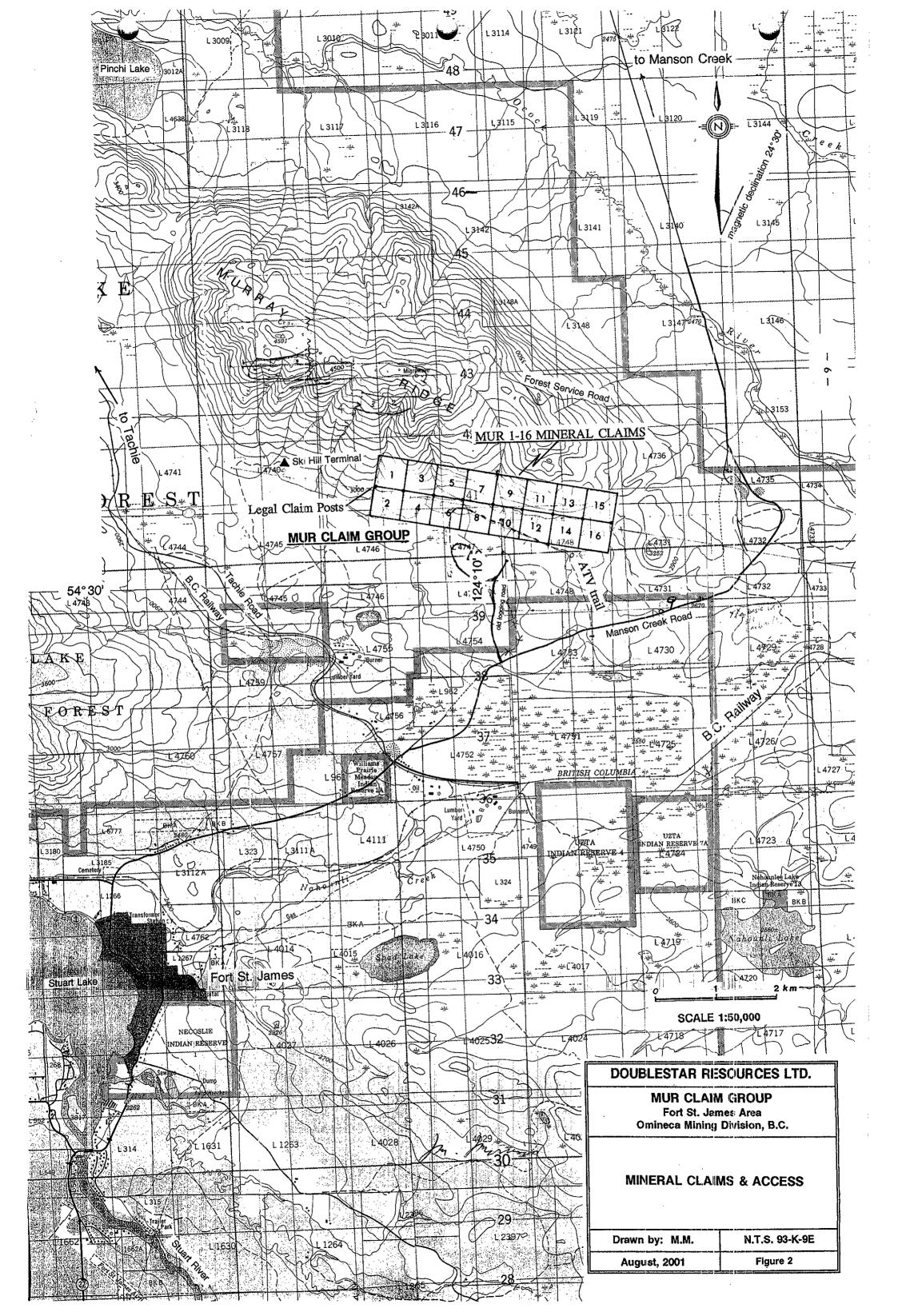
This year's mapping program was concentrated on three mineral claims which lie near the southeastern end of Murray Ridge. The results of the mapping program are illustrated at a scale of 1: 2500 on Map M-01-1 which accompanies this report.

