GOLD POTENTIAL EVALUATION REPORT
KLONDIKE DISTRICT, YUKON

ON

VIOLET GOLD - QUARTZ PROPERTY

BEING

VI 1-15 MINERAL CLAIMS

YA 55285 - YA 55299

Lat. 63°52'N., Long. 139°17'W.

DAWSON MINING DISTRICT

YUKON TERRITORY

NTS SHEET 115 O 14

FOR

EBONY RESOURCES LTD.

BY

P.S. WHITE P. ENG.,
645, 610 Eighth Ave. S.W.
Calgary, Alta., T2P 1G5
(403) 269-2122

1 November 1982

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 1500

P L Watson

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

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a) - Air Photos: 48 (2000'=1 inch) and 36, 37 (1000'=1')
b) - Location of some Quartz Deposits of Dawson Mining District (T.A. McLean - G.S.C. No. 221, 1913.
c) - Copies of selected Sections of G.S.C. Reports
   1. R.W. Brock, 1909
   2. D.D. Cairnes, 1911
   3. T.A. McLean, 1910
d) - Northern Cordillera Mineral Inventory Sheet - Violet Group - Archer Cathro & Associates.

INTRODUCTION:

General and History of District.

The Klondike Placer gold fields are located near Dawson City, Yukon, and comprise an 800 square mile area bounded by the Yukon River, the Klondike River, Flat Creek and Dominion Creek, the Indian River, and the easterly ridge of the tributaries thereto. Almost all the creeks are economic gold bearing of which the most productive ones have been Bonanza and Eldorado. Despite gold-rush era hand mining, major dredging operations, and intermittent heavy equipment re-working of those two rich streams, they are still being worked by bulldozers and other mechanical digging devices in 1982.

Many speculations and some scientific inquiries have been focused on the possible rock sources of the Klondike rich gold gravels, which on many claims measured in ounces of gold per square foot of creek bedrock. Economic placer deposits occurred on creek benches up to 200 feet above the creek bottoms, and the character of the gold nuggets has lead to various theories of concentration from long-term mechanical concentration in stages by erosion of low gold content rocks to chemical solution and precipitation of gold and quartz in crystalline nugget form.

Despite the richness of Bonanza and Eldorado Creeks and others in the vicinity, to date no one has established economic ore reserves of gold in place in the district despite the many hard rock gold showings. No great amount of scientific work has been done to relate the in-situ gold showings to the creeks, or to define an irrefutable theory for the source of the fabulous creek deposits. By 1911, fifteen years after the original Bonanza Creek discovery, 35 quartz-gold properties had received prospecting and development potential. Of these, two were placed into small

scale production, the Lone Star Mine between Eldorado and Bonanza Creeks near their confluence, and the nearby VIOLET GROUP which is located on the Southwesterly Ridge of Eldorado Creek near the headwaters of Nugget Gulch and which is the subject of this report.

The Lone Star Mine history is well documented and is the subject of current re-investigation with recently developed engineering and prospecting techniques. The Violet Mine, which was reportedly of higher grade but deeper in source, was relatively poorly documented, and verifiable assay returns are fewer then from the Lone Star. Selections of various reports done by Geological Survey of Canada geologists in the 1909 - 1912 period, are appended to this report, and are unanimous in the authors uncertainty as to gold origin and the optimism about future discoveries of economic gold concentrations on the properties.

PROPERTY OWNERSHIP

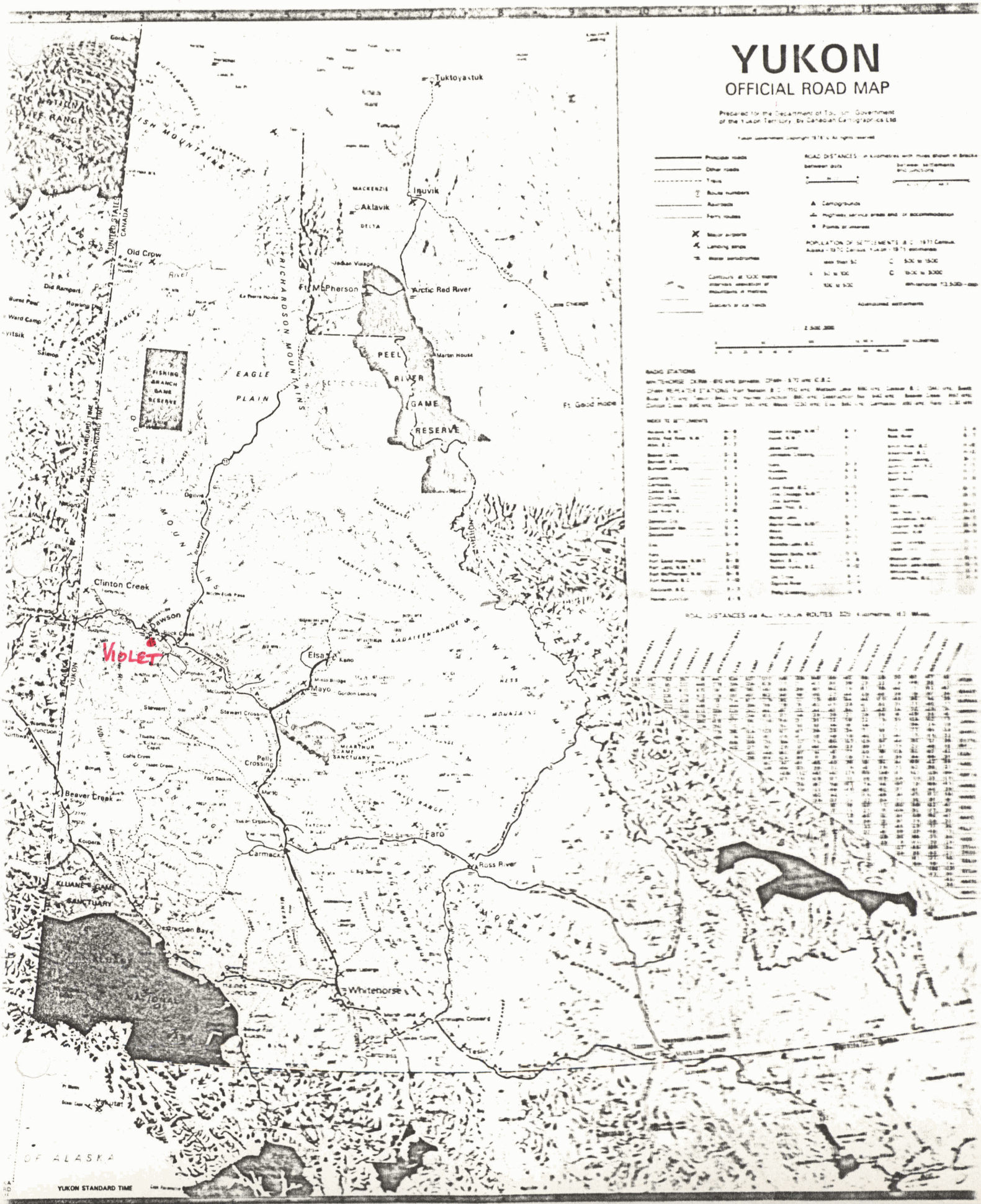
The Violet Group consists of fifteen (15) claims, each 1500 feet square and 51.6 acres, re-located in 1981 by two Yukon prospectors and transferred in their entirety to P.S. White, P. Eng. The anniversary date of the claims is 22 May 1983, and the annual work requirement (or cash paid in lieu) is $100/claim or $1500 for the Group. The claims are located under the Yukon Quartz Mining Act.

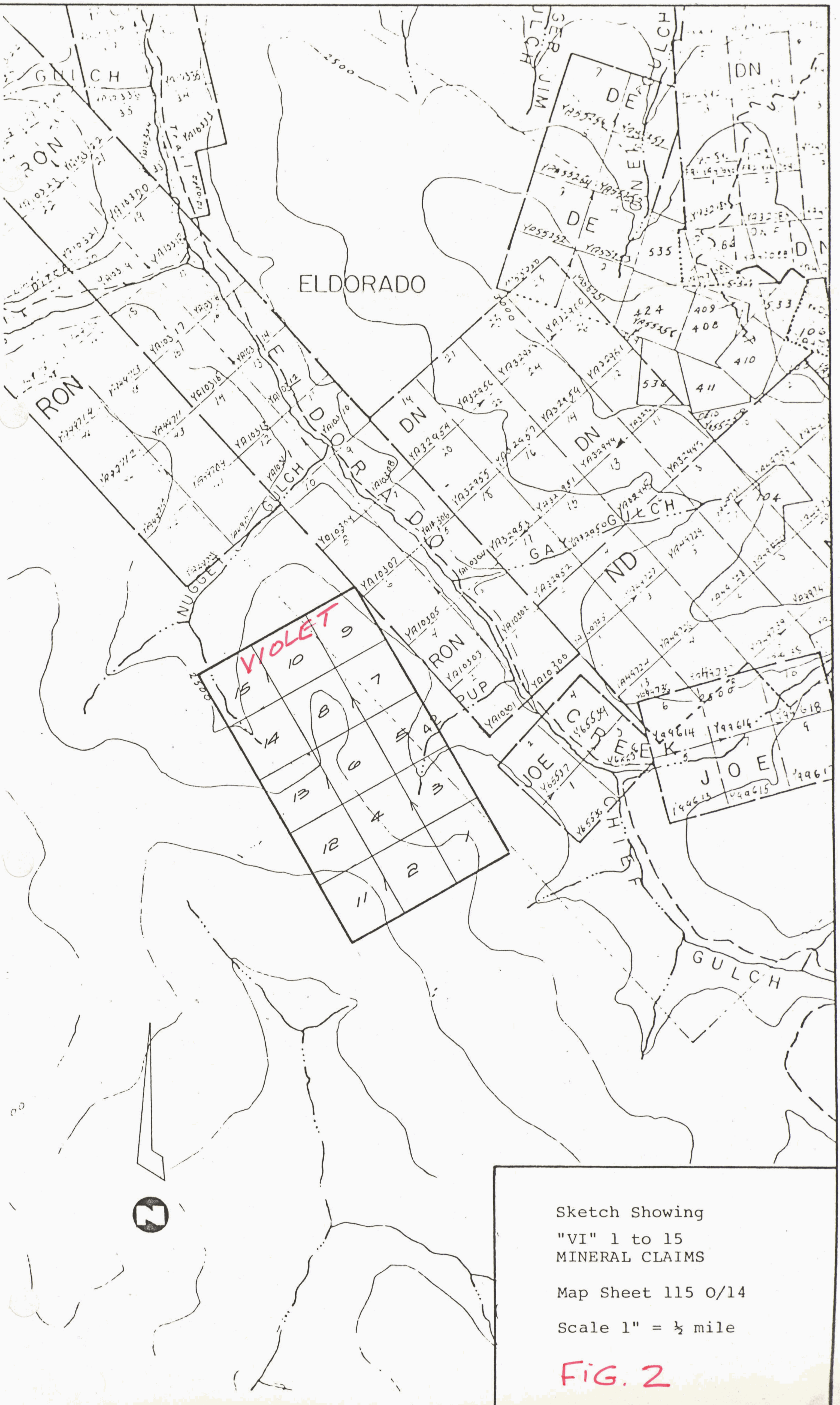
Vi 1-15 inclusive - Grant Nos. YA 55285-YA 55299 inclusive.

LOCATION AND ACCESS

The property is located approximately 16 miles southeasterly

FIG. 1


YUKON
OFFICIAL ROAD MAP
Tuktoyaktuk
Inuvik
Aklavik
Old Crow
Fort McPherson
Arctic Red River
PEEL RIVER GAME RESERVE
EAGLE PLAIN
FISHING BRANCH GAME RESERVE
Clinton Creek
Dawson
VIOLET
Elsa
Mayo
Stewart Crossing
McARTHUR GAME SANCTUARY
Pelly Crossing
Beaver Creek
Carmacks
Faro
Ross River
KLUANE GAME SANCTUARY
Whitehorse
YUKON STANDARD TIME



Sketch Showing
"VI" 1 to 15
MINERAL CLAIMS

Map Sheet 115 O/14

Scale 1" = ½ mile

FIG. 2

from Dawson City, at 3000 ft. above the sea level, on the southeasterly ridge to Eldorado Creek (left limit), 1 mile S.W. of the mouth of Gay Gulch and less than ½ mile E. of the headwaters of Nugget Gulch. Access is by all-weather road (or air) to Dawson City from Whitehorse (335 road miles), thence, by gravel highway, 16 miles up the Bonanza - Eldorado Creek road. Seasonal tractor trail access is possible from Nugget Gulch or from Chief Gulch (tributary to Upper Eldorado Creek), thence N.W. along the Eldorado left limit ridge to the property. Snow fall is minimal, and the property has a light cover of moss and underlying permafrost, 2-6' deep. The claim group has some scrub spruce timber, but the showing area at the headframe is relatively free of vegetation cover.

The location of the centre of the property is approximately 63°52'N.Lat., 139°17'W.Long. on NTS Map Sheet 115 0 14.

ECONOMIC GEOLOGY

The general geology of the district is of quartz lenses and veins and variety of fault shear zones in old (Pre Cambrian?) Klondike schists. The gold occurrences are as native gold, usually with sulfides (galena, chalcopyrite and pyrite) in the quartz veins, and in the schists at the contacts of the gold bearing veins. (See Folder report extracts.)

The Violet property is described by R.J. Cathro as an assemblage of strong, white quartz - barite veins, striking easterly or south-easterly and dipping 80° S. which bears gold with minor common sulfides. The workings are substantially caved and frozen, and cannot be entered. Occasional sampling of surface trenches and dumps by visiting geologists have given low grade gold values with occasional exceptions, which is a common

historical feature for the district. Bulk sampling, (5-10 tons), appears to be the only method to evaluate the Klondike gold showings as evidenced by the well documented nearby Lone Star Mine which produced smelter returns in the order of 3 - 4 times the normal chip and channel samples, and indicated mine head assays of 0.20 - 0.25 oz/ton Au, calculated from smelter returns. This strong vein system, which is of mineable width, and with the normal gold content of the wall rocks, can provide economic ore reserves at 0.20 - 0.30 oz./ton. The vein can be traced for hundreds of feet, on surface its lineament feature is believed to extend some thousands of feet.

A compelling feature of the Violet property is the occurrence of a high coarse nugget fraction of recoverable gold from sluicing operations in nearby Nugget Gulch. Placer miners in 1981 and 1982 obtained coarse nuggets, quartzy and generally angular, from the gulch bottom, which were 75% coarse (+16 Mesh) and up to ½ Troy ounce in size. Topography and nugget surfaces encourage one to postulate that they originated from weathering of the Violet vein system, and not from White Channel gravel reconcentration.

The mining history of the Violet group stops at 1907 - 1910 when gold was priced at $20.67/ounce. The gold mined from Eldorado Creek and Nugget Gulch in the immediate vicinity assays 70%+ Au, 20%+ Ag., and 5-10% impurities. The Violet group has not been explored, drilled or bulk-sampled since 1907 and the reported assay values of up to 0.5 oz./ton Au, combined with the wide, steep dipping mineable vein system, encourage large core diamond drilling to depths of 500 - 1000', and stripping of the vein system for surface bulk sampling, to test the property for gold values sufficient to warrant an underground program.

