

GEOLOGICAL
ASSESSMENT REPORT

on the

JUBILATION MINERAL CLAIMS

KELOWNA AREA

VERNON MINING DIVISION

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

MURRAY MORRISON, B.Sc.
15,157

Claims: Jubilation 1 & 2 (10 units).

Location: The Jubilation claims are situated 1 km north of Lambly Lake, or 19 km northwest of Kelowna, B.C.
Lat. 49°58'; Long. 119°^{42.6'}~~43'~~; N.T.S. 82-E-13E.

Owner: Murray Morrison

Operator: Murray Morrison

Date Started: June 24, 1986

Date Completed: June 25, 1986

Kelowna, B.C.

September 30, 1986

FILMED

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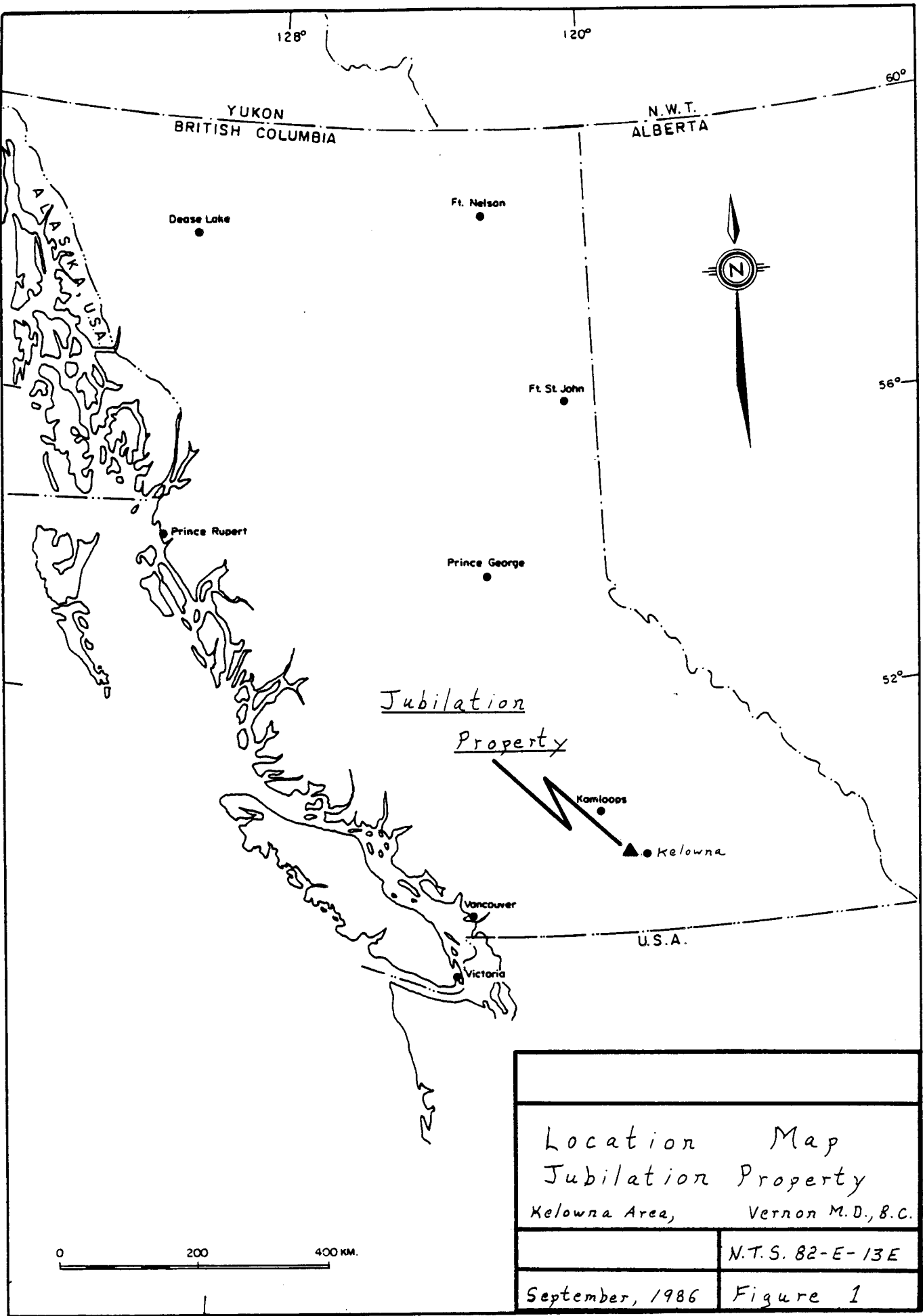
SUMMARY