## LOCATION AND ACCESS

The Mur Claim Group is situated on the lower southwest slope of Murray Ridge, 10 km northeast of Fort St. James, B.C. (Latitude 54°30' 30"; Longitude 124°10'; N.T.S. Map 93-K-9E).

The property lies in a forested area 2 to 3 km north of the Manson Creek road and can be accessed from the road via an All Terrain Vehicle trail which crosses a portion of the claim group enroute to the Murray Ridge Ski Terminal.

An old logging road which leaves the Manson Creek road 10 km northeast of Fort St. James reaches a point that lies 1 km south of the centre of the claim group (see Figure 2).



## PHYSICAL FEATURES AND CLIMATE

The Mur Claim Group covers the lower southwest slopes on the eastern half of Murray Ridge.

Murray Ridge, a remnant of the Nechako Plateau, forms a prominent geographic feature which lies 2 km southeast of Pinchi Lake or 10 km northeast of Fort St. James. The ridge rises to 1440 metres above the drift covered Nechako Plain (at 800 metres above sea level). The southwestern face of Murray Ridge slopes steeply towards the valley bottom and the western half of the ridge has been developed into a popular ski hill which is clearly visible as one approaches Fort St. James from the south on Highway 27.

The eastern half of the ridge is forested with mature Lodgepole pine and Douglas fir. Spruce and poplar are more common on the flats at the base of the ridge.

Rock exposures are generally limited to the steeper slopes of the ridge on the Mur property. The piedmont and flat regions to the southwest of the ridge are drift covered.

The recorded precipitation at Fort St. James is 40 cm annually and half of the moisture comes in the form of snow. The snow begins to accumulate in early November and it can reach depths of 2 to 3 metres on Murray Ridge. The snow usually melts from the southwestern side of the ridge by early May.

The Fort St. James climate is moderate with summer temperatures usually in the twenties and winter temperatures seldom dropping below -30°C.

## **CLAIM STATUS**

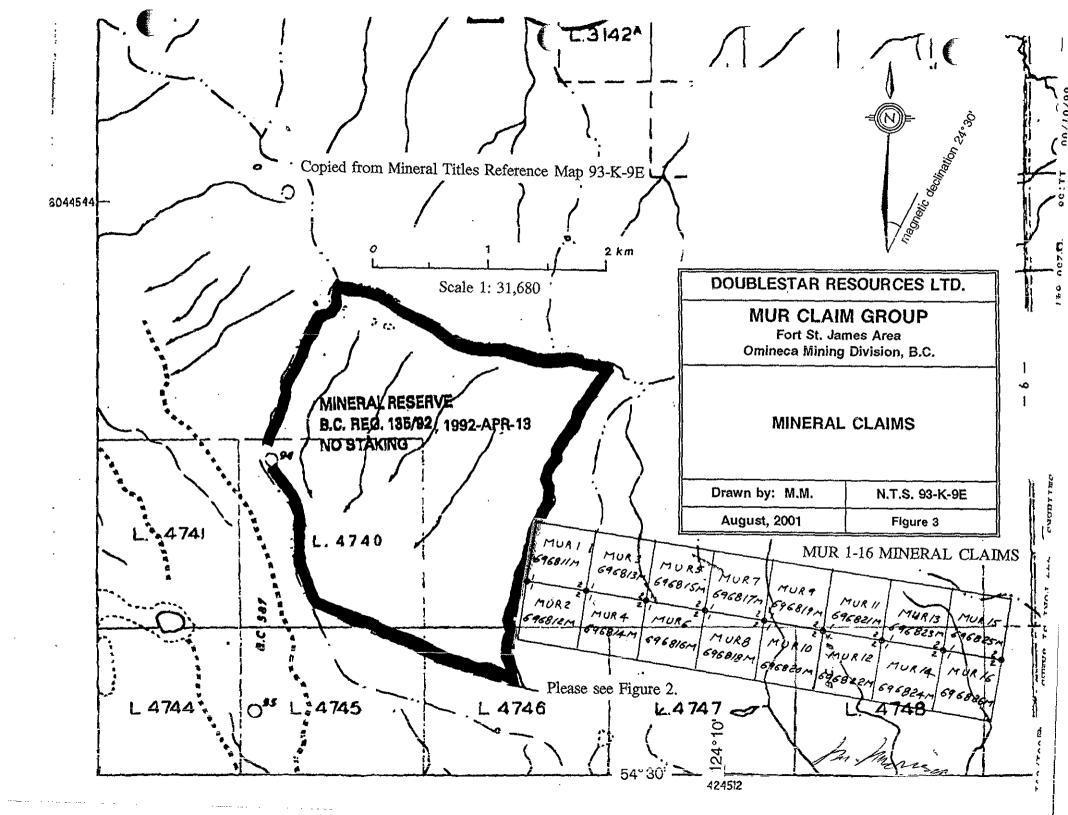
The Mur Claim Group is comprised of 16 contiguous, 2-post mineral claims that were staked by the writer in June, 2000. The mineral claims, located in the Omineca Mining Division, were recorded in Smithers, B.C. The location of the mineral claims is illustrated on government Mineral Title Reference Map 93-K-9E (see Figure 3).