WORK TO DATE

The property was originally staked in 1901, developed underground in 1902 - 1905, and bulk samples were transported from

the mine via 3500' tramway to a cyanide mill on nearby Ophir Creek. The property was sold at public auction in 1907, and no record of mining can be located by the author after that data. The Crown Grants reverted to the Crown, and the property was re-staked in 1947 and at various times thereafter, with no evidence of any exploration mining work by the various locators.

A wooden headframe stands at the main shaft, and traces of the old open cuts and trenches are easily discernible on the ground. In 1979, 1980 and 1981, the author visited the property, once with R.J. Cathro, P.Eng., and examined the workings and the geology as evidenced by the small dumps and caved trenches. The property was staked by M. Woods and M. Barker of Whitehorse in May 1981, and acquired from them shortly after. The property was aerially photographed in June 15, 1981 and at ground scales of 1000' = 1' and 2000' = 1' and various enlargements and a mosaic were made from the mapping quality photographs. Northwest Survey Ltd. of Whitehorse and Edmonton were contractors, and a regional control survey for Ortho photo mapping was performed by them in July and August, in conjunction with an exploration and mapping program on the Lone Star Mine property by Dawson Eldorado Gold Explorations Ltd. Copies of the operative photo prints are appended to this report.

RECOMMENDATIONS

The Violet group has gold potential sufficient to establish, develop and mine 1 - 3 million tons of 0.15 to 0.3 oz. Au/ton, assuming an 8' mining width of a single known vein over 500 lineal feet of traceable length and 500 feet of depth (3,000,000 tons), Other veins and the Klondike schists themselves may be found to contain sufficient gold to bring potential tonneage

to 5 - 10 million tons of economic ore material. Exploration programs should be designed to demonstrate that potential. Exploration on the property should be conducted in 1983, with bulldozer - trail access from Nugget Gulch, and the following program of prospecting and drilling:

Staged Program

a) Bulldozer access and vein stripping.

b) Basic prospecting and geological mapping.

c) Soil sampling for gold in conjunction with b).

d) Stripping and trenching of gold bearing veins and 5 ton bulk samples taken.

e) Diamond drilling (NX) 2000 feet. (4 holes at 500feet average length), assayed for gold and silver.

Cost of Program:

Phase 1.

- Bulldozer Rental and operation. D-8 or D-9 Cat @ $200/hour. 300 hours	$ 60,000
- Basic Prospecting and Mapping. 2 Men - 2 Months - Camp and Support vehicle	$ 30,000
- Soil Sampling. Assays	$ 10,000
- Bulk Sampling and Transport of Samples to Whitehorse in 5 ton lots	$ 30,000
- Supervison, Engineering and Administration	$ 20,000
TOTAL Phase 1.	$150,000

Phase 2.

- Diamond Drilling.
  2000 feet @ $100/ft. $200,000
- Geological Engineering and
  Support of Drill Program,
  including assays, transport
  and storeage of core ..... $ 50,000

  TOTAL of Phase 2. ..... $250,000

Plus

- Allowance for contingencies
  25% (and additional work if
  warranted) $100,000

  TOTAL PROGRAM COST $500,000

SUMMARY AND CONCLUSIONS

The Violet gold-silver property near Dawson City, Yukon, has a 4-8' vein width mining potential, or wider if the known vein asseamblage carries economic gold values throughout. The property reports of mining prior to 1907 and occasional surface grab-sampling since, have provided sufficient gold assay values (0.1 oz. Au/ton) ranging from 0.5 oz./ton in the mining period to 0.13 oz./ton in trench samples from recent years.

The known structure of the property is simple and physically mineable as a 6' wide vein with steep dipping attitude. The property is accessible by road and short tractor trail, and could

be prospected and drilled in one season.

A program of surface stripping, trenching, prospecting and mapping is recommended herewith followed by drilling at a staged cost of $150,000 and #350,000 respectively for a total recommended expenditure of $500,000.

Respectfully submitted,

Paul S. White, P. Eng.

PROFESSIONAL CERTIFICATION

1. I, PAUL S. WHITE, Professional Engineer, of the Cities of Whitehorse Yukon and Calgary Alberta, reside at 645-610 Eighth Ave. S.W., Calgary, Alberta, T2P 1G5 and herewith certify:

2. That I have resided in the Yukon Territory and practiced my profession in that jurisdiction for 19 years.

3. That I am a graduate of the Faculty of Applied Science at the University of British Columbia, and attained in 1956 the degree of Bachelor of Applied Science in Mining Engineering.

4. That I am a member of The association of Professional Engineers of the Yukon Territory, (1964), and that I have been a registered member of the Association of Professional Engineers, Geologists and Geophysicists of the Province of Alberta, since January, 1959.

5. That I have personally examined the Violet 1-15 Mineral Claims at Eldorado Creek near Nugget Gulch, NTS 115 O/14 which are the subject of the accompanying report.

6. That I have expended in excess of $ 3000 on property examination, sampling, aerial photography and air photo enlargements in the period May - August, 1981.

7. That I am the nominal titleholder of said Vi 1-15 Claims.

Certified at Calgary, Alberta this
15th day of November A.D. 1982.

BIBLIOGRAPHY

1. LODE MINING IN YUKON ..... T.A. McLean - 1914

2. YUKON TERRITORY- SUMMARY REPORT..... R.W. Brock - 1909

3. QUARTZ MINING IN THE KLONDIKE DISTRICT.D.D.Cairnes - 1911

4. HEAVY MINERAL STUDIES IN THE KLONDIKE C.F. Gleeson- 1970

5. MINING INDUSTRY OF YUKON-ANNUAL REPORT W.E.Cockfield-1929

6. UNPUBLISHED DATA..... Various Authors

NORTH WEST SURVEY CORPORATION INTERNATIONAL LTD.

Aerial and Photogrammetric Surveyors

REA CODE 403
EPHONE 483-8033

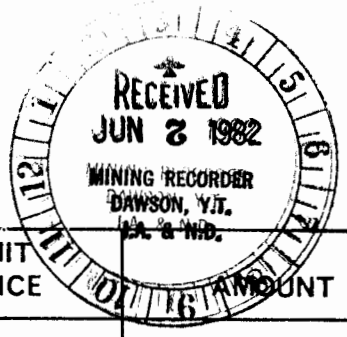
DEVILLE BUILDING
17203 - 103 AVE.
EDMONTON, ALTA. T5S 1J4

INVOICE

WITH: MR. PAUL WHITE
BOX 4550
WHITEHORSE, Y.T.

DATE: AUGUST 4-1981

JOB NO: 81-293



DESCRIPTION	UNIT PRICE	AMOUNT
To provide the following reproduction services at the Lone Star Property, Grand Forks, Yukon.		
A. 2 sets of contact prints		$216.00
B. 16 enlargements of selected prints		$560.00
C. 3 copies of mosaic at a scale of 1:12,000		$425.00
9% F.S.T.		$1201.00 $108.09
		$1309.09
VI PORTION = 12 FRAMES (1/3 of TOTAL) FOR		@ 39.24

INVOICE NO: 2138-F

091399

NET 15th OF MONTH FOLLOWING DATE OF INVOICE INTEREST @ 1½% PER MONTH (18% PER ANNUM) WILL BE CHARGED ON OVERDUE ACCOUNTS.

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9% F.S.T.		$1201.00 $108.09
		$1309.09

V. Portion @ 1/3 of Total @ 436.35

INVOICE NO: 2138-F

NET 15th OF MONTH FOLLOWING DATE OF INVOICE INTEREST @ 1½% PER MONTH (18% PER ANNUM) WILL BE CHARGED ON OVERDUE ACCOUNTS.

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EDMONTON, ALTA. T5S 1J4

INVOICE

WITH: Mr. Paul White,
Box 4550
Whitehorse, Y.T.

DATE: June 30/81

JOB NO: 81-251

DESCRIPTION	UNIT PRICE	AMOUNT
To provide aerial photography at a scale of 1:12000 and 1:25000 of an area near Grand Forks, Y.T. as requested		$2,000.00
2.25% f.s.t.		45.00
		$2,045.00
½ Portion @ 1/3	=	$681.35

INVOICE NO: 2069-F

NET 15th OF MONTH FOLLOWING DATE OF INVOICE INTEREST @ 1½% PER MONTH (18% PER ANNUM) WILL BE CHARGED ON OVERDUE ACCOUNTS.

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LEGAL SURVEYS - ENGINEERING - EXPLORATION SERVICES

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A. DENIS HOSFORD, A.L.S., B.C.L.S.
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J. FRED WELTER, A.L.S., C.L.S., ALASKA
BRIAN HUBER, A.L.S.
LORNE E. McNEICE, A.L.S., C.L.S.
AMBROSE J. WRZOSEK, A.L.S.
VINCENT ZIEGLER, A.L.S.

OUR FILE NO. 1862-81

YOUR FILE NO. _____

August 27, 1981

INVOICE

TO: P.S. White & Associates
General Delivery
Dawson City, Y.T.

RE: Photogrammetric Control Survey Lone Star Property, Grand Forks Area, Map Sheet 115 O/14, Y.T.

OUR FEE:

Labour	
Total field crew hours	$ 2,387.15
Drafting and computing	$ 474.84
Transportation & Equipment	
52.5 hours four-wheel drive vehicle @ $14.00/hr	$ 735.00
TNTA Invoice #58172	$ 492.68
19 hours power saw @ $5.00/hour	$ 95.00
17 hours DI-4-L electronic measuring device @ $15.00/hour	$ 255.00
Subsistence	
18 man days subsistence @ $50.00/man day	$ 900.00
Miscellaneous	
12 iron bars @ $2.50/each	$ 30.00
NWSC Invoice #2144-F	$ 117.72
photocopies	$ 6.25
Total our fee	$ 5,493.64

OUR JOB NO: 1862-81
OUR INVOICE NO: 2291-81

Violet Portion (VII-15) at 1/5 of Total — $1100.00

ASSOCIATED COMPANY

NORTH WEST SURVEY CORPORATION INTERNATIONAL LTD.

AERIAL PHOTOGRAPHY AND PHOTOGRAMMETRIC MAPPING

GRANDE PRAIRIE · EDMONTON · YELLOWKNIFE

Occurrence No. 73

REVISED 1975

Property Name: Common VIOLET Other

Location: Lat. 63°51' Long. 139°16' NTS 115 O/14

* Metals: Major Gold Minor Silver, lead, copper, barite

Type of Mineral Deposit: Vein

History and Previous Work:

Staked as Violet (208A), Ruth(1804), etc in Jan-June/01 by A.E. Bendin, who formed a company, Violet Mg CL which by 1907 had completed an 80 ft adit on the Peacock claims; two shafts on the Homestake cl(55 ft and 15 ft deep with a 54 ft x-cut from the bottom of the shallow shaft); $60,000 of development on the Violet group including 3 shafts (150, 55 and 35 ft deep), at least 300 ft of drifting and an open-cut (50 ft by 12 ft by 15 ft) ; a 3500 foot tramway to a cyanide mill on Ophir Creek which treated 5 tons in 1905 and 1.5 tons in 1906, and took 11 claims to lease.

* Restaked as Ophir cl(56180) in March/47 by Ophir Mg Synd.

Description:

* Several massive white quartz-barite veins cut siliceous, flaggy sericite
* schist. The largest vein is 4 to 6 ft wide, strikes east and dips 80° south and
* has been traced for several hundred ft into a lineament that extends several
* thousand feet. Minor amounts of pyrite, galena and chalcopyrite occur in small
* pockets along the vein.

No assays are available from the underground workings on the Violet Group but MacLean took 25 samples on surface, of which 20 contained no gold or silver. Two of six grab samples from 150 tons of quartz on the dump of the main shaft assayed 0.04 and 0.1 oz/ton Au and 0.3 and 0.1 oz/ton Ag. Two 2 ft channel samples containing sulfides from a trench assayed 0.09 and 0.13 oz/ton Au and 0.6 oz/ton Ag. Eleven samples were taken from the Peacock and Homestake workings of which 9 were barren. A grab sample carrying sulfides from a shaft dump assayed 0.04 oz/ton Au and 0.6 oz/ton Ag, while a 4 ft channel sample from the face of the adit assayed 0.02 oz/ton Au and 0.03 oz/ton Ag.

** A selected sample of quartz-barite vein material collected 2000 ft north of the main shaft by Gleeson assayed 0.02 oz/ton Au, 0.04 oz/ton Ag, 1.4% Pb and 1.3% Ba.

References:

Ann. Rept, 1901, Pt. B, p.65
Sum. Rept, 1911, pp 37-38
"Lode Mining In Yukon" by T.A. MacLean, Mines Branch Pub.222, 1914, p.50-61
* Bull 173, p.17

091399

NORTH WEST SURVEY CORPORATION INTERNATIONAL LTD.

June 15, 1981

091399

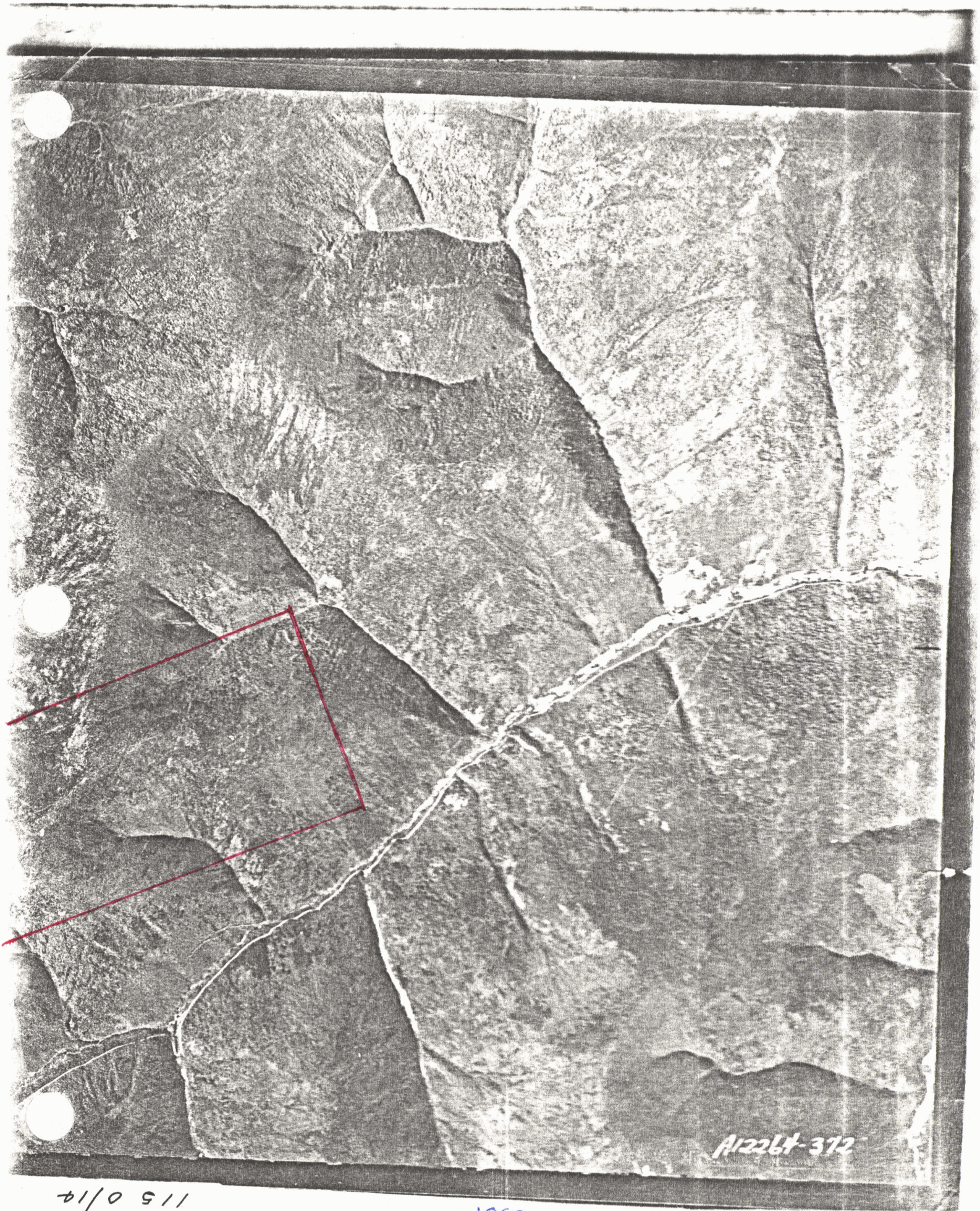
1 inch = 2000'

June 15, 1981 - VIOLET - Scale: 1 inch = 1000'

SCALE = 1 inch = 2200+ FEET

HEAD FRAME & SHAFT OF VIOLET GROUP


NW 356 81-48
NORTH WEST SURVEY CORPORATION INTERNATIONAL LTD.
N
VIOLET HEAD FRAME CENTRE OF V1 GROUP.

