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THE SHEEP CREEK GOLD CAMP

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### INTRODUCTION

The Kootenay Arc is a curving structural belt of early Paleozoic sediments flanked by the Mesozoic Nelson Plutonic belt on the west, and underlying late Pre-Cambrian Belt Supergroup quartzites and argillites to the east.

In the Sheep Creek camp these sediments are metamorphosed argillaceous quartzites of the Quartzite Range Formation, which is overlain by an argillaceous unit called the Reno Formation. The Quartzite Range Group is further subdivided into the Motherlode, Nugget, (and Nevada members), and the whole assemblage has been tightly folded into two parallel north-south trending overturned anticlines with an intervening syncline.

#### A. Structure

The fold axes strike N8-12° E, and axial planes dip 50° E, (with much shallower dips at lower horizons), and they have a gentle plunge 5-10° to Sth. The whole package has been intruded by several granite stocks, an elongate swarm of quartz porphyry sills, and lamprophyre dikes.

The core of the western anticline, is the highly productive Upper Nugget Quartzite. The vertical range through which vein fractures are known to occur exceeds 1400 m, with individual veins extending to depths of up to 600 m within these fractures.

Because the core of the western anticline is the Navada-Nugget member, (which is the most productive), its crest defines the upper limit of the productive horizon. Both anticlines plunge gently to the south, and so of course does the productive horizon. The Navada rocks, (sometimes grouped with the Nugget member), are last seen at an elevation of approximately 4700' in the southern end of the camp, and the Nugget rocks are last seen about 3800' elevation.

B. Ore Hosts

The veins tend to be found in NE trending faults where they intersect particular stratigraphic units of the Quartzite Range Formation as the faults cross the axes of the two anticlines.

The veins are most productive in the quartzite members, although the Reno Mine carried ore in conspicuously metamorphosed argillite.

The principal ore hosts are the Upper Navada Quartzite, the Lower Navada argillite, and, (best by far), the Upper Nugget massive quartzite. (The Middle Nugget argillaceous quartzite, Lower Nugget argillite, and Motherlode massive quartzite all hosted ore on the eastern anticline, but not on the west). The different beds grade into each other with indeterminate contacts.

The ore zones occupy shear fractures whose north wall in every case has moved east relative to the south wall, by as much as 160 feet and 130 feet on the Yellowstone and Queen respectively; much less on more northerly veins. Vertical movement is unknown. Generally speaking, the veins dip vertically, or steeply south.

Where veins of similar transverse faults occur in the overlying Laib limestone, (as at the Summit), considerable replacement has occurred with much higher lead and zinc content, and the high-grade ore is narrower. By far the majority of the lead and zinc mined in the camp came from the Ore Hill mine, adjacent to the Summit."

C. Veins

Vein widths are extremely irregular, ranging from 6" up to 7', and have been as high as 10' in the Queen Mine. For substantial portions of some faults quartz veining may be absent altogether. Ore occurs in localized shoots within the vein fractures, and large segments of vein ore often uneconomic.

Veins are predominantly milky white quartz, often difficult to distinguish from the enclosing quartzites. In general the vein fractures strike more nearly east at depth, and Mathews, (1955), observed that within favourable wall rocks, and within the favourable depth zone, those parts of

veins striking most nearly east are most likely to be ore-bearing. He also noted that ore-bodies tend to be wider where the strike of the fault is more easterly than usual; however, grade decreases with depth, and with increasing width.

Veins have a distinct regularity within the camp, and fall into 2 groups:

- a) minor veins which often contain up to 40-50,000 tons; and
- b) major veins generally containing 200,000-250,000 tons.

Both major and minor veins occur at regular intervals throughout the camp. (Where irregularity is noted it is probably a result of lack of data). Vein faults are known to occur at regular intervals of less than 500 feet from Reno Mountain in the north to at least Mount Waldie in the south. In the Sheep Creek Mine on the western anticline at least 12 faults are known over a 4500' distance, of which 10 were ore-bearing. The strike of these fractures can vary from 50-90° E, with these numbers being exceeded only rarely for short distances.

D. Mineralization

Mineralization is quartz veins with minor sulphides. The sulphides are pyrite, galena and sphalerite. Pyrite is the most significant sulphide, occurring in sub-parallel stringers, and coarse disseminated sphalerite, galena, pyrrhotite

and traces of chalcopyrite also occur, as do occasional traces of scheelite and indium.