The MUR 1-16 mineral claims are recorded in the writer's name, Murray Morrison of Kelowna, B.C. Doublestar Resources Ltd., a West Vancouver based company listed on the Canadian Venture Exchange, has earned a 50% interest in the property.

CLAIM <u>NAME</u>	<u>UNITS</u>	TENURE <u>NUMBER</u>	DATE OF <u>RECORD</u>	EXPIRY * <u>DATE</u>
MUR 1	1	377995	June 9, 2000	June 9, 2003
MUR 2	1	377996	June 9, 2000	June 9, 2003
MUR 3	1	377997	June 9, 2000	June 9, 2003
MUR 4	1	377998	June 9, 2000	June 9, 2003
MUR 5	1	377999	June 9, 2000	June 9, 2002
MUR 6	1	378000	June 9, 2000	June 9, 2002
MUR 7	1	378001	June 9, 2000	June 9, 2002
MUR 8	1	378002	June 9, 2000	June 9, 2002
MUR 9	1	378003	June 10, 2000	June 10, 2002
MUR 10	1	378004	June 10, 2000	June 10, 2002
MUR 11	1	378005	June 10, 2000	June 10, 2002
MUR 12	1	378006	June 10, 2000	June 10, 2002
MUR 13	1	378007	June 10, 2000	June 10, 2002
MUR 14	1	378008	June 10, 2000	June 10, 2002
MUR 15	1	378009	June 10, 2000	June 10, 2002
MUR 16	1	378010	June 10, 2000	June 10, 2002

The following table lists the mineral claims that comprise the Mur Claim Group:

\* NOTE: The Expiry Dates are based on the acceptance of this report for assessment work credits.



#### HISTORY

A rise in the price of mercury in the late 1960's sparked renewed interest in the old Pinchi Lake Mercury Mine and the Pinchi Fault. Murray Ridge was blanket staked during the rush, but most of the exploration activities were conducted on Cache Creek Group rocks which lie southwest of the ridge. Trenching and stripping operations examined Cache Creek Group rocks on the old Calex property near the Manson Creek road immediately south of the ridge (Sutherland Brown, 1965). Very little, if any, exploration was conducted over the ultrabasic rocks of Murray Ridge in the 1960's or 70's.

In 1986, the writer staked the MR 1-11 mineral claims (52 units) to cover 11 square kilometres on the western half of Murray Ridge. The mineral claims were staked to cover ground that was considered to have potential to host platinum group elements (PGE's).

In August, 1986, geologist, Brian Callaghan of Kelowna, B.C., spent seven days mapping the geology on the top of Murray Ridge and in July, 1987, the writer spent another eight days mapping portions of the southwestern slope on the western half of Murray Ridge. The geology was mapped at a scale of 1: 5000 and presented with a 1987 Assessment Report submitted to the government (Morrison, 1987).