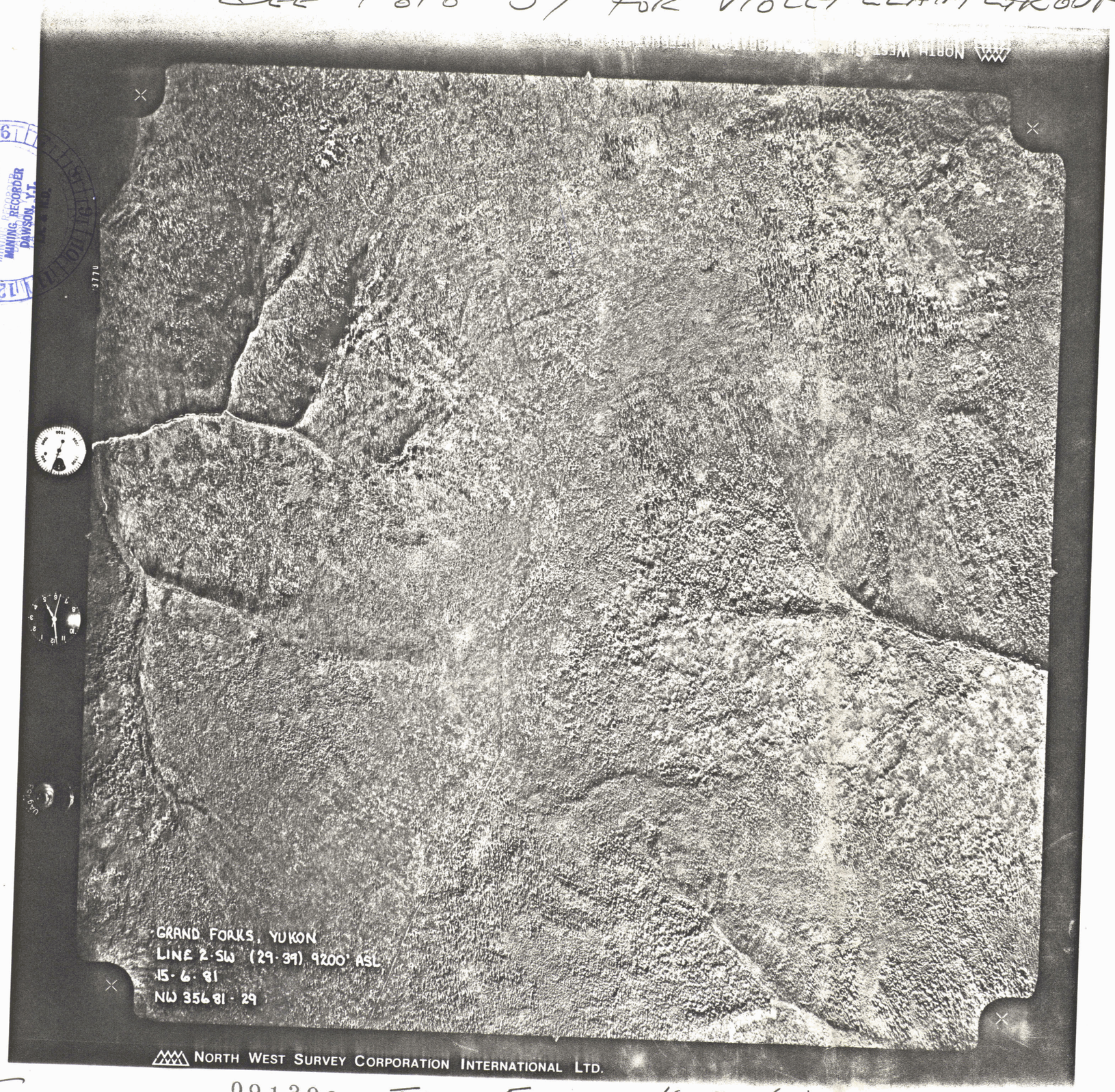


115 0/14

1960 ERA - Scale: 1" = 1 Mile±

FIRST PHOTO OF VIOLET LINE 091399
AT 1 INCH = 2200' ±
SOUTH OF ELDORADO BETWEEN FRENCH & CHIEF (GULCHES)

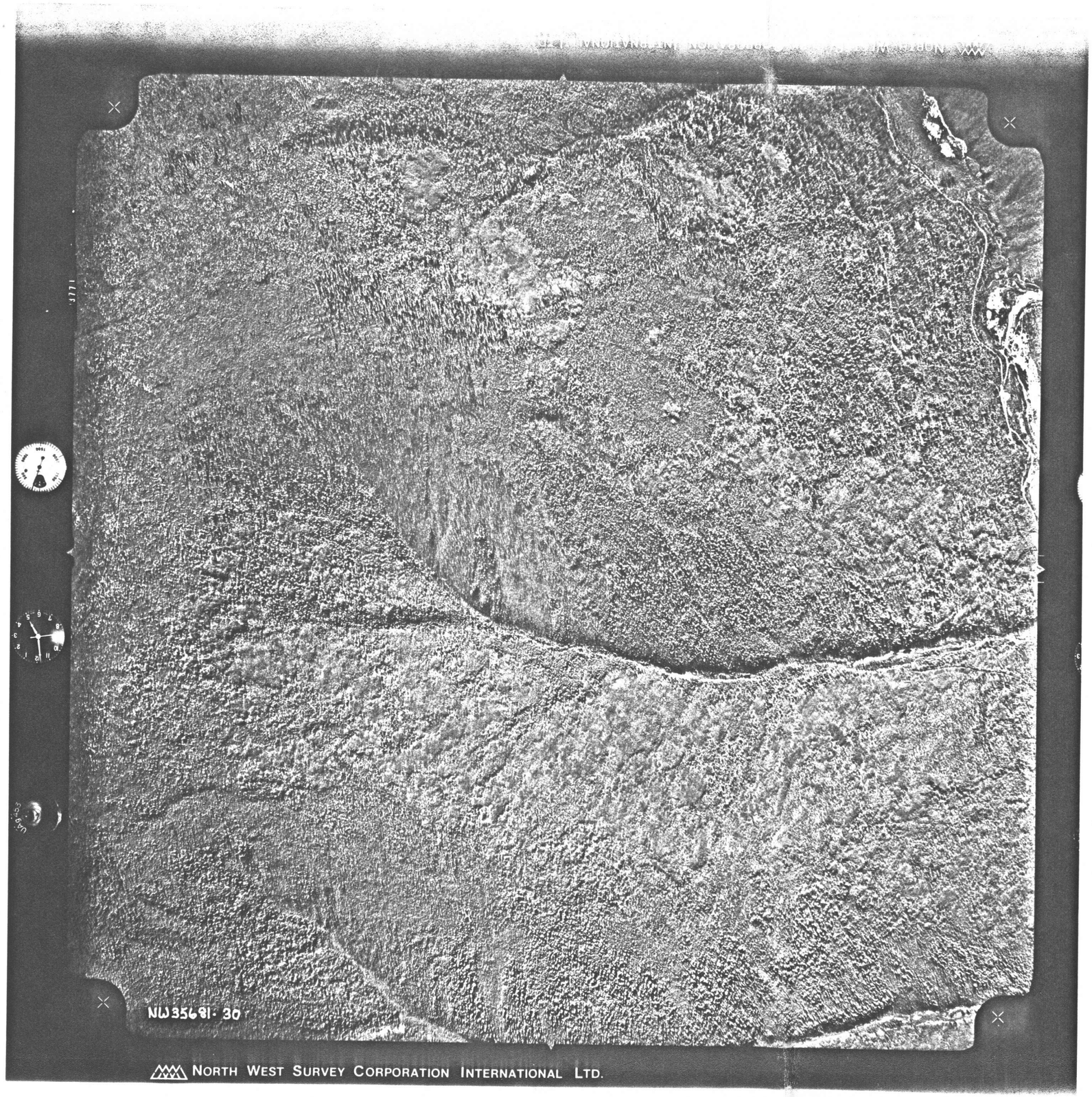
See Foto #37 for Violet Claim Group.