The Jubilation 1&2 mineral claims, situated 1 km north of Lambly Lake, or 19 km northwest of Kelowna, B.C. cover fractured, altered and limonite stained zones within Cache Creek Group metasediments. The claims are a restaking of ground formerly covered by the Nogan 1&2 mineral claims of Cominco Ltd.

Gold, silver and arsenic values in anomalous amounts were obtained from the fractured zones by Cominco Ltd. in 1980, and mapping in June of this year (1986) was designed to investigate a one square kilometre portion of the Jubilation 1&2 mineral claims centred over the old Cominco zone of interest.

Four inferred faults have been identified crossing the property, all striking parallel to the regional Powers Creek Fault. These faults are believed to have played a role in the emplacement of high level intrusives and related offshooting pyritic quartz veins. Such veins have been found to contain gold and silver on the property.

A Backhoe trenching program of 300 lineal metres is recommended to expose the fault zones that are believed to lie only 1 to 3 metres below the glacial till on the property. It is suggested that all pyritic and/or quartz material excavated by trenching should be sampled and analyzed for gold, silver and arsenic.



Location Map Jubilation Property Kelowna Area, Vernon M.D., B.C.	
	N.T.S. 82-E-13E
September, 1986	Figure 1

INTRODUCTION

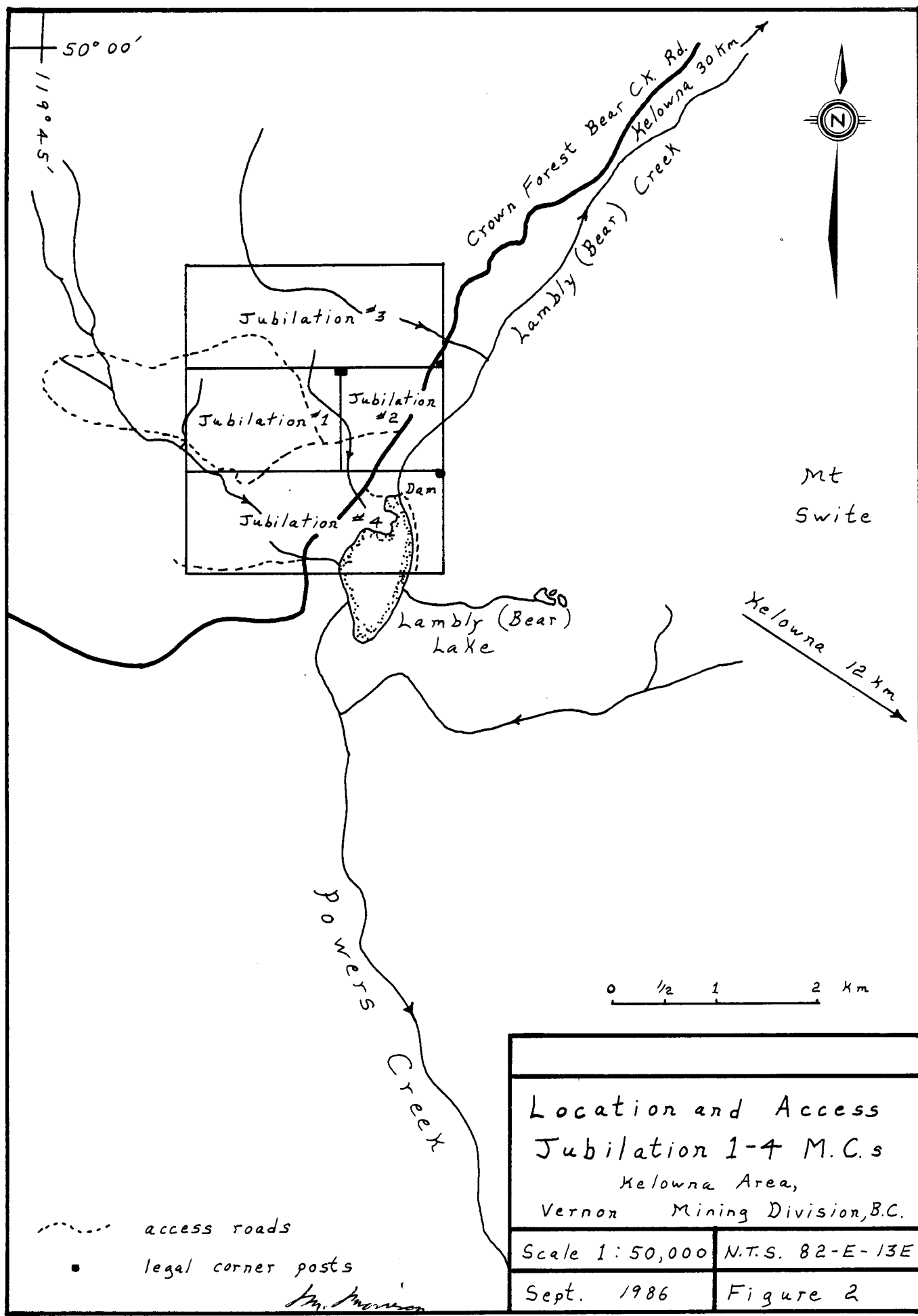
The Jubilation group of mineral claims, situated near Lambly Lake, 19 km northwest of Kelowna, B.C., is comprised of the Jubilation 1-4, 4-post mineral claims, totalling 30 units. The claim group covers a lime-rich sedimentary sequence of Cache Creek Group rocks of Permian Age that have been intruded by a hornblende diorite stock of possible Cretaceous Age. Altered, limonite and manganese stained rock samples collected from shear zones located near the centre of the claim group have been found to contain anomalous values of gold, silver and arsenic.