In the course of the mapping program, 30 selected samples were collected from various locations on Murray Ridge and these were analyzed for chromium oxide, gold and PGE's. The results were disappointing and the property was allowed to lapse in 1988.

In April, 1992, a "No Staking Reserve" was declared over an area of six square kilometres on the western half of Murray Ridge to protect the ski runs (see Figure 3).

## **REGIONAL GEOLOGY AND MINERALIZATION**

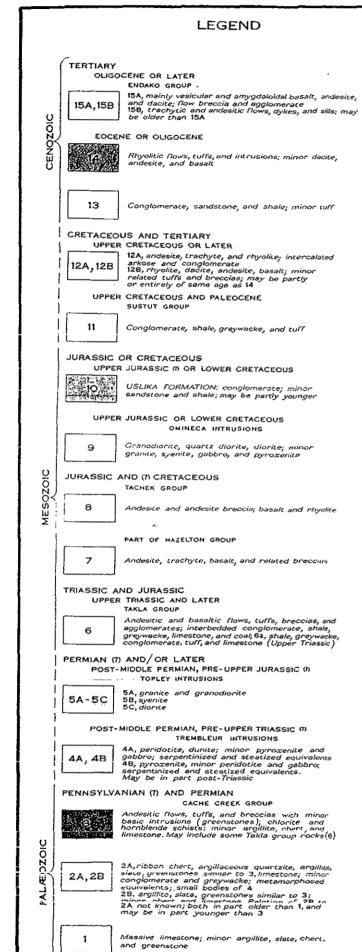
The regional geology of the Fort St. James area is illustrated on Figure 4 at a scale of 1: 380,160. J. E. Armstrong mapped the region with the Geological Survey of Canada and Produced Map 907A which accompanied Memoir 252 in 1949. Figure 4 represents a portion of Armstrong's map.

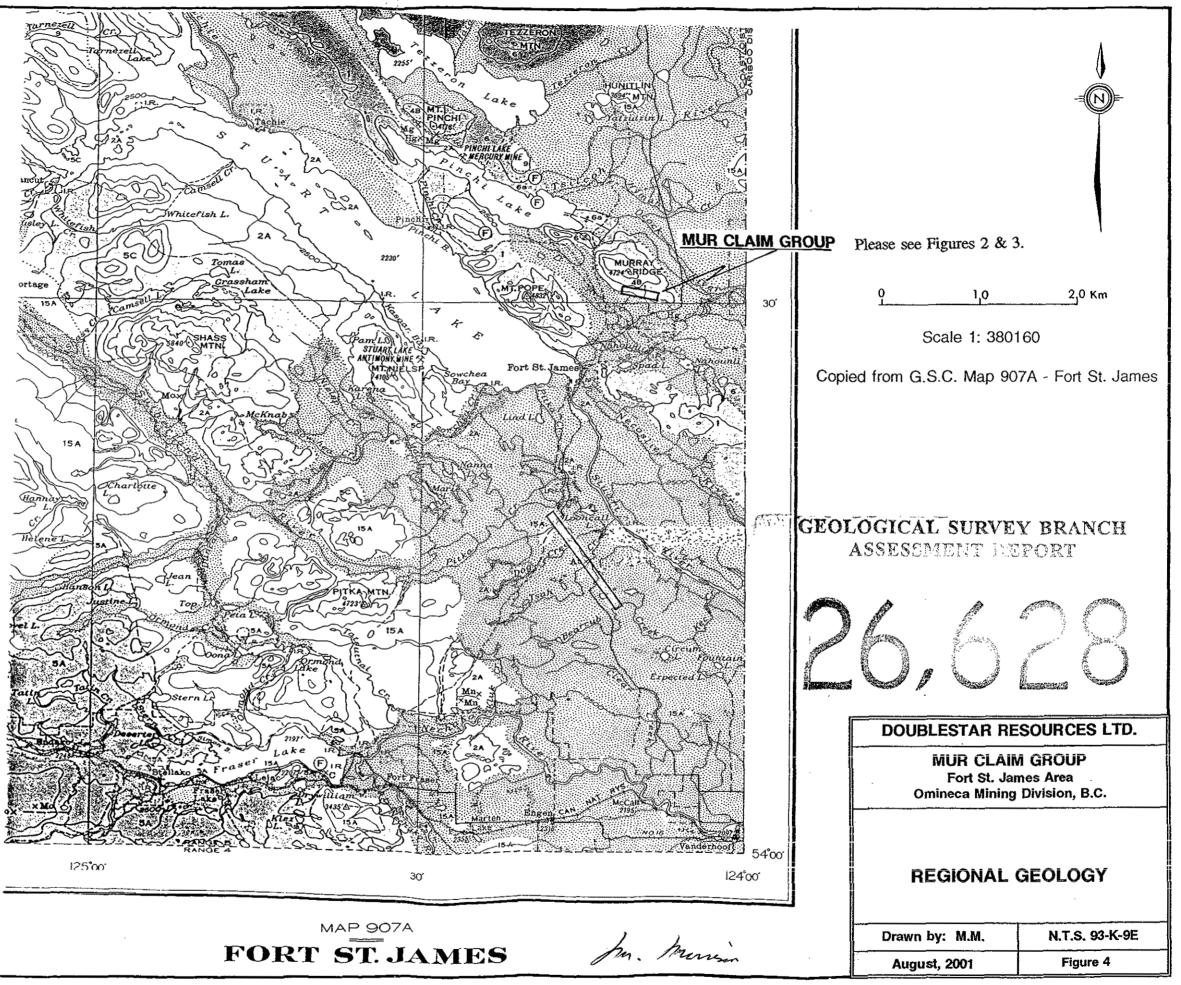
Much of the Nechako Plain northeast of Stuart Lake is heavily drift covered, but several remnants of the Nechako Plateau form rounded ridges and mountains which rise up to 1500 metres above the Nechako Plain. Mt. Pinchi and Murray Ridge are two such ridges and each is comprised of ultrabasic rocks of the Post-Middle Permian (?) Trembleur Intrusions.