SCALE:
1000' = 1 INCH ±

091399

First Foto of Violet Line South of Eldorado Between Nugget and French Gulches.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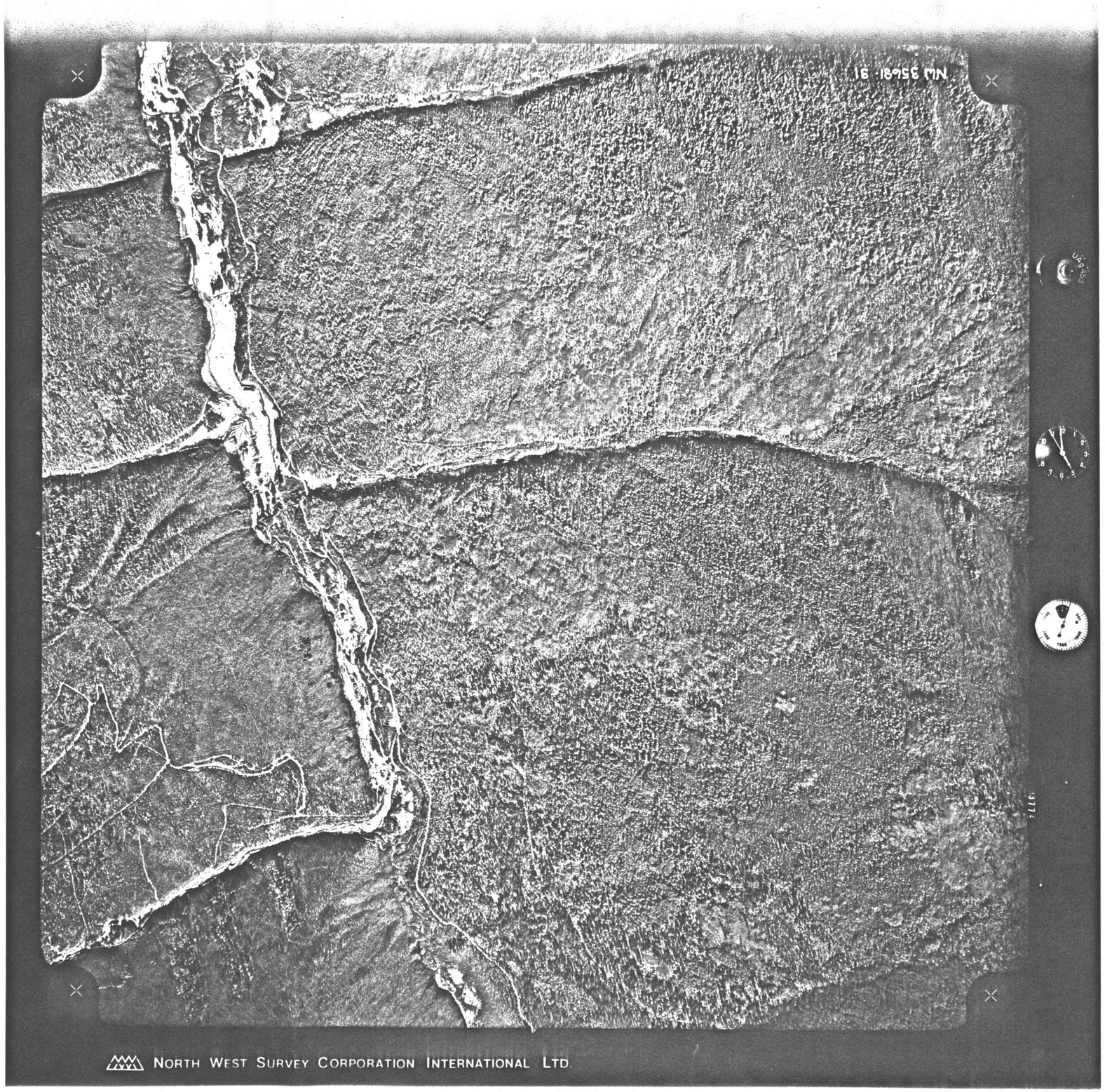
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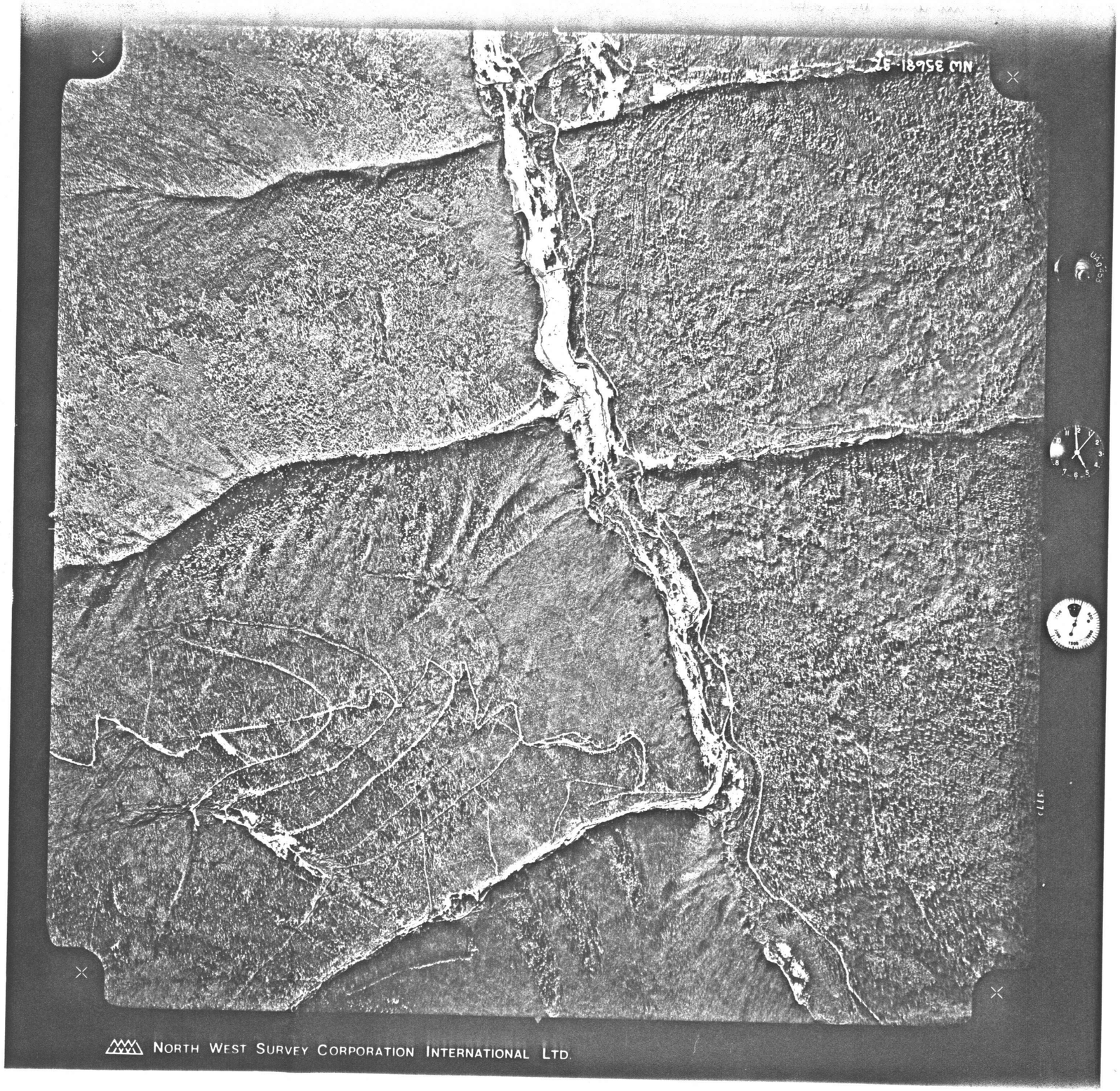
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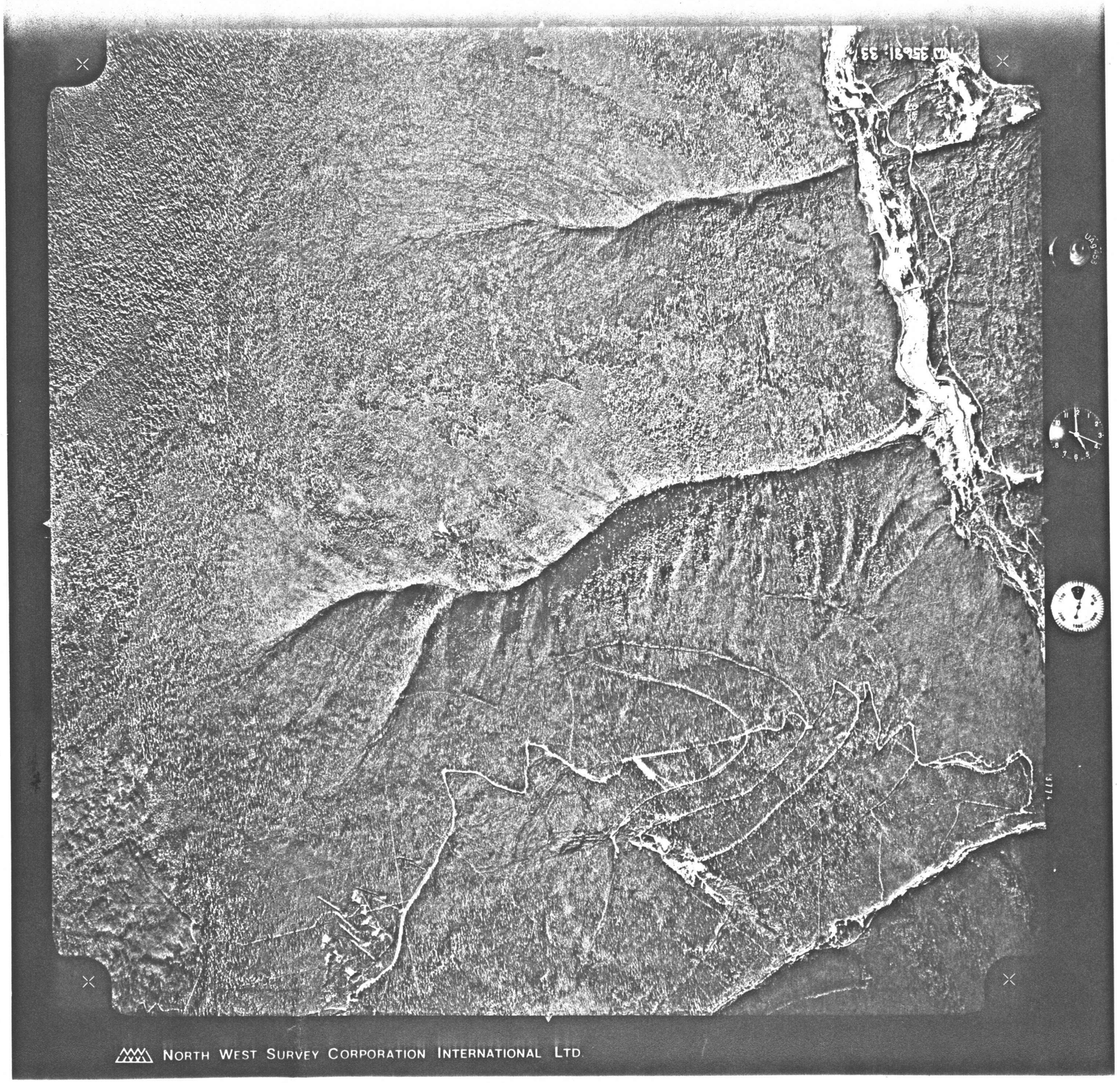
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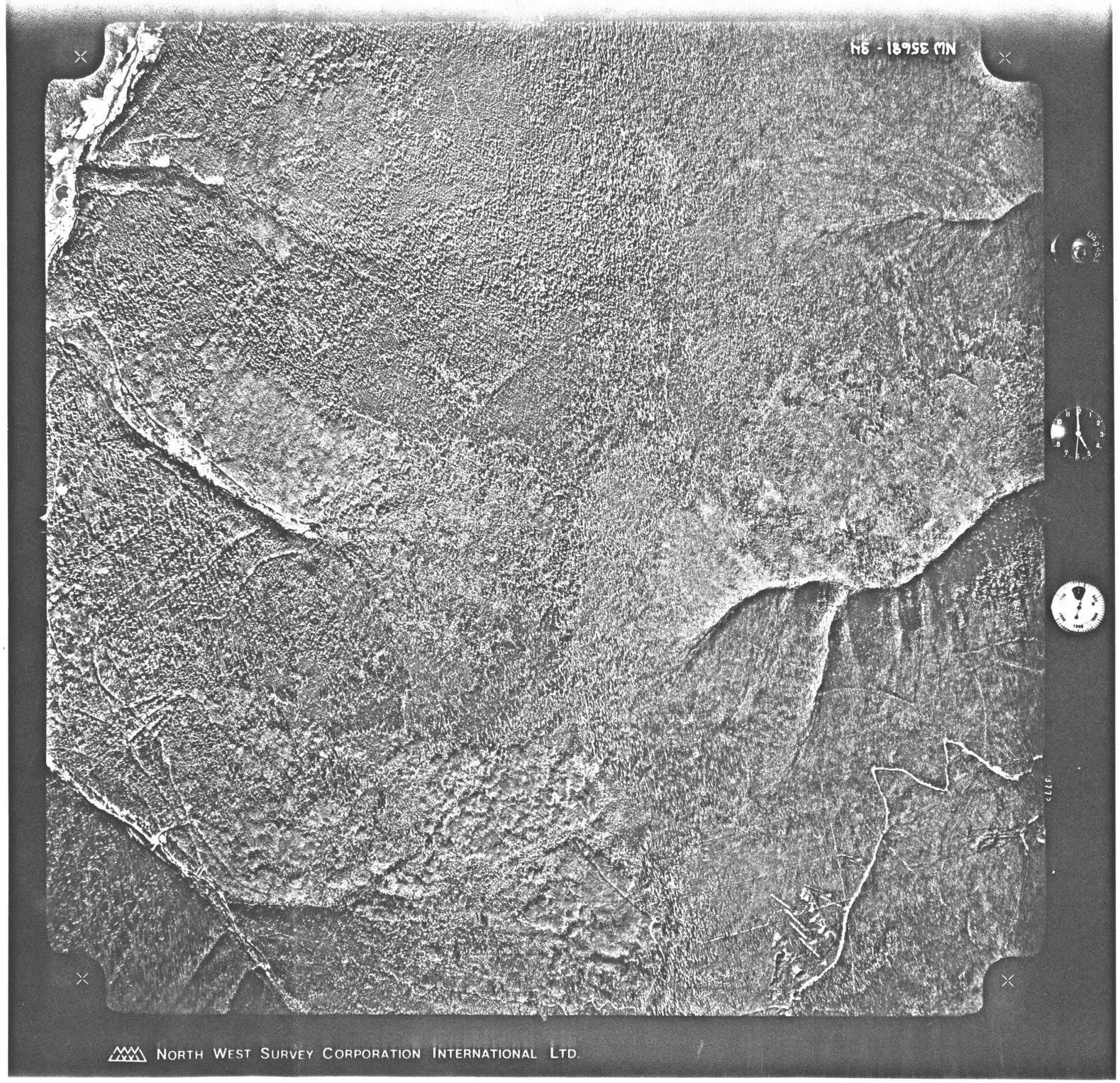
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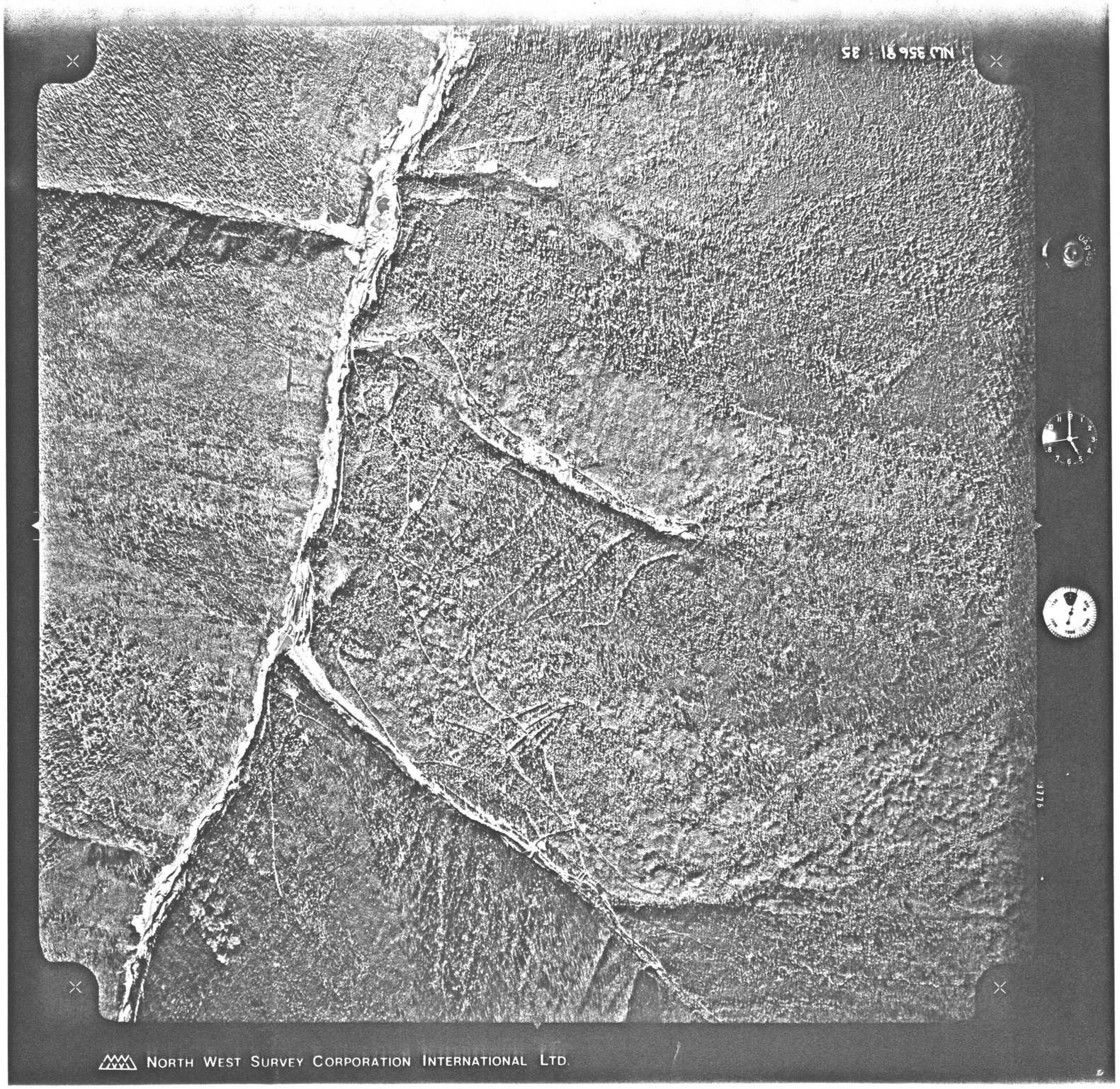
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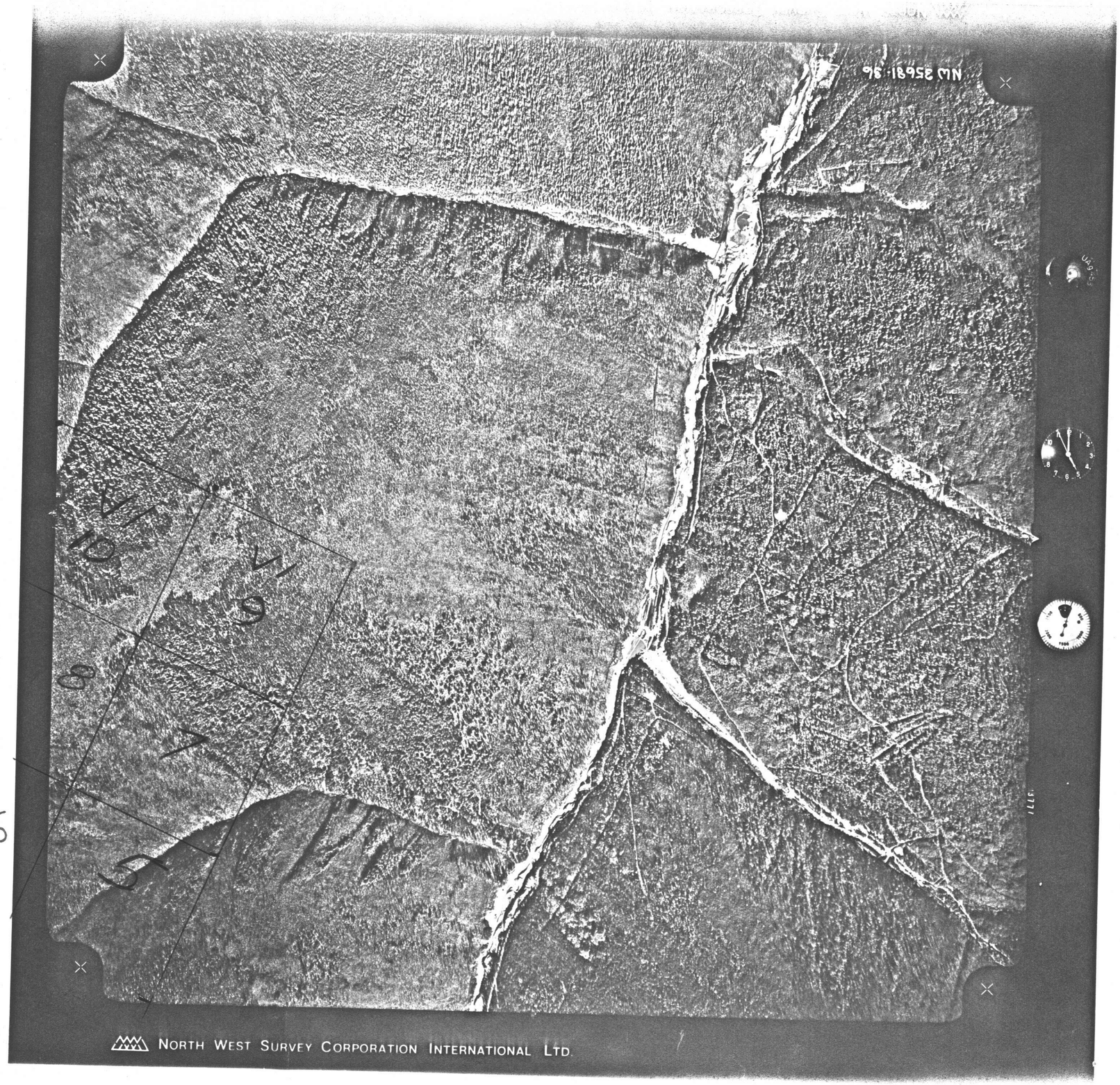
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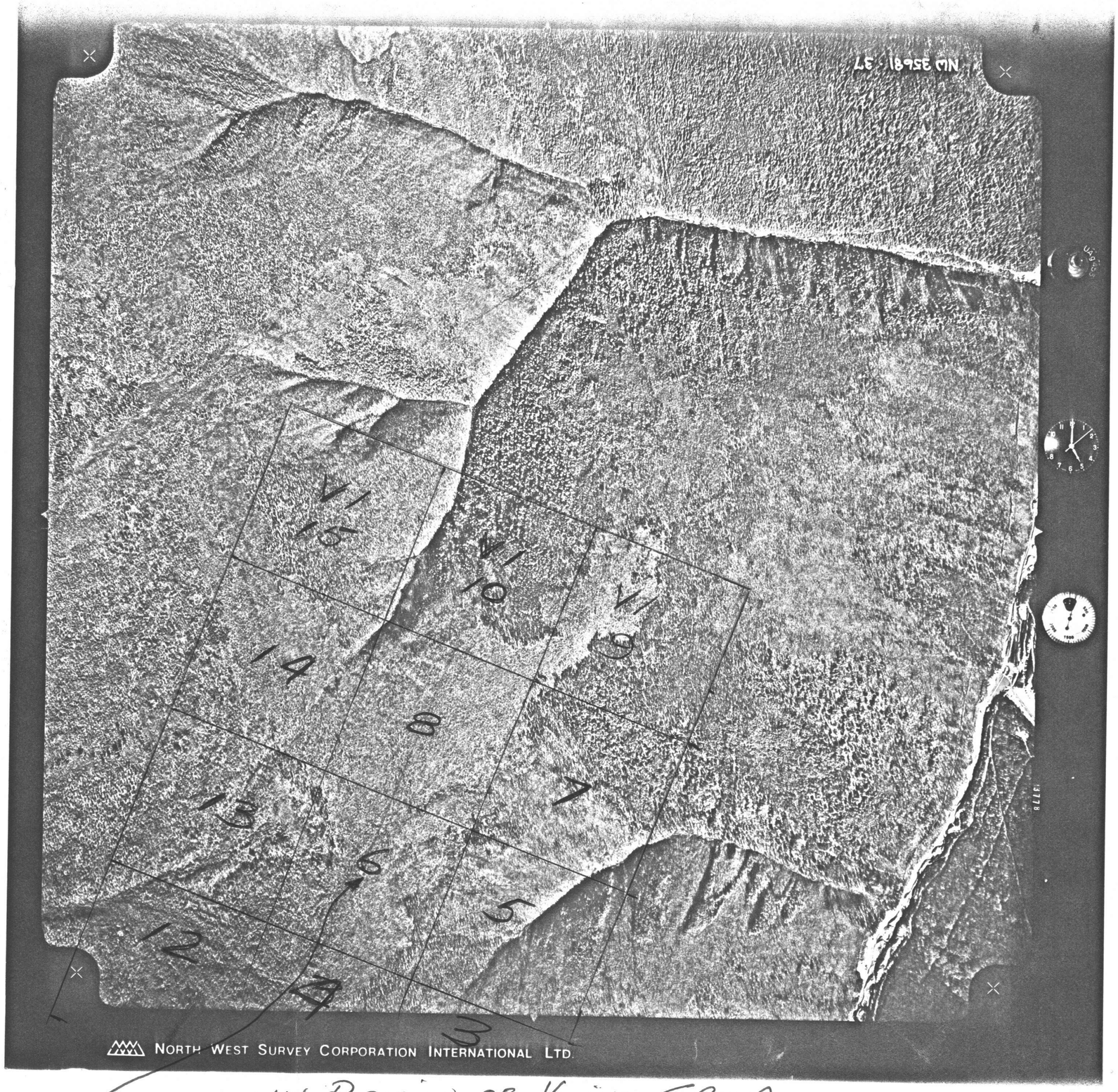
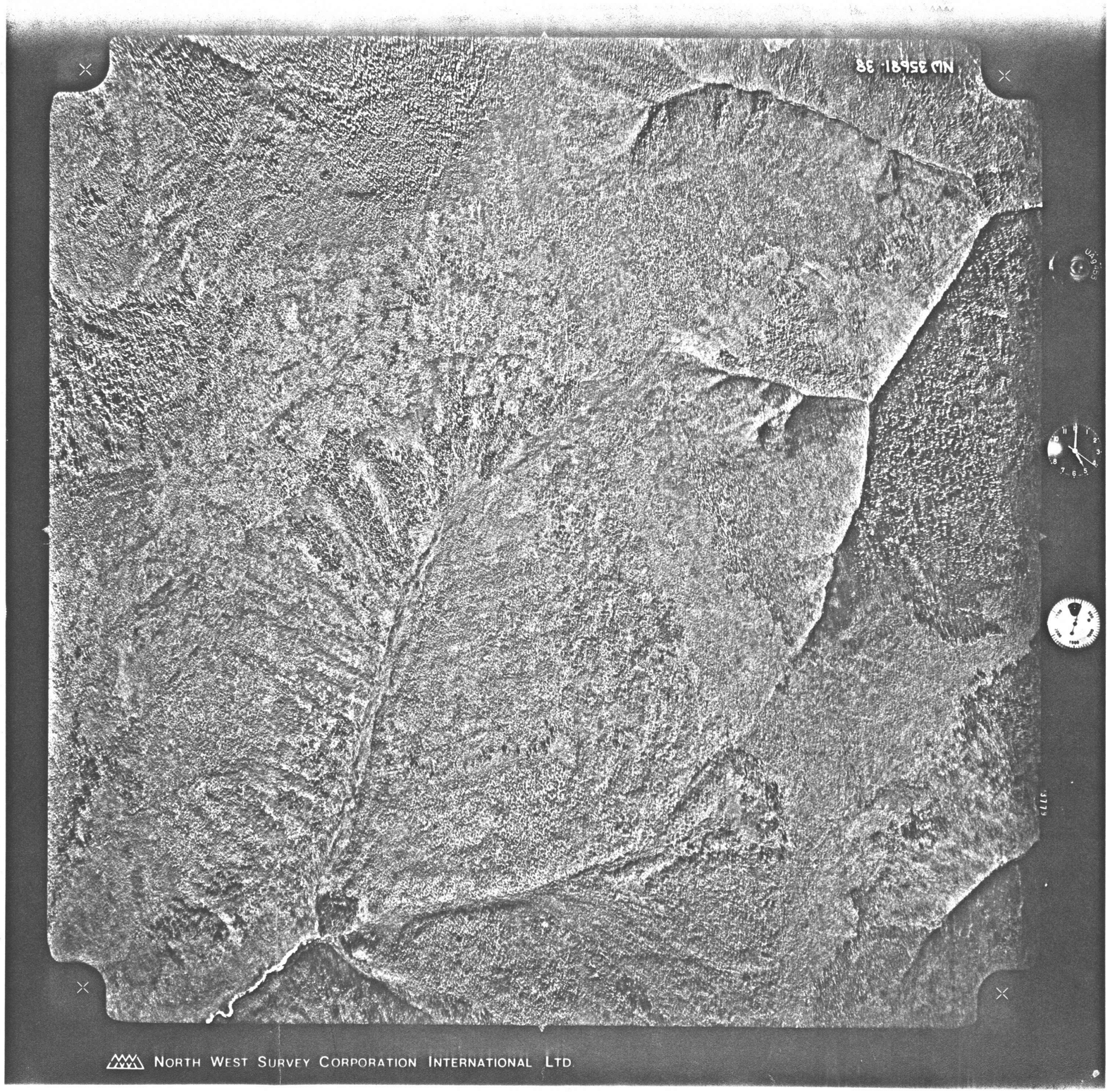