This year's (1986) exploration work was confined to the area of the claim group that has shown the most promise for precious metal deposits. In June, geological mapping at a scale of 1:2,500 was carried out over a one square kilometre area centred on the border between the Jubilation 1&2 mineral claims. A discussion of the results of the mapping program is presented within the text of this report, while the geology is illustrated on Map J-86-3 accompanying this report.

LOCATION AND ACCESS

The Jubilation 1&2 mineral claims are situated 1 km north of Lambly Lake (Bear Lake), 19 km northwest of Kelowna, B.C. (Lat. 49°58'; Long. 119°43'; N.T.S. 82-E-13E.)

The property may be reached from Kelowna via Highway 97, the Westside road, and the main Crown Forest Bear Creek logging road. The trip requires 45 minutes driving time. A secondary logging road, branching west from the Bear Creek main road near kilometre 23 runs $\frac{1}{2}$ km directly to the key area of interest on the Jubilation 1&2 mineral claims. (see figure 2).



50° 00'

119° 45'



Mt Swite

Xelowna 12 km

0 1/2 1 2 km

Location and Access Jubilation 1-4 M.C.s Kelowna Area, Vernon Mining Division, B.C.	
Scale 1:50,000	N.T.S. 82-E-13E
Sept. 1986	Figure 2

- - - - - access roads
- legal corner posts

Mr. Morrison

PHYSICAL FEATURES AND CLIMATE

The property is located on rolling-forested uplands of the Thompson Plateau adjacent the semi-arid Okanagan Valley. Relief on the property is gentle with an average elevation of 1200 metres above sea level. The mixed forest of balsam, lodgepole pine, and spruce has been strip-logged from approximately one-half of the claim area in recent years, and the main mineralized showings on the Jubilation 1&2 claims are located in one such area.

Tag alder and second-growth balsam form a dense underbrush in the forested regions.

A thin glacial till of clay and boulders covers much of the property while Pleistocene sediments occur in local basins. Natural outcroppings are confined to the steeper slopes of hills or creek banks. Recent logging activities and road construction have provided many of the rock exposures for mapping purposes.

