

GEOLOGICAL REPORT
ON THE
SOAB 4 AND SOAB 5 MINERAL CLAIMS
WITHIN THE
BOIVIN GROUP
FORT STEELE MINING DIVISION
82J/3E, 82G/14E
50°02' N 115°04' W
FOR

SILVER STANDARD MINES LIMITED - OWNER
ROCK-JOINT VENTURE - OPERATOR
BY
G. GIBSON - GEOLOGIST

OCTOBER 1979

7489

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INTRODUCTION

The SOAB 4 and SOAB 5 mineral claims, comprising the 36 unit BOIVIN GROUP were recorded on October 04, 1977, by Silver Standard Mines Limited, of 904-1199 West Hastings Street, Vancouver, B. C.

Geological assessment work on the property in 1979 was conducted as part of the ROCK JOINT VENTURE PROJECT - a program financed equally by:

Silver Standard Mines Limited
904-1199 West Hastings Street
Vancouver, B. C. V6E 3V4

Coastal Mining Company
506-1200 West Pender Street
Vancouver, B. C. V6E 2S9 and

Esso Minerals Canada Limited
314-2181 West Georgia Street
Vancouver, B. C. V6E 3J7

Claim data:

| <u>M. D.</u> | <u>CLAIM NAME</u> | <u>SIZE</u> | <u>RECORD NUMBER</u> | <u>GROUPING</u> |
|--------------|-------------------|-------------|----------------------|--|
| Ft. Steele | SOAB 4 | 18U | 313(10) | BOIVIN - (Notice to Group filed October 2, 1978) |
| Ft. Steele | SOAB 5 | 18U | 314(10) | |

OWNER: Silver Standard Mines Limited
OPERATOR: Rock-Joint Venture

Location, Access and Physiography

The SOAB 4, 5 claims are located in the Rocky Mountains of southeastern British Columbia near the headwaters of the Bull River-NTS: 82J/3E, 82G/14E, Lat. $50^{\circ}02'$ N/Long. $115^{\circ}04'$ W. They form an elongate block with a total area of 900 hectares, the center of which falls at a point approximately 55 line kilometers east-southeast of Canal Flats, and 75 line kilometers northeast of Cranbrook, B. C.

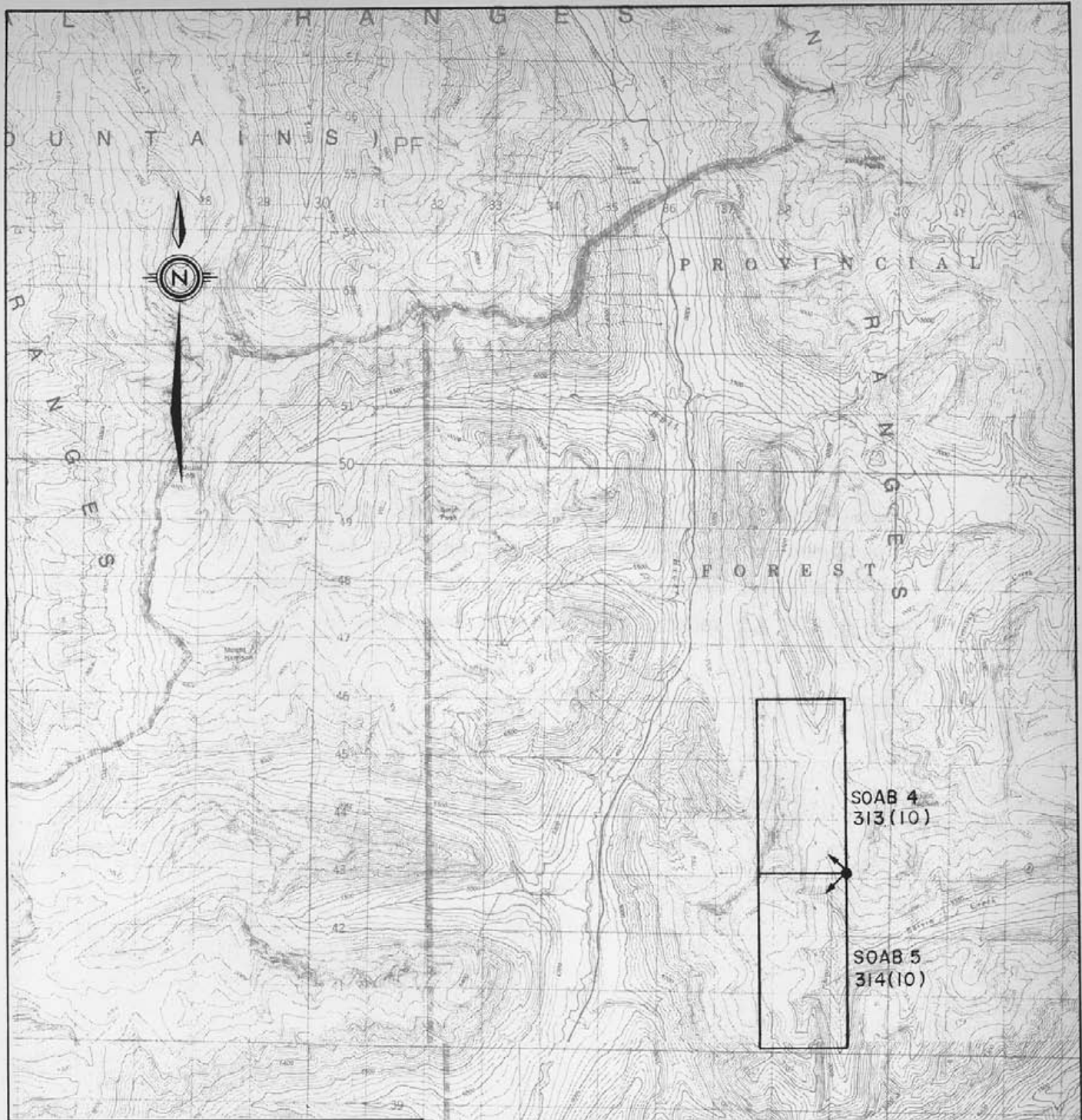
Figure 1 is an index map, scale 1:100,000 showing the location of the property.