NW PORTION OF VIOLET GROUP.

LOCATION OF MAIN VIOLET SHAFT & HEADFRAME.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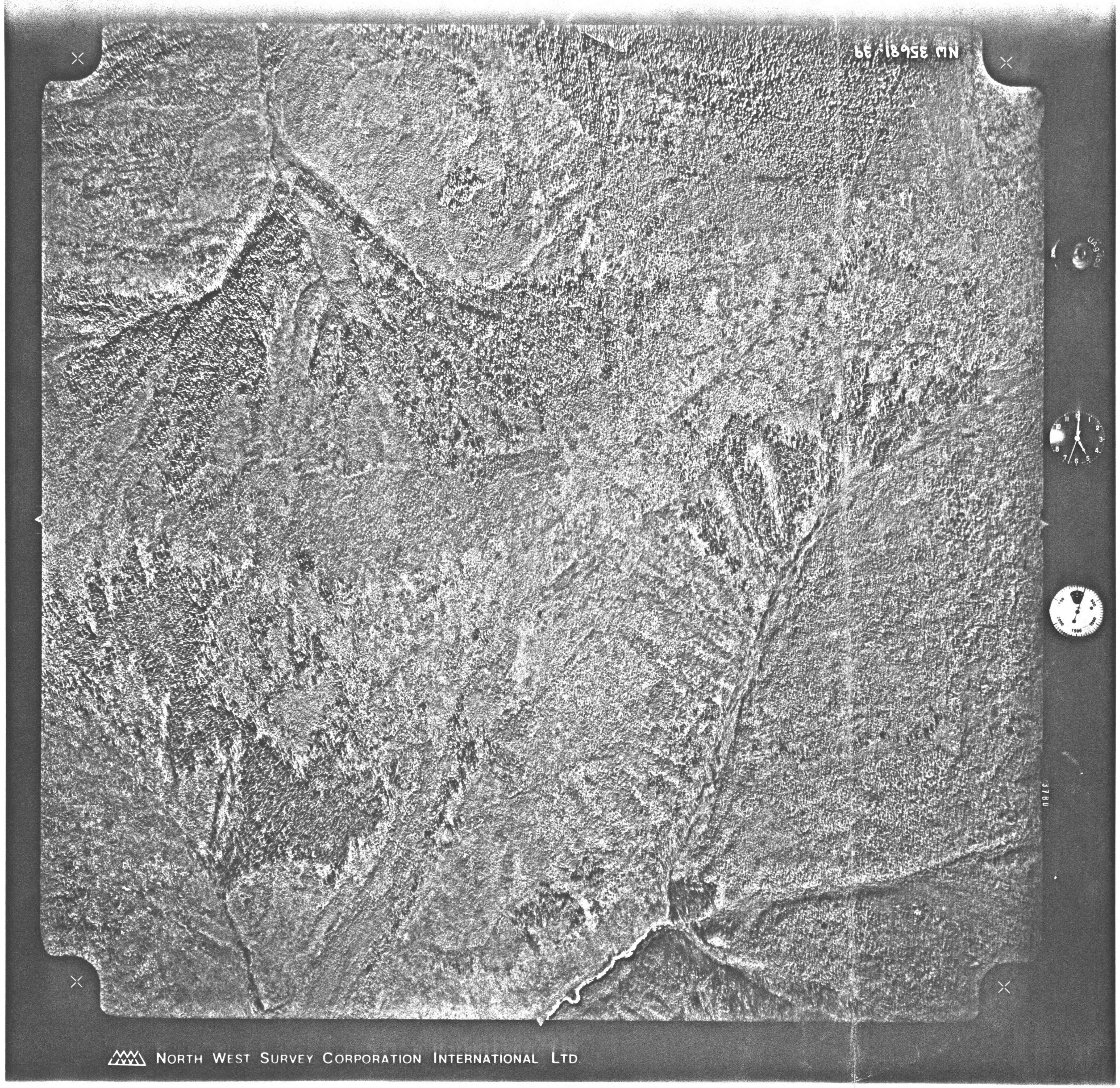
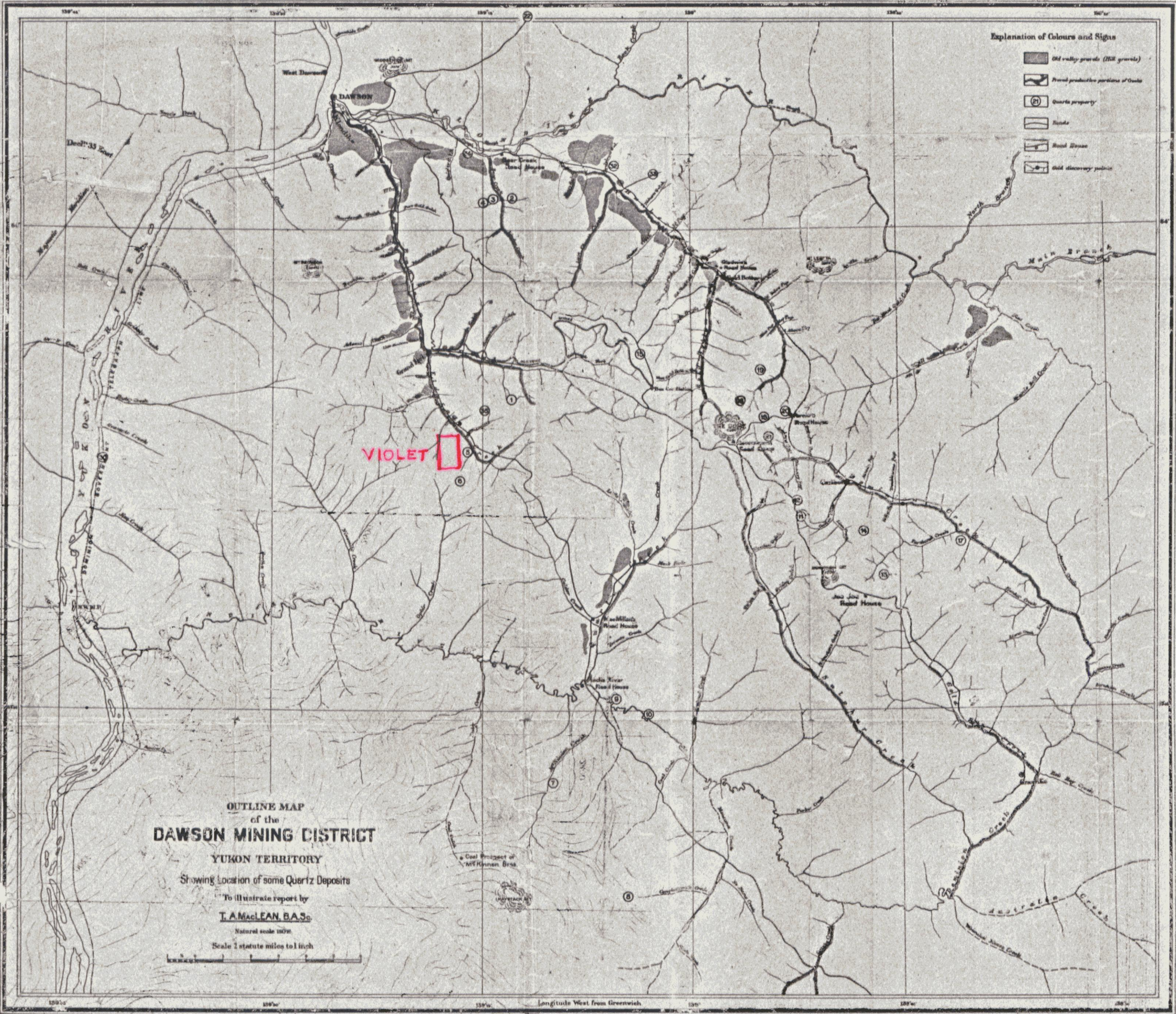