Gold is very fine-grained, usually no more than 30 microns in diameter, and normally best gold values occur where base metal grades are high, but galena and sphalerite are present in commercial quantities only where the veins are in limestone.

The original discovery in the camp took place near the turn of the century and total production from 1900 to 1951 was 1,715,875 tons grading 0.43 oz/ton gold, ( with minor silver, lead and zinc values). It is interesting to note, also, that the very high silica content of these ores has been an asset in that credits have been earned at the Cominco smelter in Trail where it is valuable as flux in their smelting operation.

John Murray

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TABLE 5 SEDIMENTARY UNITS

Correlation of Sedimentary Rocks

| Walker (1934)  | McGuire (1942)   | Mathews (1950)  | Park and Cannon (1943) |
|--|--|---|------------------------|
| Pend d'Oreille series:<br>Lower part.                            | Pend d'Oreille series:   | Laib Group (1,000 ft. +). <sup>a</sup>  | Maitlen phyllite.      |
| Reno formation.  | Reno series:<br>Reno argillite.                                    | Reno formation (50 to 900 ft.). <sup>a</sup><br>Upper Reno.<br>Lower Reno.                                |                        |
| Quartzite Range formation. <sup>1</sup><br>(Quartzite 2,600 ft.) | Reno quartzite.<br>Reno argillaceous quartzite.                    | Quartzite Range formation (2,000 ft. ±). <sup>a</sup><br>Nevada member:<br>Upper Nevada.<br>Lower Nevada. | Oppy quartzite.        |
| (Argillaceous member 200 ft.) <sup>1</sup>                       | Nugget series:<br>Nugget quartzite.<br>Nugget argillite.           | Nugget member (540 to 900 ft.):<br>Upper Nugget.<br>Middle Nugget.<br>Lower Nugget.                       |                        |
| (Massive white quartzite 1,600 ft.) <sup>1</sup>                 | Motherlode series:<br>Motherlode quartzite.<br>"Basal" argillites. | Motherlode member (1,000 to 1,100 ft.):<br>Upper Motherlode.<br>Middle Motherlode.<br>Lower Motherlode.   |                        |
| Three Sisters formation.   |  | Three Sisters formation (500 ft. +). <sup>a</sup>   |                        |

<sup>1</sup> Thickness in the type locality, 3 miles east of the Sheep Creek camp.

<sup>a</sup> Thickness or range of thickness in or adjacent to the Sheep Creek mines.