The region receives an estimated 40 cm of precipitation annually, much more than the Okanagan Valley just 15 km to the east. Half of the precipitation occurs as snow which blankets the property from early November until late April and reaches depths of 90 to 120 cm. The creeks crossing the property flow year round.

CLAIM STATUS

The Jubilation 1&2 mineral claims (record numbers 1966, and 2020) are 100% owned by the writer, M. Morrison, of Kelowna, B.C. They were recorded in the Vernon Mining Division July 3rd and October 16th, 1985, respectively.

HISTORY

The Jubilation 1&2 mineral claims overlie ground formerly covered by the Nogan 1&2 mineral claims originally staked by the writer for Cominco Ltd. in 1980. Localized geological mapping and soil and rock geochemical sampling was conducted on the Nogan mineral claims by Cominco in 1980, but no follow-up exploration was carried out. The claims were allowed to lapse by Cominco in 1985, and the ground was consequently re-staked by the writer.

REGIONAL GEOLOGY

Map 15-1961 "Kettle River West Half" by H.W. Little of the G.S.C. indicates that the Jubilation property is underlain by metasedimentary rocks of the Cache Creek Group of Permian age. The property lies 1 km from the northwestern edge of the Kelowna-Westbank Tertiary Basin, and 1 km north of a Valhalla (Cretaceous?) granodiorite batholith.

Both the Tertiary Basin and Cretaceous batholith may be fault bounded and the possibility exists that large scale fault structures may pass through the Jubilation property. One such fault structure aligning with Powers Creek appears to pass through the western side of the property. As well as being expressed topographically by Powers Creek the fault is indicated on government Aeromagnetic Map 8522G.

The aeromagnetic map indicates a "magnetic high" just to the east of the Powers Creek Fault and centred immediately north of the Jubilation 1&2 mineral claims. A hornblende diorite stock of possible Cretaceous age has been located in the field coincident with the magnetic high. A syenite plug of possible Oligocene age occurs immediately northwest of the hornblende diorite stock.

The Jubilation property clearly lies in an area that has been subjected to several events over a long geological time span.

GEOLOGICAL MAPPING PROGRAM - 1986

A Silva Ranger Compass and Topolite Belt Chain were used to establish the flagged Baseline and grid lines used for geological mapping on the Jubilation 1&2 mineral claims. The Baseline was measured 600 metres due north, while grid lines were established at 100 metre intervals east and west from the Baseline. Stations were flagged every 25 metres along each grid line.

Grid establishment was carried out in conjunction with the geological mapping, and four man-days were required to complete both jobs.

The mapping project was confined to within 300 to 500 metres of the boundary between the Jubilation 1&2 mineral claims. No samples were collected for analysis this year, and the sample sites and values indicated on geology map J-86-3 are from Cominco Ltd.'s 1980 work.

PROPERTY GEOLOGY AND MINERALIZATION

General

Metasediments of the Cache Creek Group are intruded by a magnetic hornblende diorite stock centred near the northern boundary of the Jubilation 1&2 mineral claims. The metasediments composed of argillites and limy argillites have been hornfelsed and skarnified adjacent the intrusive and for some 500 to 600 metres towards the southwest. The metasediments strike across the property 285 degrees on average and dip steeply north to vertical. The metasediments are fractured, folded, altered, and stained by limonite and manganese along a number of parallel northwesterly striking faults. Gold, silver and arsenic values in anomalous amounts have been found to occur in the sheared, stained rocks.

PROPERTY GEOLOGY AND MINERALIZATION - Continued

Unit 1 - Limy Argillite

Limy argillite underlies the southern portion of the mapped area and is at least 300 metres thick. A distinctive feature of the rock is a series of calcite (recrystallized limestone) lenses that make up from 10 to 30% of the rock. The lenses are usually aligned with bedding, or are subparallel. They may represent clasts derived from thin bedded limestones that were interbedded with the argillites. The limestone beds could have been broken soon after deposition by sedimentary forces (turbidity currents), or they could have been broken well after deposition by tectonic forces. The breaking of the limestone beds soon after deposition seems the most probable explanation for the unique appearance of this sedimentary unit.