NORTH WEST SURVEY CORPORATION INTERNATIONAL LTD.

CANADA
DEPARTMENT OF MINES
MINES BRANCH
HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL. D., DEPUTY MINISTER;
EUGENE HAANEL, PH.D., DIRECTOR.
1913



Reference

1. Lone Star Mine
2. Gordon Mineral Claim
3. Virgin " "
4. Jean I " "
5. Cullen Group
6. Violet Group
7. Britannia Group, (McKinnon Brothers)
8. Eclipse Group, (Chris. Fothergill et al)
9. Esperanzo Mineral Claim
10. Raven Mineral Claim
11. Lloyd Group
12. Green Gulch Group
13. Gold Run Group, (W. D. MacKay)
14. Patterson Group, (Flora Mineral Claim et al)
15. Box-Car Group
16. Mitchell Group
17. Portland Group
18. W. D. MacKay Group, Hunker
19. John Fawcett Claims, Hunker, Rt. Fork
20. Summit Mineral Claim, (Jos. Fournier)
21. Dome Lode Property
22. Property of Wells Quartz Mining Company
30. Property of Pickering et al
32. California Girl Mineral Claim
33. Unexpected Mineral Claim
34. W. O. Smith Property, on Klondike
35. Eldorado Dome

Explanations

(1) Nos. 23 to 29 inclusive, apply to Claims in the Duncan Creek Mining District

(2) No. 31 refers to Claims of J. A. Anderson on Excelsior Creek, further south on Yukon than here shown

Base Map, Geological Survey

Nº 221

CANADA

DEPARTMENT OF MINES

HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER

MINES BRANCH

DR. EUGENE HAANEL, PH.D., DIRECTOR.

LODE MINING IN YUKON:

AN INVESTIGATION OF QUARTZ DEPOSITS IN THE KLONDIKE DIVISION

BY

T. A. MacLean, M.E.

OTTAWA
GOVERNMENT PRINTING BUREAU
1914

No. 222

MONTREAL, M

VIOLET GROUP.[1]

This group consists of four claims and a fraction, all crown granted, as follows:—

"Big Jim," "Violet," "Violet and Ruth Fraction," "Ruth" and "Lady Gay," situated about 5 miles from Grand Forks, on the divide between Eldorado and Ophir creeks, the latter a tributary of Indian river.

It is reached from Grand Forks by driving around the head of Eldorado, crossing on the divide between Eldorado and Caulder creeks, and back along the ridge overlooking Eldorado, left limit; the whole distance being about 10 miles, and the elevation, in the vicinity of the mine, varies between 3,400 and 3,500 feet.

History.—It was not learned when these claims were first staked, except that it was previous to 1905. Mr. T. G. Wilson, then resident in Dawson, promoted a company to open up the mine. Operations began on a considerable scale, and the equipment and works, described more in detail below, were established.

Work continued under this regime up to 1907, when it is said that the expenditure of $60,000 had been made. The funds then became exhausted, and the property was sold by public auction, in September, 1910, and acquired by the present owner, Mr. H. H. Honen, of Dawson. The latter has, so far, done nothing with it. Little information is now available as to the results obtained for the above considerable expenditure.

The shafts, and underground workings, are filled with water, or frozen up, and very little surface work, by way of exposing the deposit, was done, and most of it is now partially filled with debris.

The remnant of an assay plant was found in the shaft house.

A gravity tramway was partially constructed, of native timber, for a distance of some 3,500 feet, descending on a slope of 10° to 15°, and terminating in a high trestle, at Ophir creek. This was to have been the mill-site, where a small stream of water flows—continually it is said—in the creek. The above was an ill-advised undertaking, as the money was needed to prospect and prove the value of the ore bodies.

If, as mentioned above, $60,000 had been expended, it may justly be said at this time that it should have furnished much more reliable information as to the true status of this deposit than appears now available from any source.

Description of Deposit.—As a result of their prospecting operations, the owners came to the conclusion that this deposit consisted of three

[1] McConnell, Part B, Annual Report Geological Survey, 1905, Vol. XIV, p. 65B. Cairnes, Sum. Rep. Geological Survey, 1911, pp. 37-38.

quartz veins, one of which strikes easterly[1] with the enclosing schists, but dips across them.[2] This had been uncovered by an open-cut for a length of 50 feet and found, by Dr. Cairnes[3], to vary from three to six feet in width. McConnell also describes it as broken by several small faults.

At the time of examination this open-cut was partially filled by debris. As a result of this, and the inaccessibility of the shafts, little could be learned at first hand from the development previously carried on. As a result of some surface trenching, however, in addition to outcroppings, it was learned that the quartz occurs plentifully in a belt, which varies in width from a few feet, to upwards of a hundred feet, striking easterly and westerly for several thousand feet, and embracing the vein referred to above.

The quartz occurs, generally, in individual masses, from a few inches up to six feet in width, and ten feet or more in length, and while there may be lack of regularity and continuity to the individual quartz bodies there is decided continuity to the belt, which may be traced through, and beyond the property easterly towards Glacier pup.

Considerable detail work would be necessary to absolutely define the width of the quartz zone, but, from outcroppings along the ridges, and exposures at different places, it is evident that there is a close similarity to conditions found at Victoria gulch, and that the quartz is here also very widely distributed throughout the schists. The quartz is crystalline, of a rusty or ochreous colour, and contains reddish feldspar, giving it a pegmatitic appearance.

Minerals noted were iron and copper pyrites and galena.

Development.—Workings consist of main shaft, $4' \times 6' - 150'$ deep, with shaft house about $12' \times 30'$; head sheave, etc. A power hoist had been in use, but at present nothing but a hand windlass remains.

Some drifting had been done,[4] but, as stated, this could not be seen.

A quartz pile of about 150 tons was made near the shaft, and the waste dumps carried perhaps 10 per cent of quartz, the balance being schist. Probably one-third of all material excavated would be quartz. This shaft is located towards the western limit of the Violet claim. (See plate VI, p. 12.)

Two other shafts, 35′ and 55′ respectively, are located westerly from the main shaft, and are on the Ruth claim.

A number of open-cuts or trenches have exposed some quartz, both easterly from the main shaft on the Violet claim, and westerly on Ruth and Lady Gay.

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[1] Bearings given throughout this report are magnetic, the variation being 35° east. The above would, therefore, be about southeasterly, Astron.

[2] McConnell, R. G., "Report on Klondike Gold Fields," An. Rep. Geol. Survey Can., 1905, Vol. XI, p. 65B.

[3] Cairnes, D.D., "Quartz Mining in Klondike District," Sum. Rep.Geol. Survey, 1909, pp.16-22.

[4] Cairnes, D. D., "Quartz Mining in Klondike," Sum. Rep. Geol. Sur., 1909, pp. 16-22.

It was decided that, in addition to sampling outcrops and exposures, a liberal sampling of the quartz pile would afford most valuable information. Six samples were, therefore, taken from the latter, one of which (No. 90) was quartered down from 1,250 lbs. This assayed $2.51; No. 89 assayed 98c, while four others gave only traces.

It may be noted, by referring to samples tabulated on Assay Sheet No. 9, page 58, that not one colour of gold was panned in some 25 samples from Nos. 85-109, and, further, that of the six samples (Nos. 85-90), from the 150 ton quartz pile, only the last two assayed over a trace, and only five samples in twenty-five assayed any values.

It is not pretended that the assay results here given are conclsiuve or that they represent an average of this deposit; an analysis of results leads to the same conclusion as in the case of the Lone Star, namely, that a thorough mill test is the best means of deciding definitely as to whether this property is workable. There is no question about a very large tonnage of quartz being available. Results of the above sampling are, however, only moderately encouraging.

Violet Group
R. W. Brock
1909

CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA
MEMOIR 284

YUKON TERRITORY

Selected Field Reports of the
Geological Survey of Canada
1898 to 1933

Compiled and Annotated
by
H. S. Bostock

EDMOND CLOUTIER, C.M.G., O.A., D.S.P.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
Ottawa, 1957

give the impression of being persistent. The slips are not very numerous, and the ground inside the frost line is as solid and free from disturbances as in most mineralized areas. Near the surface, in the frost zone, the ground is broken into small blocks which are gradually working downhill. This 'creep' is quite pronounced. Since our visit, it is reported that two ledges have been encountered from which good assays have been obtained.

Near the close of the season, a two-stamp mill on the Lone Star group at the head of Victoria gulch made a test run of over one hundred hours on surface quartz, with results that are said to be entirely satisfactory. McConnell, in his report on the Klondike Gold Fields (p. 65), speaking of these veins says, "the prospects are certainly encouraging, and warrant further investigation".

The prospecting on the rock bluff 10 miles below Dawson, and below the Indian village of Moose-hide, shows that attention is not wholly confined to the placer creeks. The bluff consists of coarse, quartz-mica schists, with numerous quartz stringers, a few of which are said to pan gold. But the rock which attracted attention is a basic igneous dike which cuts the schists. On the exposed surface it is rusty-weathering with a marked spheroidal structure. We did not succeed in obtaining colours, but subsequent pannings are reported to have yielded positive results.

As yet there is nothing definite on which to base a judgment regarding the quartz possibilities, but there are facts in connexion with the geology of the district and the occurrence of placer gold, which have a bearing on the question, and furnish at least suggestions with regard to prospecting for quartz. Detailed descriptions of the district may be found in McConnell's Klondike Gold Fields (Geological Survey, No. 884), and his 'Gold Values in the Klondike High Level Gravels' (Geological Survey, No. 979), and need not be repeated here. But the salient points which strike the visitor may be worth mentioning.

Geological History of the Klondike

The complete geological history of the district is, of course, somewhat more complicated than represented in the following notes. The district is not glaciated, and the present topography is the result of weathering and erosion. Viewed from an eminence, the streams are seen to possess wide valleys with gently sloping sides rising to rounded hills with broad, rather flat tops. Outcropping rocks are conspicuously absent. Broad amphitheatres at the heads of the creeks are characteristic. Rock-waste subdues the outlines of the hills, and deep gravel deposits cover the gently sloping valley bottoms. Here is seen a region in a state of advanced maturity. But rejuvenescence occasioned by a recent uplift is also observable. The Yukon has sawn a trench 700 feet or so into the bottom of the old valley. The Klondike, responding to this lowered base-level, has correspondingly trenched its old bed, and Bonanza and Hunker creeks have channelled their valleys in harmony with the new Klondike level. The creeks south of the Dome are still in the old channels, for the Indian river has not yet advanced its new cañon as far up as the mouths of these streams.

For a period extending a long distance into the geological past, conditions of weathering, erosion, and deposition have obtained, with no disturbances sufficient to seriously interrupt these processes, to erase their effects or sweep away their products. This fact, brought into notice by the topography of the district, is accentuated by an examination of the gravels

themselves. The old valleys, except where covered by recent accumulations or cut into by the rejuvenated streams, are floored with 'White Channel gravels', which rest on a yellowish, clay-like bedrock, the weathered, rotted country rock. The 'White Channel gravels' themselves are bleached mixtures, consisting largely of fine sericite and quartz pebbles. Pebbles of country rock have decomposed and fallen to pieces, or if present, disintegrate at a touch. Stratification is gone. Decomposable minerals have broken down. Soluble elements have been leached out, and stable combinations like sericite formed of what remains. Magnetite is practically absent, though originally it must have been plentiful. Only the most resistant minerals, such as quartz and sericite, with some gold, are left. Weathering, therefore, has been an important and long-continued process on the rock surfaces, in the hillside wash, and, finally, in the stream accumulations in the valley bottoms.

The country rock consists of sericite and chloritic schists, with some dark, graphitic argillites cut by some dikes of igneous rocks, quartz porphyries, rhyolites, and andesites. Quartz veins and stringers, some, at least, gold-bearing, are abundant in these schists. Exposures are not numerous, being largely confined to occasional outcrops on the summits or in the cañons of the rejuvenated streams. But the large amount of quartz in the debris which mantles the solid rock evidences the presence of quartz veins where they are not exposed.