Table of Formations

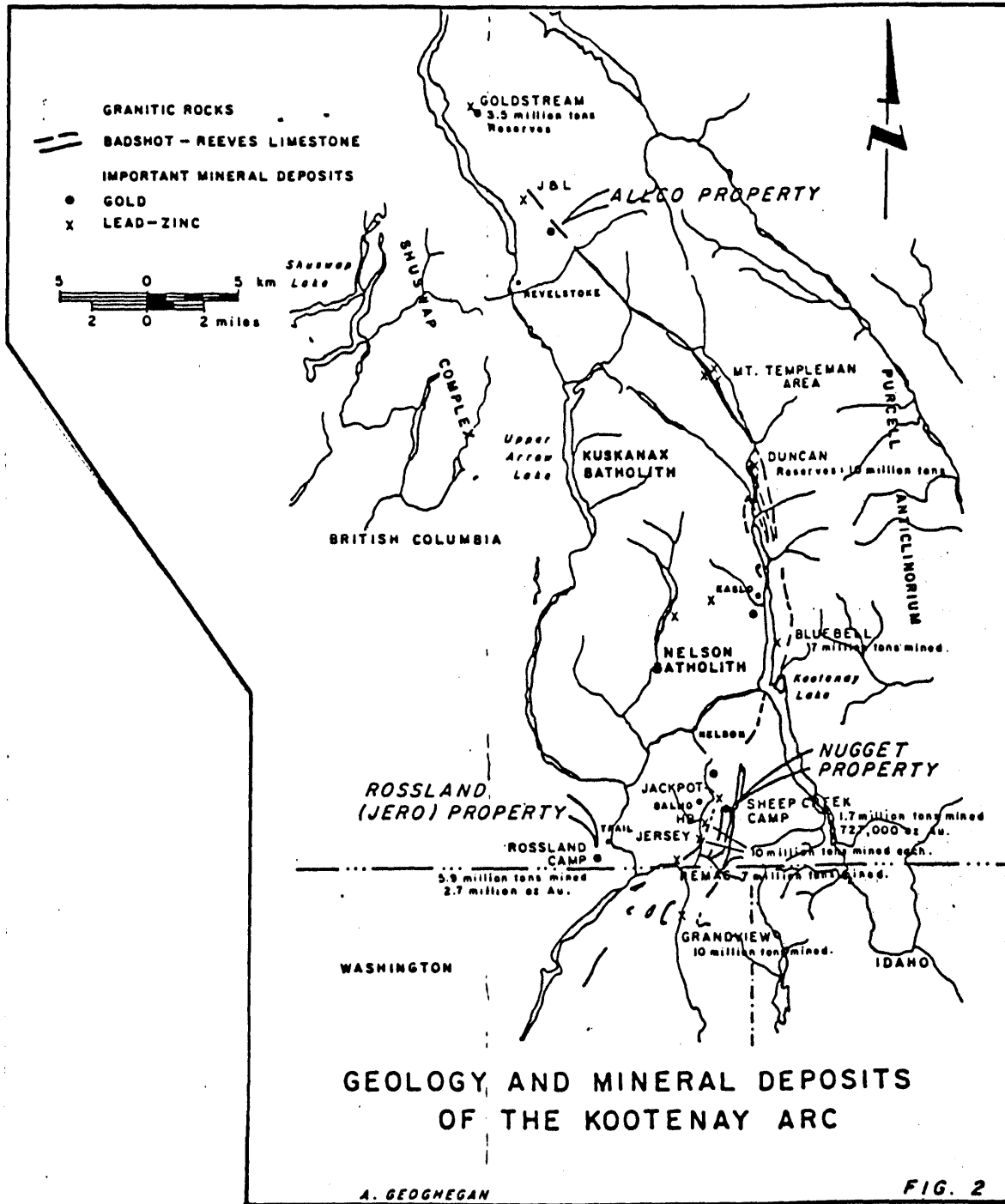
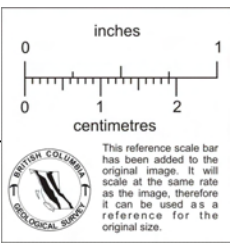
| Age                     | Formation                 |                   | Lithology   | Thickness in Feet   |                     |         |
|-------------------------|---------------------------|-------------------|---|---|---------------------|---------|
| Lower Cambrian          | Laib Group                |                   | Argillite.  | 200 <sup>1</sup>  | 1,000+ <sup>1</sup> |         |
|                         |                           |                   | Grey limestone.   | 150 <sup>1</sup>  |                     |         |
|                         |                           |                   | Argillaceous in some localities, elsewhere dominantly calcareous.             | 300-500 <sup>1</sup>                                      |                     |         |
|                         |                           |                   | Limestone and argillite.  | 150-300 <sup>1</sup>                                      |                     |         |
|                         |                           |                   | Argillaceous beds, biotitic and amphibolitic schists.                         | 100-300 <sup>1</sup>                                      |                     |         |
|                         |                           |                   | Limestone.  | 0-60 <sup>1</sup>   |                     |         |
| Precambrian (?)         | Reno Formation            | Upper Reno        | Impure dark bluish or greenish quartzite with some grit beds.                 | 125 <sup>a</sup>  | 50-900 <sup>1</sup> |         |
|                         |                           | Lower Reno        | Argillite, argillaceous quartzite.  | 450 ± <sup>a</sup>  |                     |         |
|                         | Quartzite Range Formation | Nevada Member     | Upper Nevada  | Massive white quartzite.                                  | 20-160              | 120-300 |
|                         |                           |                   | Lower Nevada  | Dark, thin-bedded quartzites and argillaceous quartzites. | 100-140             |         |
|                         |                           | Nugget Member     | Upper Nugget  | Massive white quartzite.                                  | 135-375             | 540-900 |
|                         | Middle Nugget             |                   | White, grey and dark quartzites, dark argillaceous quartzites, and argillite. | 175-300   |                     |         |
|                         | Lower Nugget              |                   | Argillite and dark argillaceous quartzite.                                    | 150-225   |                     |         |
|                         | Motherlode Member         | Upper Motherlode  | Massive white quartzite.  | 370-450   | 1,000-1,100         |         |
|                         |                           | Middle Motherlode | Argillite, grey grit and green schist.  | 50  |                     |         |
|                         |                           | Lower Motherlode  | Massive white quartzite.  | 500-700   |                     |         |
| Three Sisters Formation |                           |                   | Grey grit, white quartzite and grit and green schists.                        |   | 300+ <sup>1</sup>   |         |