The limy argillite becomes more skarnified and hornfelsed as the hornblende diorite is approached from southwest to northeast. Noteable epidote and garnet is associated with the calcite lenses, and the argillite becomes a biotite hornfels.

Unit 2 - Argillite, Siltstone, Sandstone

An argillite, siltstone and sandstone unit of several hundred metres thickness lies to the north of the limy argillite unit. This unit (Unit 2) composed predominantly of argillite with some thin bedded siltstones and sandstones extends to the northeastern boundaries of the mapped area where it is metamorphosed to a biotite or hornblende hornfels by an underlying hornblende diorite intrusive.

Andesite tuffs (Unit 3) are interbedded with Unit 2 sediments in beds up to 1 metre in thickness.

Unit 3 - Andesite Tuffs

Fine to medium grained andesite tuffs are interbedded with the sediments of Unit 2 just described.

PROPERTY GEOLOGY AND MINERALIZATION - Continued

Unit 4 - Hornblende Diorite

A hornblende diorite stock that shows up as a magnetic high on government aeromagnetic map 8522G underlies the northeastern portion of this year's mapped area at shallow depth. Near the eastern end of Line 25N windows in a thin veneer of hornfels reveal the underlying hornblende diorite. At many locations to the northeast of the creek on geology map J-86-3 the rocks are composed of a hybrid rock of hornfels and diorite and the diorite is believed to be very near surface in this area.

To the north of this year's mapped area the hornblende diorite is less contaminated with country rock. The fresh looking rock is medium grained with 10% hornblende crystals up to 5 mm in size.

Unit 5 - Tuffaceous Rhyolite Dyke

A vertical(?), north-striking, 20 metre wide dyke of probable Tertiary age cuts through the hornfels and diorite on the eastern side of the mapped area. The dyke is composed of fine grained tuffaceous crystals of quartz and feldspar. The rock appears to be silica rich and is, therefore, probably a rhyolite. The dyke contains up to 10%, rounded, calcite (limestone) clasts and 3%, sub-rounded, quartz clasts, presumably rafted from country rock. The dyke contains 1% limonite blebs (after pyrite?).

Structural Geology and Faulting

The Cache Creek Group metasediments strike across the property at an average 285 degrees and dip steeply north to vertical. It is assumed that the younger sediments lie to the north although the "tops" of bedding was not determined this year.

Continued . . .

STRUCTURAL GEOLOGY AND FAULTING - Continued

Strong joints are perpendicular to bedding. The attitude of the sedimentary sequence is uniform except near faulting where drag folding is notable, and near the hornblende diorite and rhyolite dyke at the northeastern corner of the mapped area where the attitudes of the sediments have been greatly disrupted by these intrusions.

Six inferred faults have been drawn on Map J-86-3. Criteria used in defining the faults included drag folding, fracturing and alteration of the rock, slickenside surfaces, topographic lineaments and displacement of rock units.

The strike fault crossing the property at 285 degrees appears to separate the main body of the hornblende diorite intrusive on the northeast from the metasediments on the southwest with the metasediments down faulted relative to the intrusive.

The four parallel faults at 333 degrees on Map J-86-3 have the same strike direction as the regional Powers Creek Fault. There seems to be successive movement of the limy argillite to the south as each fault is crossed from east to west.

The slightly curved, north-south striking fault located just to the east of the Jubilation 1&2 mineral claim boundary is well-expressed as a topographical depression. Bedrock on both sides of the valley (fault) on line 23N is highly fractured with many slickenside surfaces.

ALTERATION AND MINERALIZATION

As mentioned earlier the effects of contact metamorphism (hornfelsing and skarnification) increase from southwest to northeast towards the hornblende diorite intrusive. In addition to the contact metamorphism there is also hydrothermal alteration of

Continued . . .

ALTERATION AND MINERALIZATION - Continued

the metasediments associated with the four parallel northwest striking faults. At several sites shown on Map J-86-3 the limy argillites have been brecciated, bleached, kaolinite-altered, and heavily stained by limonite and manganese. Pyrite-bearing quartz veinlets of $\frac{1}{2}$ to 3% cut the brecciated rock in places. The altered, stained rocks usually yield anomalous silver or arsenic values, and the sample collected for Cominco Ltd. in 1980 which contained the most gold (1044 ppb) contained 5% quartz veinlets and 1% pyrite.