The old White Channel gravels, representing a natural concentrate from a great mass of gold-bearing material through long ages, by weathering and stream action, are rich in gold. The gold occurs in a well defined paystreak, as is usually the case in stream gravels. The present stream beds where they have cut down through the White Channel paystreak were enormously rich, as might be expected since they represent a reconcentration of an already rich concentrate. Where the White Channel paystreak was untouched, the present stream bed was apt to prove lean. Going up stream, the gold usually becomes less worn, rougher, more angular, and coarser. The gravels are not always of pay grade to the heads of the creeks nor always to the mouths of the creeks; some of the tributary gulches are rich and some have proved barren. Often gulches which head together are paired as to gold contents. If one is rich the other is rich; if one is poor the other is poor. Gold in the recent gravel freshly derived from its original source is similar to gold in the corresponding White Channel gravel. Many of the gold grains and most of the nuggets, enclose quartz. Quartz pebbles are found containing gold, some at least very rich in gold. The quartz of the boulders is similar to the quartz of the veins, and gold of the veins to the gold of the gravels. From the foregoing and other facts, it is obvious that the gold is absolutely local in origin, derived from the basins of the pay gulches and creeks.

Quartz Possibilities

The extraordinarily rich gravel represents the concentration of a great mass of gold-bearing material. There are several possibilities regarding the source of the gold. It might be derived from disseminations through the country rock. A gold value of a few cents a ton, such is the volume of country rock weathered and eroded, would more than account for all the millions in the gravels. But this interpretation does not fit the facts. In addition to those above alluded to, it may be recalled that Eureka creek, which is gold-bearing, is not in the Klondike schists at all, but in the Nasina

series, which almost everywhere else is unproductive. It is then practically certain that the gold of the gravels has come from the quartz veins. When one considers the extremely local occurrence of the gold, the suggestive form of the nuggets, the overwhelming importance of quartz in the gravel, the widespread occurrence of quartz in the very nuggets themselves, the 'kindly' appearance of the quartz of the pebbles and the actual occurrence of gold in this quartz and also in some of the veins so far uncovered, the numerous veins on the rich creeks, etc., no other view seems at all tenable. But granting this, there still remain several possibilities. The gold may be somewhat uniformly distributed throughout the innumerable quartz stringers and veins, in which case they would almost certainly be too lean for profitable exploitation. The probabilities, however, are that this is not the case, and such facts as are known do not suggest this possibility. To begin with, this is not the usual characteristic of gold-quartz veins. Again, quartz is widespread; gold confined to particular creeks and gulches. Some of the quartz boulders are likely-looking, some very unpromising; suggesting that they are from veins of different origin and contents. Other facts also tend to indicate that the gold is confined to certain veins. The large nuggets and the richness of the gravels at the heads of some of the pay channels would suggest that in the auriferous veins themselves the gold is already concentrated to a certain extent at least. The rich kidney of quartz found on the New Bonanza claim, Victoria gulch, is an example.

Up to this point, the argument is all in favour of the possibilities of rich quartz veins, but here some uncertainties enter. The gold might be concentrated in ore shoots, as is usually the case in veins. These might be large and workable bonanzas or small and pockety. The pay ore may have been largely removed by erosion, and for the most part, only low-grade roots of veins left. Veins, though rich, might be too small or irregular for mining. McConnell admits that most of the veins seen by him were of this character. On the other hand, comparatively few of the veins have been exposed, and it is quite possible that large and regular veins are to be found. So far, developments on the Dome property tend to strengthen this possibility. Moreover, the small veins might occur in groups or zones that collectively might be capable of development, or the country rock in the neighbourhood of a vein might prove sufficiently mineralized to give workable dimensions to the ore body. There is not yet sufficient information available to determine the actual conditions in the Klondike with respect to these last points, so that the future of the lode mining cannot be predicted with certainty. As just shown, the balance of the evidence, so far as it goes, is distinctly favourable, and the stakes are tempting. In my opinion, then, it is well worth while making serious attempts to locate workable quartz.

In this connexion it is interesting to note that prospecting for quartz in the placer camps of Alaska is furnishing encouraging results. Some promising gold-quartz has been found in the Koyukuk and Chandalar regions. At Fairbanks, according to information furnished by A. H. Brooks, of the United States Geological Survey, prospecting for quartz or veins has been carried on at a number of points. Veins varying from less than an inch wide to 12 feet have been found. The rich ore has thus far been confined to stringers or veins under 3 feet thick, but valuable material is reported in places in the adjoining country rock. Though many of the individual stringers pinch out and some of the veins are faulted, others may be followed for several hundred feet. Development work is as yet limited, but

the prospects are considered sufficiently encouraging to warrant serious development and further prospecting for quartz veins.

On the Seward peninsula, quartz seems to be receiving greater attention than ever before. This autumn a magazine was started at Nome in the interests of quartz mining on the peninsula. The Big Hurrah mine, in the Solomon River region, has been operated for a number of years, and has the distinction of being the first lode mine on the peninsula. It has a stamp mill, and seems to have demonstrated that in certain spots at least, mineralization is sufficiently concentrated, and veins sufficiently large and continuous, to make a lode mine. Here is one place where a northern placer has developed into a lode mine, and where some of the placer gold has been traced to its source.

Notes for Prospectors

The prospects for developing lode mines in the Klondike I would consider to be quite as promising as in the lower Yukon. The most attractive prospecting ground is naturally on the creeks which have had rich gravels, for since the gold is local in origin and, presumably, derived from quartz, they indicate the existence of auriferous veins in their basins. Some guidance as to the best points to prospect in the individual basin is furnished by the gold in the gravel. For example, the head of a creek or a tributary gulch that has a bedrock which would retain gold, but does not contain pay gravel, would be an unpromising field for prospecting. On the other hand, the valley walls or the gulches at the head of pay gravel would be likely ground. For instance, Victoria gulch with No. 7 pup is almost at the head of the productive part of Bonanza creek. The gold is coarse, and in the upper part very rough and angular. Here, evidently, one is 'hot on the scent'. On No. 7 pup the gravel is angular, and consists of almost unworn slide rock. This should be a good place to prospect. Gay gulch, which heads with Victoria gulch, is also auriferous. This and the divide between the two gulches furnish favourable ground. A study of the geological maps and reports, and a consideration of the production from the various claims, will furnish numerous suggestions regarding other good points for attack.

When the gravels of a creek appear to be enriched on a certain claim as if from a local source of gold, it should first be determined if the excess supply has been derived from the White Channel paystreak. Only when this has not been the case may such enrichment be taken to indicate the presence of a rich vein in the immediate vicinity. If coarse or unworn gold suddenly makes its appearance where normally only fine and worn gold might be expected, this would be indicative of a fresh, local supply from a nearby source. Such would be a favourable place to prospect.

Prospecting will be slow and tedious, hampered as it is by the lack of rock exposures and the mantle of loose rock. The latter is steadily creeping down hill, a point to be remembered when float is discovered. When a vein is found and sufficiently uncovered to show the character of the vein material unmixed with 'wash', unless it is of pay grade it is usually unwise to sink on it or otherwise test it at depth in the hope that values will improve. If it is felt to be worth further development, it is usually better to prospect it horizontally rather than vertically. This can be done either by trenching, or if the cover is too deep, by drifting. Either will be cheaper and more rapid than sinking, and will test the vein as successfully, for the chance of striking better grade material along the vein is quite as strong as, if not stronger than down it, and much more of the vein is tested in the same time

and for the same money. If, however, pay ore is encountered, it is advisable to sink on the ore as well as to follow the vein horizontally, for gold often exhibits a tendency to concentrate on the surface, and it is, therefore, necessary to demonstrate that the values continue downward. Until the ore shoot is well developed, so that certain knowledge is to be had of its position, dip, continuity, value, etc., in no case should expensive work be undertaken elsewhere than on the ore, under the assumption that it goes down, or has any particular attitude. 'Stick to the ore' is advice to be heeded. These points may seem too elementary to be worth making, but justification is furnished by the amount of money wasted in young camps, everywhere, by disregarding them, and by the frequent expenditure of time and money in a way that detracts from rather than adds to the value of the claim.

For the encouragement of prospectors it may be noted that, up to a certain point, the greater the number of veins that prove barren or almost so, the greater are the chances that some occur that are rich, for the reason that the fewer sources there are for the gold, the richer these sources must be.

Some light on the value of the quartz of veins might possibly be had from the quartz boulders of the gravels. Many will no doubt be from barren veins; many are cavernous. These probably held auriferous sulphide minerals which have been leached and the accompanying gold dropped out, in which case the values found would be too low. But tests made with discrimination and judgment might furnish some instructive results.

Placer Prospects

It is to many a matter of surprise that the discovery of the Klondike has not been followed by that of other important placers in the Yukon. The possibility of this is not yet exhausted. Prospectors from the Stewart are bringing out encouraging reports of creeks, tributary to this river. In some respects the conditions are very favourable for placer mining. From information which appears to be reliable, the placer prospects of the Stewart River district are to be taken seriously. Two dredges are being operated on the river.

Information obtained from the Klondike may be used with advantage in prospecting for new placers. Here, as noted above, the essential points were, gold-bearing country rock (auriferous by reason of gold-bearing veins), a very long period of concentration of the gold through weathering and erosion with, in places, a reconcentration of the already rich gravels. The same conditions were essential in the formation of the placer camps of the lower Yukon—notably at Fairbanks and the Seward peninsula. (At Nome reconcentration was effected on several beach lines.)

The presence or absence of the essential factors in a district, except the auriferous character of the country rock, can be speedily recognized by an inspection of its topographical features and the condition of the surface and of the old gravels. Whether the country rock is gold-bearing, and so could have supplied gold to the gravels, is not so readily determined, but in certain cases, at least, this can be more readily ascertained (or at all events its probability indicated) by an examination of the materials of the gravels, the slide rock, and outcrops than by the more laborious digging and washing of the gravels.

For instance, in the Klondike, the amount of quartz, and particularly the suggestive character of the quartz in the numerous milky, cavernous boulders, would indicate a strong probability of the occurrence of gold,

Violet Group
D.D. Cairnes
1911

1910

In 1910 no field work was done in Yukon Territory.

1911

Introductory Notes

In his Summary Report for 1911, page 4, the Director, Mr. R. W. Brock, includes the following notes on field work in Yukon Territory:

"Mr. D. D. Cairnes was engaged on the Yukon-Alaska boundary line between the Yukon and Porcupine Rivers.

"For the geological work in both Yukon and Alaska, a geological section to the Arctic Ocean is needed, and the Geological Surveys of the United States and Canada are co-operating in this work, Canada becoming responsible for the section along the boundary line from the Yukon to the Porcupine River, and the United States for the section from Porcupine River to the Arctic Ocean. The total length of the combined section will be about 340 miles.

"Returning from the field, Mr. Cairnes examined a number of quartz properties in the neighbourhood of Dawson."

The preliminary reports by D. D. Cairnes, published in the Summary Reports for 1911 and 1912 and dealing with his explorations along the Yukon-Alaska Boundary north of Yukon River, are not reprinted here as the information they contain was later published in Memoir No. 67 as a single complete volume, with maps, and a supply of this publication is still available. Only that part of Cairnes' report for 1911 describing 'Quartz Mining in the Klondike District' and including a note on Dublin Gulch and vicinity is reproduced here.

QUARTZ MINING IN THE KLONDIKE DISTRICT

by D. D. Cairnes

After completing the regular season's work along the 141st meridian* (the Yukon-Alaska boundary) a few days in September were spent in the examination of a number of the more promising quartz properties in the Klondike district, mainly in that portion of Dawson Mining district which is situated along and between Indian and Klondike rivers and their tributaries.

Considerable interest has of late been displayed concerning the quartz veins of the Klondike, and special efforts are being made to develop the lode mining of this district, in the hope that a revenue may eventually be derived from this source that will continue to foster the mining industry of this portion of Yukon when the placer deposits have become exhausted, which it is thought, however, will not be for many years to come.

Summary and Conclusions

Quartz veins are very plentiful in the schistose rocks of the Klondike district, and although the greater number of these deposits are small and

* For the results of this work see pp. 17-33 of this Summary Report.

non-persistent, still the aggregate amount of quartz is very great. Occasional very encouraging assays have been obtained, but with rare exceptions it is not even approximately known what average amounts of gold the deposits in the different localities contain. The quartz is practically all free-milling and is but slightly mineralized, the only metallic constituents apparent being pyrite, and rarely magnetite, chalcopyrite, galena, and native gold.

More systematic sampling and assaying should be conducted to obtain a fair general idea of the gold content of the quartz, and the various deposits should be more thoroughly prospected to ascertain their probably lateral and vertical extent. In case the results of these tests prove sufficiently encouraging, it would be particularly advantageous to have a stamp mill built at some convenient point capable of handling readily and quickly 5 or 10 ton samples from the various deposits of the district; in this manner claim owners could obtain sure and ready information concerning their properties. This is virtually the only way that reliable results can be obtained from these low-grade, free-milling deposits, as it is almost impossible to obtain perfectly satisfactory results from ordinary assay samples, and the expense of shipping small samples to outside points is practically prohibitive.

The Quartz Deposits

A great amount of quartz occurs in the old schistose rocks that are so extensively developed in the Klondike district, and in some localities it is in sufficient quantity to even constitute a considerable portion of the whole rock mass. The quartz occurs prevailingly in veins which exhibit considerable variety of form, and are as a rule small and non-persistent, but range in size from mere threads to masses several hundred feet in length but in most places less than 10 feet in thickness; one vein, however, on Yukon river below the mouth of Caribou creek, exceeds 30 feet in thickness.

The most common type of vein is lenticular in form, the individual lenticles measuring but a few inches in thickness and less than 50 feet in length; in places, however, individuals as much as 10 feet in thickness occur, but even these are rarely traceable for any considerable distances. The lenses in most places follow, in a general way at least, the strike of the schistosity of the containing rocks, but along their dips they frequently cut the wall-rocks at various angles.

Typical bedded or sheeted veins are also characteristic of some localities; in this type of deposit the quartz occurs interleaved with the folia of the schists, the individual quartz bands being generally but a few inches in thickness; in places such deposits occur in zones up to 10 feet or more in width that consist entirely of alternate quartz and schist lamellæ exhibiting a wide range of relative proportions.

Typical fissure veins were also noted, but on account of the decidedly schistose and fractured character of the enclosing rocks, these veins readily pass into the lenticular or sheeted types, due to the fact that the solutions from which the quartz was deposited, were naturally frequently diverted in whole or in part from the particular channels along which they might at any time be travelling, on account of the multitude of cleavage and fracture cracks which intersect these rocks, affording thus numerous routes for percolating waters. All types of veins are thus liable to bifurcate or branch out, and smaller veins frequently unite to form larger deposits. In places along lines of previous excessive fracturing, mineralized zones occur in

which several of the vein types are represented; lenses, sheets, pockets, and various irregular deposits of quartz may be separated by and include varying amounts of wall-rock, and the whole be intersected by, or associated with numerous stringers and fissure veins of quartz.