The well-known Pinchi Fault, which extends for several hundred kilometres through central British Columbia lies immediately southwest of Murray Ridge. The fault separates Pennsylvanian (?) and Permian Cache Creek Group metasediments and limestones on the southwest from Upper Triassic Tatla Group volcanics and metasediments on the northeast.

The world-class Pinchi Lake Mercury Mine (now closed) occurs in Cache Creek Group rocks near the Pinchi Fault, 20 km northwest of Murray Ridge. The old Calex mercury prospect which is also associated with faulted Cache Creek Group rocks lies immediately south of Murray Ridge (Sutherland Brown, 1965).







#### **PROPERTY GEOLOGY**

#### A Review of the 1986-87 Geological Mapping Program

Mapping in 1986-87 revealed that Murray Ridge is entirely comprised of an ultrabasic body of Post-Middle Permian Age (?). The ultrabasic is predominantly harzburgite with minor dunite (3%) layering and orthopyroxenite (1%) layering and dykes. The layered intrusive strikes at 115 degrees and dips steeply (75 degrees) to the northeast. The intrusive is at least 4000 metres thick and varies little from bottom to top. The top is believed to lie to the northeast. Dunite layering is best developed on the western half of Murray Ridge where it occurs intermittently from the bottom to the top of the ridge.

The analytical results from 30 samples collected during the 1986-87 mapping program were discouraging (i.e. the best results were 2.13% chromium oxide, 19 parts per billion gold and 38 ppb platinum). However, it was considered significant that the dunite layers (with associated chromite) increased in thickness towards the base of the ultrabasic body. It was recommended (Morrison, 1987) that the lowermost portions of the ultrabasic body should be investigated in an effort to locate sizeable dunite layers with chromititic horizons.

The Mur Claim Group was staked to cover the southwestern portion of the ultrabasic body on the eastern half of Murray Ridge (as mentioned earlier, the western half of Murray Ridge is now a No Staking Reserve). This year's mapping program was designed to investigate a portion of the ultrabasic body 1 to 2 km southeast of areas that were previously mapped.