The hornfels at the eastern end of line 25N is bleached and well stained with limonite and manganese. The rock also contains up to 1% disseminated pyrite. The hornfels at this showing is only $\frac{1}{2}$ to 1 metre thick at the interface with the hornblende diorite intrusive. The intrusive rock is generally fresh and unmineralized.

DISCUSSION

Limited lithogeochemical sampling by Cominco Ltd. in 1980 yielded samples with up to 1044 ppb gold, 10.6 ppm silver, and 275 ppm arsenic from the altered and brecciated zones that are now on the Jubilation property. Rock exposures in the area are sparse and a follow-up soil geochemical survey by Cominco met with discouraging results. It is now believed that the boulder till and glacial sediments in large measure rendered the geochemical survey ineffective.

It is felt that the gold, silver and arsenic mineralization on the property is associated with pyrite-bearing quartz veinlets which cut the metasediments along the four northwest faults (inferred) illustrated on Map J-86-3. These faults are parallel with the regional Powers Creek Fault, and are believed to be deep seated. The pyritic quartz veins could be offshoots from underlying granitic bodies that have intruded along the fault structures.

CONCLUSIONS AND RECOMMENDATIONS

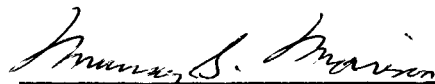
This year's geological mapping program on the Jubilation 1&2 mineral claims has yielded information useful in the appraisal of the significance of the anomalous gold, silver, and arsenic values found in rock samples collected from the property five years ago by Cominco Ltd. Although the main zone of interest, near the boundary of the Jubilation 1&2 mineral claims, is in a slight depression covered by glacial till and sediments the geological mapping of the surrounding hillsides has yielded proof of the existence of a magnetic hornblende diorite to the northeast of the zone, and of strong faulting within the zone. As mentioned under the title "Discussion" the four parallel inferred northwest striking (333 degrees) faults are thought to be a control responsible for the emplacement of the gold, silver and arsenic mineralization on the property, and they are worthy of further investigation.

It is recommended that several Backhoe trenches be excavated across the four parallel faults perpendicular to their strike directions (333 degrees). The trenches should expose the bedrock at 50 metre intervals along the faults, starting in the vicinity of L 21N and progressing northwest. Trenching should be continued as far northwest as the favorable geology persists. It is estimated that 300 lineal metres of the trenching may be needed. The glacial till is believed to be no more than 3 metres deep in the area under consideration for trenching, and access to the trenching site is already established.

Samples should be collected from the excavated fault zones and analyzed for gold, silver and arsenic. Particular attention should be given to pyritic quartz vein material.

Percussion drilling of the fault structures should be considered if the results of the trenching program are successful.

September 30, 1986



Murray S. Morrison, B.Sc.

REFERENCES

Little, H.W.

1961: Map 15-1961 Geology Kettle River West Half,
British Columbia, Geological Survey of Canada

1973: Map 8522 G, Peachland, British Columbia,
Aeromagnetic Series, Geological Survey of Canada.

APPENDIX "A"

STATEMENT OF QUALIFICATIONS

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

1. 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 sixteen years.
3. During the past sixteen years, I have intermittently held responsible positions as a geologist with various mineral exploration companies in Canada.
4. I have examined many mineral properties in Southern British Columbia during the past sixteen years.
5. I conducted or supervised the Geological Mapping Program outlined in this report.
6. I own a 100% interest in the Jubilation 1&2 mineral claims.

September 30, 1986

Kelowna, B.C.


Murray Morrison, B.Sc.

APPENDIX "B"

STATEMENT OF EXPENDITURES - ON THE JUBILATION 1&2 MINERAL CLAIMS.

Statement of Expenditures in connection with the Geological Mapping Program carried out on the Jubilation 1&2 Mineral Claims, located in the Okanagan region of British Columbia (N.T.S. 82-E-13E) for the year 1986.