A notable feature of some of the veins is the presence in them of occasional feldspar crystals indicating their relation to certain pegmatites in the vicinity. In this connexion Mr. McConnell says*: "A few examples of typical pegmatite veins or dykes occur in the district, and in one case, a coarse-grained pegmatite vein was observed to pass along its strike into a purely siliceous rock. The aqueo-igneous origin of the pegmatites, and their close genetic connexion with certain classes of quartz veins, maintained by various writers, is supported by the facts observed in the Klondike district."

The quartz veins are in most places but slightly mineralized; pyrite and more rarely magnetite occur in places in sufficient quantity to produce a reddish coloration on the exposed and oxidized portions of the veins, and in a few places the quartz contains particles of galena, chalcopyrite, and native gold.

The Economic Importance of Quartz

Often fair and occasionally even high assays are obtained, and in places the quartz shows native gold, but, except in possibly a very few instances, it is not known even approximately what average amounts of gold the quartz contains. From the various properties that have been examined, however, the gold that does occur is always either associated with metallic sulphides or is at or near the contact between the quartz and schists; in the latter case the gold is generally found in both vein material and wall-rock.

It would thus seem possible that some of the fractured zones that have become irregularly impregnated with quartz, may prove of greater value than the more clearly defined massive veins, since the former contain a greater area of contact-surfaces in the same volume or weight of material. However, the majority at least of the mineralized zones that have been examined, do not appear to be sufficiently persistent to allow of their containing sufficient quantities of pay-ore to make a mine; it is possible, nevertheless, that larger and more richly mineralized zones may yet be found. In a number of places several veins or mineralized zones which were noted in close proximity to each other could be worked conjointly. These would yield a considerable tonnage, and would become important producers if the bulk of the quartz will pay for milling. It is thought that, since the majority of the veins are non-persistent, the successful exploitation of the quartz of this district will largely depend on finding groups of veins or mineralized zones sufficiently close to allow of their being worked conjointly.

The deposits that have already been discovered in Klondike, in all probability represent but a small portion of the quartz that actually exists in the district, as bedrock is covered by superficial deposits in most places, except along the summits of the hills and ridges, and along the sides of the secondary valleys, where the bulk of the quartz occurs that has so far been found; other discoveries have been largely accidental and due frequently

* McConnell, R. G. "Report on the Klondike gold fields": Ann. Rept., Geol. Surv., Canada, Vol. XIV, p. 63 B.

to placer operations. It is, therefore, probable, that future prospecting and development will disclose numerous deposits that are at present unknown.

More development should be performed, however, in connexion with the quartz deposits of the district that have been already discovered, with a view to ascertaining their extent, and more systematic sampling and assaying should be performed in order to determine within reasonable limits, at least, the average values of the materials they contain. It seems probable that at least the upper weathered and decomposed portions of a number of the deposits could be profitably milled, due to the fact that the district has not been glaciated, and a certain surface concentration of gold is to be expected, and in places is known to occur.

Prospectors and others interested in lode mining frequently do not sufficiently realize the importance of assays, and when these are made, in probably the majority of instances in Klondike district, they are from samples that are not representative of the deposits from which they are taken. Two reasons seem mainly to account for this condition: one is that it is not as convenient to have assays made in Yukon as in most mining districts, and moreover it is frequently realized how difficult it is to obtain really representative assay samples from free-milling deposits.

The most reliable and satisfactory results for such ores are obtained from mill tests of at least 5 or 10 ton lots. A sampling mill capable of making tests of 10 ton samples of the different quartz deposits of this district would greatly facilitate the development of the industry, and would stimulate prospecting throughout the district. With such a mill situated somewhere in the vicinity of Dawson, sufficient information could be obtained in a short time, possibly in one or two seasons, to demonstrate whether the Klondike has or has not a future in quartz. If these deposits are not profitably workable, the sooner this is known the better it will be for those owning, holding, and developing such properties; also if a number of deposits are sufficiently rich to become producers, the earlier this fact is established the greater will be the benefits that will accrue to the territory in general and to those most interested. In the meantime, however, it is important that more definite information be obtained concerning the extent and average value of the various deposits throughout the district.

Mining Properties

General Statement

Among the more promising quartz properties in the Klondike district, and those on which the most energy has been expended in development, are: the Lone Star group, near the head of Victoria gulch, a tributary of Bonanza creek; the Violet group, situated along the divide between Eldorado and Ophir creeks; the Mitchell group, on the divide between the heads of Hunker and Goldbottom creeks; the Lloyd group and neighbouring claims, situated along the divide between the heads of Green gulch and Caribou gulch, tributaries respectively of Sulphur and Dominion creeks; and several groups of claims on Bear creek near where joined by Lindow creek. Of these, the Lone Star was the only property on which any work, other than the necessary assessment duties, was being performed during the summer of 1911.

In addition to the above-mentioned properties, considerable enthusiasm has been aroused during the past two seasons over a number of claims

staked on Dublin gulch, a tributary of Haggart creek which drains into the south fork of McQuesten river. This locality is not in the Dawson mining district, but is in the Duncan Creek mining district; it is, nevertheless, frequently spoken of as being in the general Klondike district and will be here so considered.

The Lone Star Group*

The Lone Star group is situated near the head of Victoria gulch, a tributary of Bonanza creek. This property is owned by a joint stock company with head office in Dawson and having a capitalization of $1,500,000; the president, Dr. Wm. Catto, as well as the secretary-treasurer, and the majority of the board of directors also reside in Dawson.

On these claims two main veins, or really one vein and a mineralized zone, have been discovered, which have been, by the owners, designated respectively the 'Corthay vein' and the 'Boulder lode'; these occur in much metamorphosed sericite and chloritic schists. The Boulder lode strikes N. 50° W.,** dips from 70° to 80° to the S.W., and is in most places at the surface from 3 to 10 feet in width, containing 1 foot to 7 feet of quartz. This 'lode' has been traced definitely along its outcrop for 400 feet, and quartz is exposed at various points in the same general line of strike for 600 feet farther, indicating that this zone may persist for this distance. The quartz occurs prevailingly in lenses, sheets, and irregular bodies ranging in size from those that are only microscopically observable to others 3 or 4 feet in thickness; these are interbanded or interfoliated with the schists, and generally agree with them in strike, but along their dips cut the planes of schistosity of the enclosing rock at various angles up to 90°. In places masses of practically solid quartz as much as 4 or 5 feet thick occur, but such a condition is rather exceptional. Numerous fissure veins or stringers less than 6 inches in thickness, intersect the main zone in various directions.

The Corthay vein strikes N. 14° W., has an almost perpendicular attitude, and where it has been explored is much more regular than the Boulder lode; this deposit also resembles more an ordinary compound fissure vein, and consists mainly of quartz which is in most places from 3 to 6 feet in thickness.

The quartz of both the Corthay vein and the Boulder lode is but slightly mineralized, the only metallic constituents that were noted being pyrite and native gold. The pyrite occurs as scattered particles or in small bunches, and is in sufficient amount in places to give the quartz a rusty appearance where weathered. The native gold occurs mainly as occasional grains and nuggets both in the quartz and wall-rock, but prevailingly near their contact, and is in places quite well crystallized.

An open-cut about 70 feet long, 10 feet wide, and having an average depth of approximately 15 feet, as well as 8 or 10 smaller surface cuts or pits have been dug at intervals along the strike of the Boulder lode. A cross-cut tunnel 310 feet long has also been driven, from which, when examined in September, 1911, about 40 feet of drifting had been run on the Boulder lode which at this depth of approximately 60 feet was much narrower than at the surface and contained in most places less than 2½ feet

* McConnell, R. G. "Report on the Klondike gold fields": Ann. Rept., Geol. Surv., Canada, Vol. XIV, pp. 64 B-65 B.

** All bearings given in this report are astronomic or true. The magnetic declination in the Klondike district is in most places 35° east.

of quartz. A vertical shaft has been sunk through the schists and tapped the Corthay vein at a depth of 60 feet where the quartz was about 4 feet thick. Another shaft 40 feet deep has been sunk on the Corthay vein and was connected with a drift from the tunnel by a 30-foot upraise; a drift 70 feet long was also run from the bottom of this shaft.

A four-stamp Joshua Hendry mill has been erected on this property, and a gravity tramway 3,500 feet long has been constructed to convey the ore from the workings to the mill on the creek about 900 feet below. A power line 4 miles long was about completed in September, which was to convey power to the mill from the power line of the Northern Light and Power Company on Bonanza creek, the cost of the power to be at the rate of three cents per horse-power.

Miners working on this property and in the vicinity receive $4 per day (10 hours) and board.

The manager of the Lone Star group claims to be able to mine and mill the ore from this property for $3.50 per ton. It is not known what average amounts of gold the quartz and adjoining rock there contain, but a number of promising assay returns have been received and the tests that have been made indicate that at least the somewhat decomposed superficial portion of the Boulder lode and possibly of the Corthay vein as well should pay to mill. No definite information was obtained concerning the remaining portions of the deposits.

The Violet Group*

The Violet group is situated on the divide between Eldorado and Ophir creeks, about 5 miles from Grand Forks, and consists of four claims and a fraction, all of which are Crown granted. It is claimed that $60,000 has been spent in developing this property which, however, was sold by public auction in September, 1910, and acquired by the present owner, Mr. H. H. Honen.

Three veins are reported to have been discovered on this property, but the bulk of the work has been done on one of these which strikes in a southeasterly direction with the enclosing schists, but dips across them. This vein is in most places from 3 to 6 feet in thickness, and the quartz composing it is crystalline and contains considerable reddish feldspar giving it a pegmatitic appearance. The quartz contains considerable iron which near the surface weathers and gives the vein a rusty appearance; particles of galena were also noted. It is not known what amounts of gold this vein contains but it is stated to average $10 to $11 per ton.

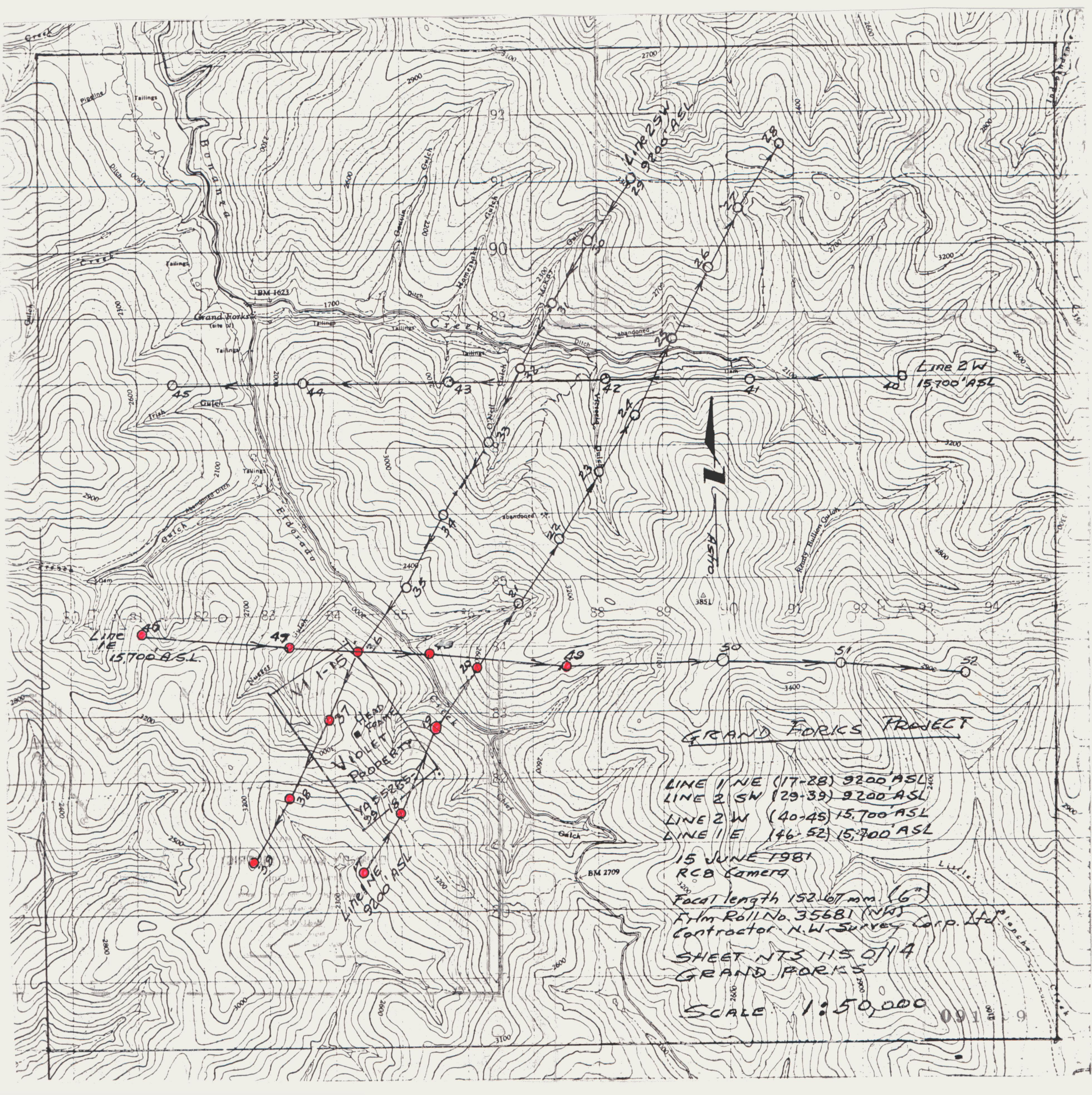
Three shafts, respectively 55 feet, 35 feet, and 150 feet in depth have been sunk on the property, and 300 feet of drifts have been driven; in addition, one open-cut 50 by 12 by 15 feet approximately, and a number of smaller cuts have been dug.

The Mitchell Group

The Mitchell group is situated on the divide between the heads of Hunker and Goldbottom creeks, and consists of about 27 claims which are owned by Mrs. Margaret J. Mitchell.

A number of quartz veins occur on this property, but as the surface of

* McConnell, R. G. "Report on the Klondike gold fields": Ann. Rept. Geol. Surv., Canada, Vol. XIV, p. 65 B.


Line 2 SW
9200 ASL
Line 2 W
15,700' ASL
Line 1E
15,700' A.S.L.
Line 1 NE
9200' ASL
Head Frame
VIOLET PROPERTY
Grand Forks
Bonanza
Creek
Eldorado
Tailings
BM 1623
BM 2709
ASTRO
GRAND FORKS PROJECT
LINE 1 NE (17-28) 9200' ASL
LINE 2 SW (29-39) 9200' ASL
LINE 2 W (40-45) 15,700' ASL
LINE 1 E (46-52) 15,700' ASL
15 JUNE 1981
RC8 Camera
Focal length 152.07 mm. (6")
Film Roll No. 35681 (NW)
Contractor N.W. Survey Corp. Ltd.
SHEET NTS 115 O/14
GRAND FORKS
SCALE 1:50,000