## <u>Grid</u>

The Location Line of the MUR 9-14 mineral claims which runs at 100 degrees was called Baseline 10+00N for this year's survey. Stations were measured at 100 metre intervals along the Baseline and six flagged grid lines spaced 200 metres apart were then measured for 500 metres to the northeast of the Baseline, as illustrated on Map M-01-1. Stations were flagged

#### **PROPERTY GEOLOGY** continued

#### Grid continued

at each 25 metre measure along all of the lines to facilitate the mapping program. A Topolite belt chain and Silva Ranger compass were used to measure the 1000 metres of Baseline and 3000 metres of grid line which were established in conjunction with the geological mapping program.

## Harzburgite

All of the rock illustrated on Map M-01-1 is harzburgite. It is exposed on the steep southwestern slops of Murray Ridge where it is massive to blocky in outcrop. The weathered rock is tan with a distinct lumpy surface, caused by the orthopyroxene crystals (30%) which are more resistant to weathering than the olivine which makes up 70% of the rock. In some local areas where olivine comprises most of the rock (i.e. dunite), the surface of the outcrop has the colour and texture of a coarse sandpaper. Fresh broken harzburgite is glassy black and it is difficult to identify the mineral constituents.

The harzburgite varies little from one outcrop to the next in the map area. The orthopyroxene crystals (20-30%) are 5-10 mm, while the olivine crystals (70 to 80%) are less than 5 mm. Serpentinization of the ultramafic minerals occurs on fractures with the formation of lizardite. Lizardite equals 1-4% of the rock locally. Chromite occurs as a ubiquitous accessory mineral which is disseminated throughout the rock as 1 to 5 mm black shiny crystals in amounts equalling 0.5 to 2%.

#### **Dunite**

The distinct chromititic dunite layers which cross the western half of Murray Ridge are absent in this year's map area on the eastern half of the ridge. There are minor irregular zones with

## **PROPERTY GEOLOGY** continued

## **Dunite** continued

90% olivine (at L24+00E, 12+50N; L26+00E, 13+50N and L30+00E, 12+50N), but clearly defined contacts with the harzburgite do not exist. There is also no increase in the chromite content in the olivine rich zones such as occurs on the western half of Murray Ridge.

## **Orthopyroxenite**

Although orthopyroxenite layers and dykes comprise 1% of the rock on the western half of Murray Ridge, only a few narrow (4-10 cm) dykes occur in this year's map area. The dykes are made up of 90% orthopyroxene crystals of 2 to 10 m and they weather to a chalky white.

## Structural Geology and Faulting

The layering of the ultrabasic body on the MUR 9, 11 & 13 mineral claims is variable and often indistinct. There are no true dunite layers such as there are 2 km to the west. The layering is crudely defined by thin bands of aligned orthopyroxene crystals. The layering and joints crossing the harzburgite are often curved and the ultrabasic body has clearly undergone some ductile deformation. Measurements of the layering range from 100/70NE to 130/80NE. On average it is believed that the layered ultrabasic body strikes 115 degrees and dips 75 degrees northeast. The top of the body lies to the northeast.

#### **Alteration**

Serpentinization of the ultrabasic rock is widespread on the western half of Murray Ridge, but it is less common in this year's map area. It is restricted to narrow fractures where lizardite replacement equals from 1 to 4% of the rock.

#### PROPERTY GEOLOGY continued

#### **Mineralization**

Chromite (1/2 to 2%) is disseminated throughout the harzburgite as black shiny crystals of 1 to 5 mm size. The crystals protrude from the harzburgite and are clearly visible on tan weathered surfaces.

The map area lacks the well developed dunite layers with chromititic lenses which occur further to the west on Murray Ridge. As a consequence, no samples were collected for PGE analyses.

The main economic element on the Mur Claim Group may be the magnesium contained in olivine which comprises a large portion of the harzburgite (see Discussion).