FIELDWORK - GEOLOGICAL MAPPING

M. Morrison, geologist	2 days @ \$200.00/day	\$ 400.
B. Callaghan, geologist	2 days @ \$150.00/day	300.
Truck (4x4, incl. gasoline)	2 days @ \$ 60.00/day	120.
Flagging, belt chain thread		20.
	Sub-total:	<u>\$ 840.</u>

REPORT PREPARATION COSTS


M. Morrison, geologist	1 day @ \$200.00/day	\$ 200.
Drafting		0.
Typing		0.
Copying		5.
	Sub-total:	<u>\$ 205.</u>

GRAND TOTAL \$1,045.

Of the Grand Total \$600.00 have been allocated to the geological mapping of the Jubilation 1 mineral claim, and \$445.00 have been allocated to the geological mapping of the Jubilation 2 mineral claim.

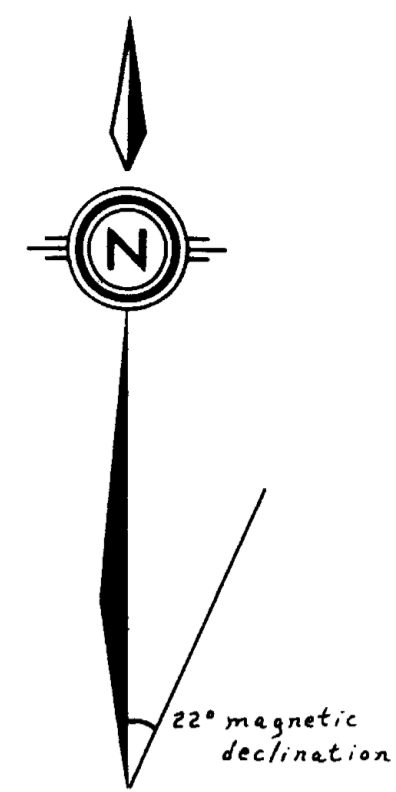
I hereby certify that the preceding statement is a true statement of monies expended in connection with the Geological Mapping Program carried out June 24-25, 1986.

September 30, 1986


Murray Morrison - Geologist.