Best ground access is via a network of well maintained logging roads from Canal Flats, Fernie or Galloway. Mile 58 (km 93) on the Bull River (Galloway) logging road falls within 2.5 km of the western property boundary. From here a difficult uphill hike to the claims is possible.

Air access is facilitated by permanent helicopter bases at Fairmont Hot Springs, Cranbrook, Golden, and Sparwood.

Rugged alpine topography with serrate ridges and deep glaciated valleys typifies most of the claim area. In general, ridges and valleys trend northward, parallel to the regional grain of underlying Paleozoic sedimentary rocks. Elevations on the property range from 1650 m to 2650 m A.S.L.

Vegetation on the valley floors consists mainly of mature coniferous forests. The upper levels, above a tree-line at approximately 1800 m A.S.L., can support only a sparse growth of grasses and lichens. By nature of the very steep terrain, about 60% of the property is entirely devoid of vegetation.



INDEX MAP

SOAB 4,5 CLAIMS

Gordon Gibson

SCALE 1:100,000

FIG. 1

Wildlife is abundant, with mountain goats, deer, porcupines and ground squirrels the species most often encountered. A resident population of elk occupy the upper reaches of Boivin Creek.

Climate is moderate. The property is snow-free during the interval mid-June through late October.

Previous Work

In 1978 surface blasting and sampling (total dimensions approx. 8m x 1.5m x 1m) was undertaken on the BOIVIN zinc occurrence-located at the headwaters of Boivin Creek on the SOAB 5 claim - see Statement of Exploration and Development, October 2, 1978.

Summary of Work - 1979

Geological mapping was carried out during the period June 12 to July 26. Airphoto based contour maps (1:5,000) and airphoto enlargements (1:8,000) were used as field maps. Data are compiled on Drawing 1 of this report - scale 1:10,000. Total area surveyed is 1200 hectares.

GEOLOGY

Regional Setting

The Boivin zinc occurrence and other related zinc showings in the SOAB 4, 5 claim area are localized in carbonate lithologies of late Devonian age near the western margin of the Front Ranges subprovince, Eastern Fold Belt, southeastern Canadian Cordillera.

In general, the Eastern Fold Belt at this latitude comprises a thick (14 km) assemblage of sediments ranging in age from Middle

Proterozoic to Early Tertiary. Of these the Proterozoic to Late Jurassic sequence accumulated as a westward thickening continental terrace wedge derived from a cratonic source area to the east. The upper Devonian part of the section (which hosts the SOAB 4, 5 Zn occurrences) constitutes a widespread massive, burrowed, micritic pellet bank deposit with laterally equivalent evaporites in the subsurface of southern Alberta and Saskatchewan.