#### **DISCUSSION**

The Murray Ridge ultrabasic body was first staked by the writer in 1986 because it was believed to have some features in common with two of the great platinum bearing ultrabasic intrusions in the world, namely the Bushveld Complex of South Africa and the Stillwater Complex of Montana, U.S.A.

Both Complexes are thick and layered. The Bushveld Complex is 7 to 9 km thick, while the Stillwater Complex is 7.4 km thick. The best PGE values at each Complex are associated with some of the lowest chromititic zones within the intrusions.

One of the lowest chromititic layers of the Bushveld Complex is the UG2 chromitite layer. It contains an average 8.2 parts per million (ppm) gold and PGE's which include 3 ppm platinum and 3 ppm palladium. Although the UG2 chromitite layer is only 1 metre thick and occupies a small proportion of the 7000 to 9000 metre thick Complex, it represents the largest single concentration of PGE's in the Bushveld Complex and in the world (Cabri, et al, 1981).

#### **DISCUSSION** continued

The UG2 chromititic layer lies 1300 metres above the base of the Bushveld Complex. A second very important chromititic layer, the Merensky Reef, lies 2500 metres above the base of the Bushveld Complex. The Merensky Reef contains 6 to 8 ppm PGE's and represents another world-class reserve of PGE's.

At the Stillwater Complex, the "A" Zone is the most important in terms of PGE content. It is the lowermost of 13 successive chromititic zones near the base of the Complex and it contains an average of 3.1 ppm PGE's (Cabri et al, 1981).

Clearly the lowermost chromititic zones of layered ultrabasic complexes deserve the most concentrated examination with respect to PGE prospecting.

The preliminary work on Murray Ridge in 1986-87 discovered that the chromititic zones were poorly developed; the chromium oxide content was low and the value of the PGE's were insignificant. However, it was recognized that the lowermost dunite zones of the ultrabasic body were never identified and that further prospecting would be required to locate the lowermost zones.

Last year's staking and this year's mapping were designed to cover and locate some of the lowermost dunite layers of the ultrabasic body.

As mentioned previously, no well developed dunite layers were found in this year's map area. The dunite layers that are fairly well developed on the western half of Murray Ridge (Morrison, 1987) do not extend on to the eastern half of the ridge.

If the average attitude of layering of the intrusive is considered (i.e. 115/75 NE) then much of this year's map area lies on strike with the geology mapped in 1987, and no new knowledge was obtained with regard to the composition of the lower portions of the ultrabasic intrusion.

#### **DISCUSSION** continued

In fact, the topography indicates that the ultrabasic body may end abruptly near Baseline 10+00N where the steep slopes of Murray Ridge rise from the drift covered flat lands.

It is known that Cache Creek Group rocks underlie the flat lands, and it seems that the lowermost portions of the ultrabasic body may be truncated against the Pinchi Fault which crosses the flat lands. The best chromititic dunite layers may occur elsewhere.

The widespread occurrence of chromite (1/2 - 2%) within the intrusive body is interesting, but because of the dissemination it is not economic. The Cr/Fe ratio in harzburgite associated chromite is 2.56, while that in the dunite associated chromite is 3.06 (Whittaker & Watkinson, 1981).

The main value of the ultrabasic body of Murray Ridge may lie in the olivine content (70%). A process has been developed to remove carbon dioxide emissions from coal burning thermal electric plants. The magnesium from magnesium silicates (e.g. olivine) is used to combine with the carbon dioxide to form benign magnesium carbonate so that the carbon dioxide is not released into the atmosphere (Johnson, 2001).

If the new technology is used for the many thermal coal electric generating plants in Alberta and Saskatchewan, then the olivine of Murray Ridge would be a good source of supply. Murray Ridge lies just 3 km from the British Columbia Railway lines and a spur rail line could easily be built to a quarry on the Mur property.

A small quarry has already been excavated at the eastern end of Murray Ridge. The rock was used as a ballast during the building of the Tatla Lake extension of the British Columbia Railway.