L.C.P.
Jubilation 1
25 x 3 W

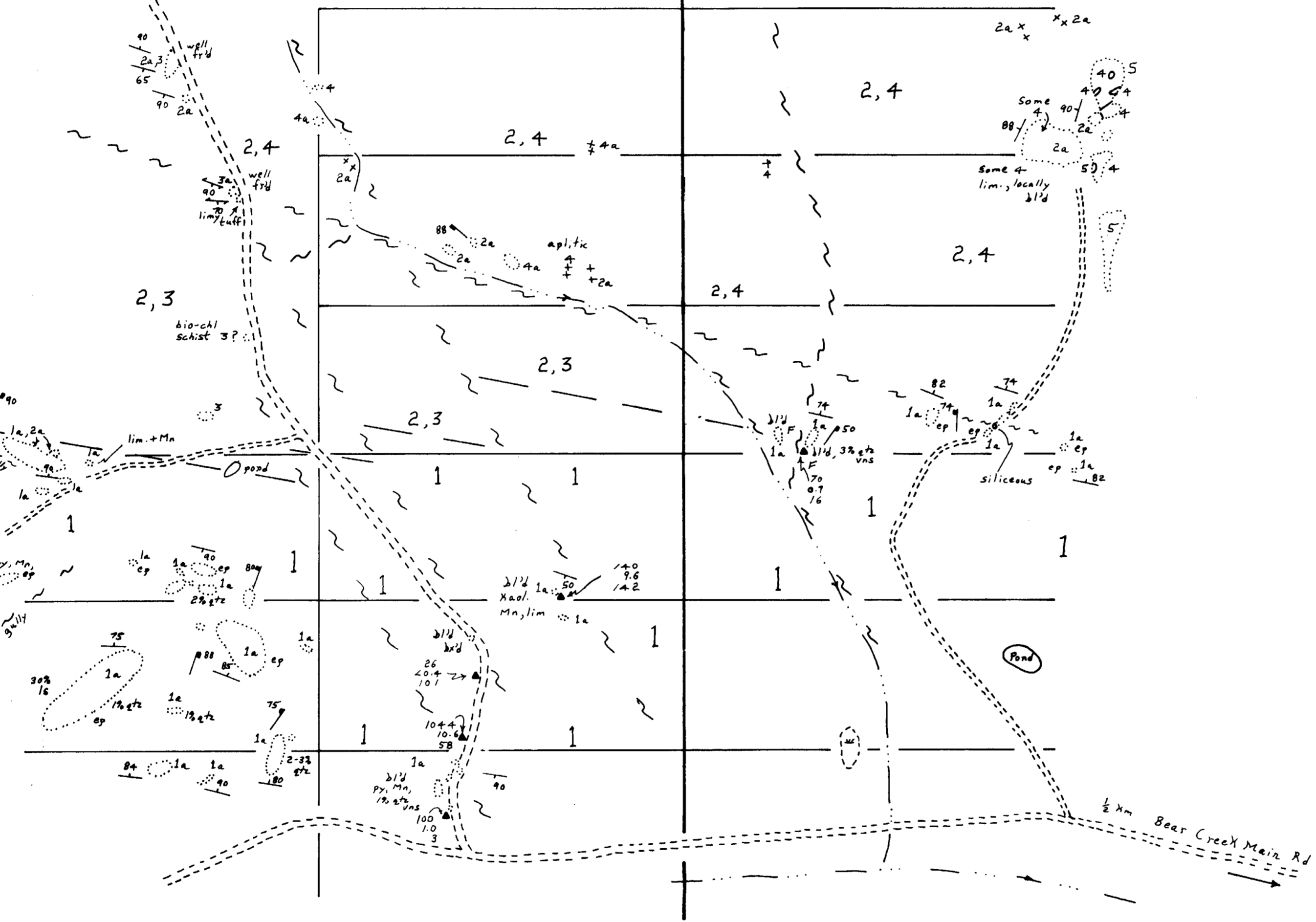
L.C.P.
Jubilation 2
25 x 2 E



Jubilation 1
6 units

Jubilation 2
4 units

L 26 N
L 25 N
L 24 N
L 23 N
L 22 N
L 21 N

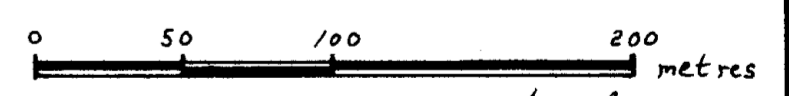


- Legend —
- Oligocene(?)
5 Rhyolite Dyke
- Cretaceous(?)
4 Hornblende Diorite Intrusive
4a hornfelsic-diorite hybrid
- Permian Cache Creek Group
3 Andesite Tuff
3a hornfelsic andesite tuff
- 2 Argillite, Siltstone, Sandstone
2a hornfelsic argillite, siltstone and sandstone
- 1 Limy Argillite
1a hornfelsic and stannified limy argillite

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

15,157

- | | | | |
|------|----------------------|-------|----------------------------|
| bio | biotite | lim | limonite |
| bl'd | bleached | ls | limestone |
| bx'd | brecciated | haol | halimite |
| chl | chlorite | Mn | manganese |
| dio | diorite | py | pyrite |
| ep | epidote | qtz | quartz |
| fr'd | fractured | | |
| F | faulted | | |
| hn | hornblende | | |
| ○ | outcrop | ~~~~~ | faults |
| xx | angular, local float | — 9 — | bedding, joints, foliation |
| — | roads | | |
| ~ | creeks | | |
| ⊕ | marsh | | |



▲ Sample Site, Rock Geochem.
140 ppb gold
9.6 ppm silver
142 ppm arsenic

To Accompany a Geological Report by M. Morrison.
M. Morrison

Jubilation Property Kelowna Area, Vernon Mining Division, B.C.		
Geology — Main Zone Jubilation 1+2 Mineral Claims		
Geology: M.M.+B.C.	Sept. 1986	N.T.S. 82-E-13E
Drawn by: M.M.	Scale 1:2,500	Map J-86-3

Legal Corner Posts Tied-In With A Compass and Belt Chain.