The structure of the Front Ranges subprovince in the area under study is dominated by a series of gently westward dipping imbricate thrust faults. These divide homoclinal panels of carbonates and shales, exposed at the level of Cambrian to Jurassic. By contrast, the westwardly adjacent Main Ranges subprovince features broad anticlinoria and synclinoria with local overprinting by complex fold patterns. Exposure is at the level of Cambrian and Ordovician strata; mainly foliated incompetent shales.

Property Geology

Lithology

Upper Devonian to Mississippian sediments, mainly thick, cliff-forming carbonates, underlie the immediate property area (see Table of Formations - Figure 2).

Structure

Structures are strongly aligned in a NNW-SSE direction, parallel to the regional tectonic and physiographic grain (see Drawing 1).

Assymetric, open to compressed, concentric folds with westwardly dipping axial surfaces develop in massive strata and typify most of the claim area. By contrast, incompetent strata (i.e. Banff Fm. shales) deform in a plastic manner to produce complex internal flow-folds.

FIGURE 2 - TABLE OF FORMATIONS

| ERA | PERIOD | GRP./FM./MEM. | LITHOLOGY | |
|-----------|-------------------|-----------------|---|---|
| PALEOZOIC | MISSISSIPPIAN | RUNDLE GROUP | Crystalline LIMESTONE, grey wea., fetid. Crinoidal LIMESTONE. | |
| | | BANFF FM. | Cherty LIMESTONE, fine grained, nodular, grey-brown wea., dolomitic in part. Calcareous SHALE, black. Crystalline LIMESTONE, fetid. | |
| | | EXSHAW FM. | Black SHALE, non calcareous, recessive. | |
| | UPPER DEVONIAN | PALLISER FM. | COSTI- GAN MEM. | Argillaceous LIMESTONE, med. bedded to nodular, buff wea., cherty in part, crinoidal in part, pyritiferous. Sedimentary Carbonate BRECCIA, rip-up clasts, crinoidal. |
| | | | MORRO MEM. | Massive LIMESTONE, fine to med. grained, pale grey wea., burrowed, dolomite- mottled in part, resistant LIMESTONE med. grey wea., well bedded. ALGAL (?) DOLOMITE geopetal-fenestral texture, associated zinc minerals (see Mineralization). |
| | | ALEXO FM. | Dolomitic SANDSTONE, med. grained, tan wea. DOLOMITE, well bedded, contains rugose corals. SILTSTONE, shaly in part | |
| | | FAIRHOLME GRP. | LIMESTONE, well bedded, grey-brown wea. SHALE | |

Faults on the property are of three types:

- 1) Major west - dipping reverse (thrust) faults forming boundaries between panels of folded stratigraphy.
- 2) Longitudinal normal faults displacing the cores of concentric folds.
- 3) Minor high-angle faults discordant to major structures.

Mineralization

Zinc mineralization is hosted entirely by a narrow facies of the upper Devonian Palliser formation - lower (Morro) member. (See Table of Formations.) Said facies is comprised of a distinctive carbonate rock-type known locally as "zebra rock". "Zebra rock" is thought to be of supratidal algal origin. It is characterized by the fenestral (and geopetal) arrangement of sparry dolomite crescents within a fine grained saccharoidal dolomite matrix.

Megascopically the "zebra" facies forms extensive concordant layers and lenses to 15 m in width bounded above and below by massive limestone. It can grade laterally into bedded limestone across very abrupt transition zones but usually shows diffuse or interfingering outer contacts. Within the SOAB 4, 5 claim area all "zebra" dolomite levels fall within an overturned stratigraphic sequence that forms part of the lower limb of an eastwardly directed asymmetrical anticline. The outcrop pattern and areal extent of the "zebra" facies is shown on Drawing 1.

Zinc mineralization occurs as discrete pods or disseminations of straw-colored sphalerite within the "zebra" dolomite gangue. Alteration of sphalerite to smithsonite, hydrozincite and limonite is common in surface exposures. At the Boivin occurrence a mineralized

pod measuring approximately 12 m in length and 2 m in width grades 20% zinc. All other surface showings are much smaller in size and usually of lower grade.

CONCLUSIONS

Geological mapping and prospecting of the SOAB 4 and 5 claims has shown that sporadic zinc mineralization is confined to a relatively narrow belt of algal (?) fenestral dolomite within the upper Devonian Palliser formation - lower (Morro) member. Host dolomites are exposed only within an inverted sequence from the lower limb of a north-trending overturned anticline.

Apart from the Boivin zinc occurrence all related surface showings on the property are of too small a size to warrant further interest at this time.