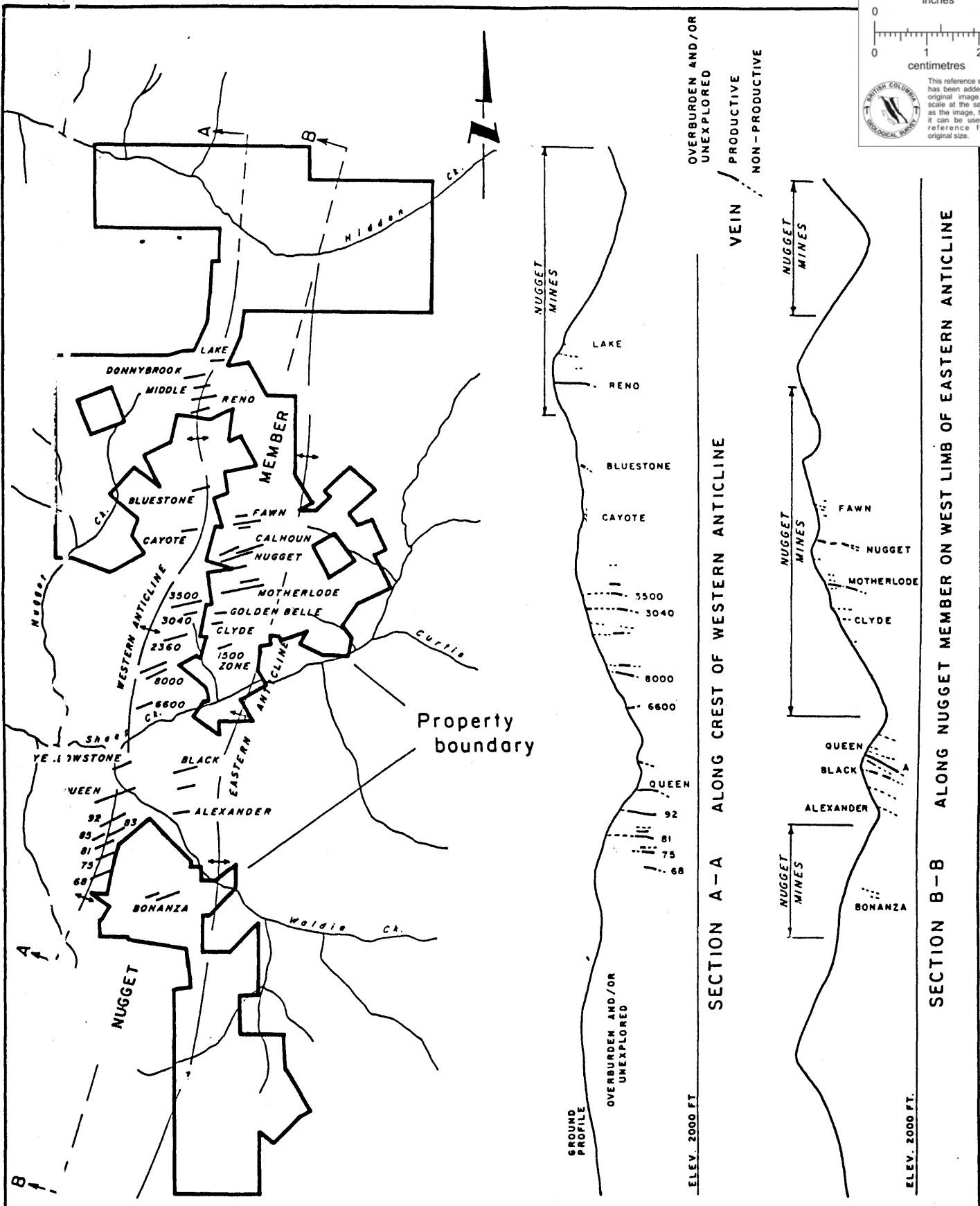
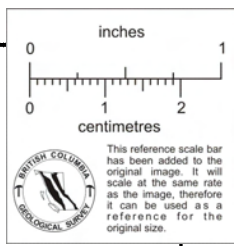
<sup>1</sup> Thickness or range in thickness for the northwestern part of the camp, near the Reno mine.

<sup>a</sup> Average thickness from measurements near Reno mine.

After Mathews (1953)







GUNSTEEL RESOURCES INC. - NUGGET PROPERTY  
 PLAN AND VERTICAL SECTIONS  
 SHOWING VEIN LOCATIONS

A. SEOGHEGAN

FIG. 3