#### CONCLUSIONS AND RECOMMENDATIONS

This year's geological mapping program conducted on the MUR 9, 11 & 13 mineral claims failed to find well developed dunite layers within the ultrabasic body which forms Murray Ridge. Chromititic dunite layers which were mapped on the west half of the ridge in 1987 do not extend eastward to the limits of this year's map area. All of the rock encountered this year was layered harzburgite.

The Murray Ridge ultrabasic body is related to the Post-Middle Permian Trembleur Intrusions. The body is a layered intrusion turned on its edge with the top lying to the northeast. The layering strikes at 115 degrees on average and dips 75 degrees northeast. Approximately 4000 metres of intrusive is represented on Murray Ridge. It is believed that the southwestern side of the ultrabasic body may be truncated by the Pinchi Fault and that the lowermost layers of the intrusion lie elsewhere.

It is expected that the lowermost portions of the ultrabasic body (if they could be found) would have the best developed chromititic dunite layers and therefore, also the best potential to contain economic concentrations of the PGE's. The richest PGE deposits in the world are associated with the lowermost chromititic dunite layers at the Bushveld Complex in South Africa and at the Stillwater Complex in Montana, U.S.A. (see Discussion).

Chromite (1/2 to 2%) is ubiquitous within the harzburgite and dunites of Murray Ridge, but because of its dissemination, it is not considered economically important.

It is believed that the value of the Mur Claim Group may lie in the high concentration of olivine (70%) and in the future application of olivine in thermal coal electric generating plants. The magnesium of olivine can be used to remove carbon dioxide emissions from the power generating process (see Discussion).

# CONCLUSIONS AND RECOMMENDATIONS continued

Further research is recommended to determine the value of the olivine on Murray Ridge with respect to the new technology. If the new technology is applied to the many thermal coal electric generating plants operating in Alberta and Saskatchewan then the olivine on the Mur Claim Group may represent an enormous source of supply that is readily accessible. The tracks of the British Columbia Railway lie just 3 km from the property.

Murray Morrison, B.Sc.

August 25, 2001 Kelowna, B.C.

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## APPENDIX A

## STATEMENT OF QUALIFICATIONS

I, Murray Morrison, of the City of Kelowna, in the Province of British Columbia, do hereby state that:

- I graduated from the University of British Columbia in 1969 with a B.Sc. Degree in Geology.
- 2. I have been working in all phases of mining exploration in Canada for the past thirtytwo years.
- 3. During the past thirty-two years, I have intermittently held responsible positions as a geologist with various mineral exploration companies in Canada.
- 4. I have conducted several geological, geochemical, and geophysical surveys on mineral properties in Southern British Columbia during the past thirty-two years.
- 5. I conducted the geological mapping program outlined in this report.
- 6. I own a 50% interest in the MUR 1-16 mineral claims.

August 25, 2001 Kelowna, B.C.

Murray Morrison - B.Sc.

## APPENDIX B

## STATEMENT OF EXPENDITURES ON THE MUR CLAIM GROUP

Statement of Expenditures in connection with a Geological Mapping Program carried out on the MUR Claim Group, located 10 km northeast of Fort St. James, B.C. (N.T.S. Map 93-K-9E) for the year 2001.

#### **GEOLOGICAL MAPPING PROGRAM (60 Hectares)**

M. Morrison, geologist	3 days @ \$300.00/day	\$ 900.
Automobile (including gasoline and insurance)	3 days @ \$50.00/day	150.
Meals and Lodging	3 days @ \$80.00/day	240.
Flagging and belt chain thread		 <u>    20.</u>
	Sub-total:	\$1,310.

#### **REPORT PREPARATION COSTS**

M. Morrison, geologist	2 days @ \$300.00/day	\$ 600.
Drafting		53.
Typing		87.
Copying		20.
	Sub-total:	\$760.
	GRAND TOTAL:	<u>\$2,070.</u>

I hereby certify that the preceding statement is a true statement of monies expended in connection with the Geological Mapping Program carried out June 5-7, 2001.

August 25, 2001 Kelowna, B.C.

Murray Morrison - Geologist