Gordon Gibson
Gordon Gibson
Geologist

REFERENCES

- Beales, F. W., 1953: Dolomite Mottling in Palliser (Devonian) Limestone, Banff and Jasper National Parks, Alberta; BULL. AM. ASSOC. PETROL. GEOL., vol. 37, pp.2281-2293.
- Beales, F. W., 1956: *Conditions of Deposition of Palliser (Devonian) Limestone of Southwestern Alberta*; BULL. AM. ASSOC. PETROL. GEOL., vol. 40, pp. 848-870.
- Belyea, H. R. and Labrecque, J. E., 1972: Devonian Stratigraphy and Facies of the Southern Rocky Mountains of Canada, and the Adjacent Plains; Guidebook - Field Excursion C18, INT. GEOL. CONGR., 95 p.
- Price, R. A., Balkwill, H. R., Charlesworth, H. A. K., Cook, D. G., and Simony, P. S., 1972: The Canadian Rockies and Tectonic Evolution of the Southeastern Canadian Cordillera; Guidebook - Field Excursion AC15, INT. GEOL. CONGR., 129 p.

STATEMENT OF COSTS

1. WAGES (June 12 - July 26)

| | | | |
|----------------------|-----------------|-----------------------|------------------|
| <u>Sr. Geologist</u> | July 18-July 22 | 5 man-days @ \$67.50 | \$ 337.50 |
| <u>Geologist</u> | June 12-July 22 | 33 man-days @ \$50.00 | \$ 1,650.00 |
| <u>Assistant</u> | June 12-July 26 | 32 man-days @ \$35.00 | \$ 1,120.00 |
| <u>Assistant</u> | July 10-July 26 | 13 man-days @ \$35.00 | <u>\$ 455.00</u> |
| | Sub-Total | | \$ 3,562.50 |

2. FOOD AND ACCOMODATION (June 12 - July 26)

83 man-days @ \$28.00/man-day \$ 2,324.00

3. TRANSPORTATION (June 12 - July 26)

Helicopter Charter - Bell 206 B
10.8 hours @ \$360.00/hr. \$ 3,888.00

Truck Rental - 1979 GMC 4 x 4 ½T
45 days @ \$23.00/day \$ 1,035.00

4. REPORT PREPARATION \$ 400.00

TOTAL: \$11,209.50

STATEMENT OF QUALIFICATIONS

I, Gordon Gibson, with residential address at #201-2020 West 2nd Avenue, Vancouver, British Columbia, do hereby certify that:

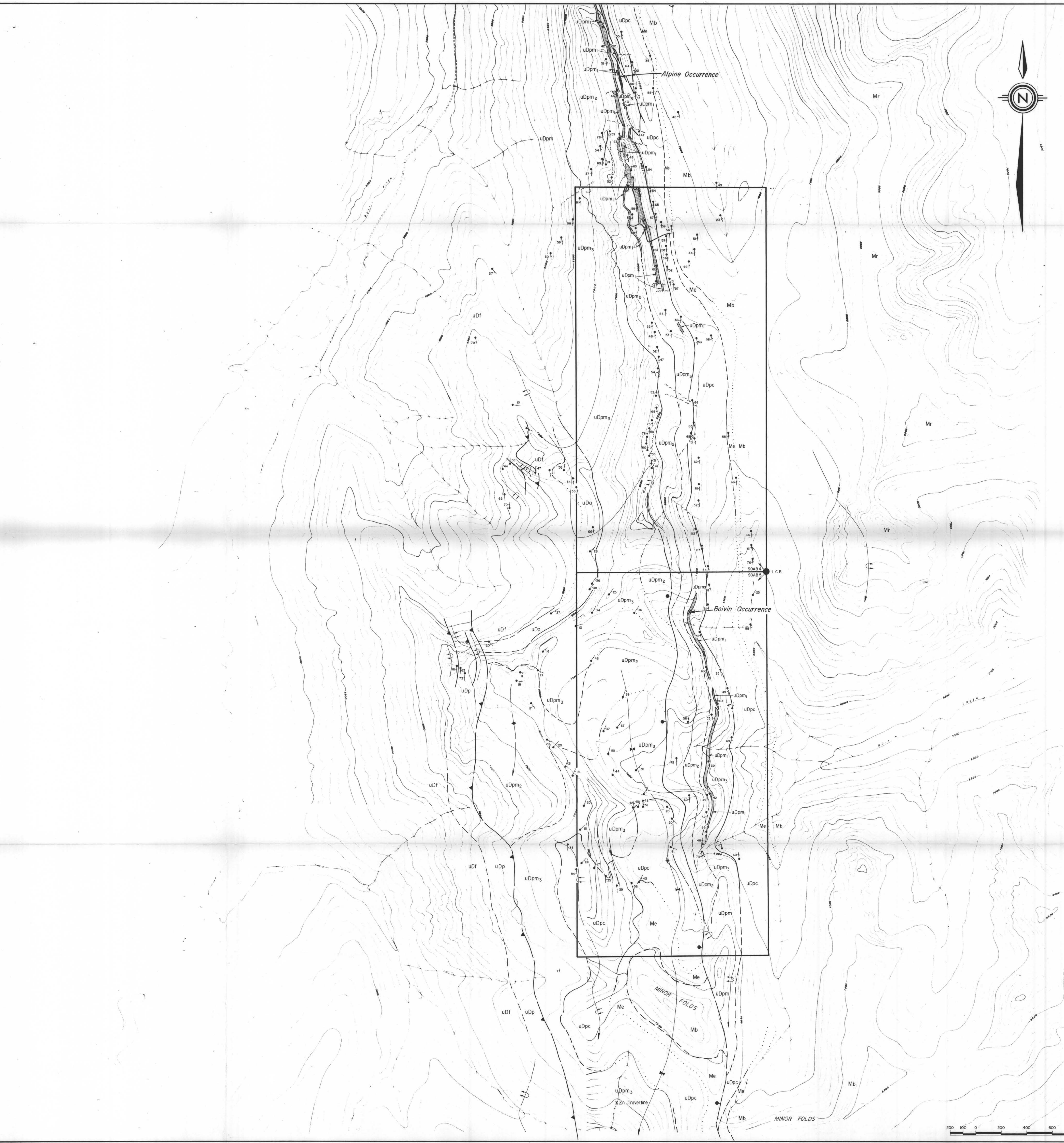
1. I am a geologist in the employ of Silver Standard Mines Limited, of 904-1199 West Hastings Street, Vancouver, B. C., V6E 3V4.
2. I am a graduate of the University of British Columbia with a Bachelor of Science degree (1975).
3. I have practiced in the field of mineral exploration since 1975.
4. I am a member of the Candian Institute of Mining and Metallurgy.

Respectfully submitted,

7489

Gordon Gibson

Gordon Gibson
Geologist



LEGEND

- MISSISSIPPIAN**
- Mr** RUNDLE GROUP
 - Crystalline LIMESTONE
 - Crinoidal LIMESTONE
 - Mb** BANFF FORMATION
 - Cherty LIMESTONE
 - Calcareous SHALE
 - Crystalline LIMESTONE
- MISSISSIPPIAN / UPPER DEVONIAN**
- Me** EXSHAW FORMATION
 - Black SHALE
- UPPER DEVONIAN**
- uDp** PALLISER FORMATION (undivided)
 - uDpc** COSTIGAN MEMBER
 - Argillaceous LIMESTONE
 - Sedimentary carbonate BRECCIA
 - uDpm** MORRO MEMBER (undivided)
 - uDpm₃** Massive, mottled LIMESTONE
 - uDpm₂** Bedded LIMESTONE
 - uDpm₁** Agal (?) "Zebra" DOLOMITE
 - uDa** ALEXO FORMATION
 - Dolomitic SANDSTONE
 - DOLOMITE
 - SILTSTONE
 - uDf** FAIRHOLME GROUP
 - LIMESTONE
 - SHALE
- STRUCTURAL FEATURES**
- BEDDING - inclined, overturned, vertical, horizontal (circle indicates location of measurement)
 - ANTICLINE, SYNCLINE - Upright (arrow indicates direction of plunge)
 - ANTICLINE, SYNCLINE - Overturned
 - THRUST FAULT (teeth on upward side)
 - NORMAL FAULT (circle on downward side)
 - Minor cross-cutting FAULT
 - GEOLOGICAL CONTACT - Defined, approximate, assumed
 - Zinc Occurrence
 - Claim boundary (circle indicates Legal Corner Post)

7489

Gordon Gibson
Oct 04/1979

To accompany Assessment Report on
SQAB 4,5 claims, Fort Steele M.D.
by G. Gibson October 04/1979

| | |
|---|------------------|
| REVISED | |
| GEOLOGICAL PLAN SOAB 4,5 CLAIMS | |
| SURVEY BY: G. Gibson | DATE: Oct., 1979 |
| DRAWN BY: Altair/g.m.b. | SCALE: 1/10,000 |
| SILVER STANDARD MINES | |

