# 6109

GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL REPORT

#### ON THE

WALL PROPERTY

#### by

Ken Ralfs Serem Ltd. October 29, 1976



OWNER:

Eric and Peggy Denny R.R. # 1 Nelson, B.C.

OPERATOR: Serem Ltd. #505 - 850 West Hastings Street Vancouver, B.C.

LOCATION:

Fort Steele & Nelson Mining Division N.T.S. 82 F/10ビ 11 km ENE of Lockhart Creek Provincial Park on Kootenay Lake 49°33'30" N Latitude; 116°39'20" W Longitude



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#### SUMMARY

The Wall property is underlain by Precambrian metasediments of the Mount Nelson and Toby **f**ormations. Within these formations, a buff weathering fine grained dolomite-siliceous limestone unit and a white weathering, bluish-grey recrystallized limestone unit host argentiferous galena, sphalerite, pyrite and argentiferous tetrahedrite discontinuously along quartz-carbonate vein structures.

Geochemical soil sampling has outlined anomalous zones of lead, zinc, copper and silver, some zones coincident with observable bedrock mineralization and other zones covered with overburden. The overburden covered anomalies likely reflect the same style of mineralization found exposed elsewhere on the property.

The magnetometer survey has outlined an anomaly coincident with a magnetite, pyrrhotite bearing resistant foliated greenstone which locally is in contact with the dolomite unit. A horizontal loop electromagnetic orientation program did not respond over known mineralization indicating that the sulphides with good conductivities are either not sufficiently interconnected or lack sufficient strike length to make this method useful on the Wall property.

Results of assaying underground chip samples indicate a lack of disseminated sulphides within the dolomite unit, concentration of sulphides locally within the vein system and local high silver values (up to 123 oz/ton), which do not appear to be in any fixed ratio with either galena or tetrahedrite.

The current exploration program indicates widespread mineralization within the two carbonate units probably reflecting geochemically anomalous concentrations of lead, zinc and silver and that sulphide concentrations, controlled by quartzcarbonate veining, is very localized and does not hold potential for sufficient tonnages on this property.

#### INTRODUCTION

Serem Limited, on behalf of owners Eric and Peggy Denny, operated a geological, geochemical and geophysical exploration program on the Wall property east of Kootenay Lake intermittantly between June 11 and October 7, 1976.

The Wall property consists of nine mineral claims, Wall # 1 to # 9, six mineral leases, Bald Mountain, Montana, Echo, Celebration, Assurance and Experiment and the Montana Fraction, a crown-grant.

The claims are underlain by metasediments of the Precambrian Mount Nelson and Toby formations. Underground development totalling 630 meters were driven during the early 1900's in a buff weathering dolomite unit within the Mount Nelson formation. These workings expose pyrite, galena, sphalerite and tetrahedrite, the major sulphide minerals, with varying amounts of silver determined by assaying chip samples.

Exploration efforts during 1976 were directed toward:

 determination of the existence and extent of stratiform mineralization within the apparently favourable dolomite unit, and

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2. examine the overall potential of the dolomite unit along strike and the potential of a mineralized white weathering, bluish-grey limestone unit on the west side of the property.

To this end 220 man days were spent on both underground and surface exploration.

#### PROPERTY

The Wall property comprises the following mineral claims, mineral leases and crown-grant:

NAME OF CLAIM	RECORD NO.	MINING DIV.	OWNER
Bald Mountain	1 (L.7233)	Fort Steele	Eric Denny
Montana	2 (L.7230)	Fort Steele	Eric Denny
Echo	7 (L.7232)	Fort Steele	Eric Denny
Celebration	8 (L.7229)	Fort Steele	Eric Denny
Assurance	158 (L.7237)	Nelson	Eric Denny
Experiment	159 (L.7238)	Nelson	Eric Denny

NAME OF	CLAIM RE	CORD NO.	MINING DIV.	OWNER
Wall # 1		15538	Nelson	Peggy Denny
Wall # 2	•	15539	Nelson	Peggy Denny
Wall # 3		15616	Nelson	Peggy Denny
Wall # 4		15617	Nelson	Peggy Denny
Wall # 5	i	15618	Nelson	Peggy Denny
Wall # 6	i	15619	Nelson	Peggy Denny
Wall # 7	,	15620	Nelson	Peggy Denny
Wall # 8	ł	15621	Nelson	Peggy Denny
Wall # 9	)	15622	Nelson	Peggy Denny

Montana Fraction L. 7231 Crown Grant Fort Steele

Eric Denny & Peggy Denny

The claims in the Fort Steele Mining Division are believed to be in the Nelson Mining Division. Application is proceeding to have these claims transferred to the Nelson Mining Division.

Eric Denny filed Notice to Group in both Nelson and Fort Steele Mining Divisions October 26, 1976, to group all of the above claims, mineral leases and crown grant into one group.

#### LOCATION

The Wall property, straddling the Nelson - Fort Steele Mining Division boundary, is centered at about 49°33'30" N. latitude and 116°39'20" W. longitude. The claims are 11 kilometers ENE of Lockhart Creek Provincial Park which is on the east shore of Kootenay Lake. The claims are partially bounded on the south by 1a France Creek (Fig. # 1,*p.6-d*)

#### ACCESS

Access is by helicopter or truck. A logging road leaves Highway 3a at Mountain Shores Resort, 7 km. south of Gray Creek and follows the north slope of La France Creek for 10 km.to the property boundary. A good cleared, blazed and flagged trail leads from the road to a cabin located at 2125 m. altitude on the Celebration claim.



#### DESCRIPTION OF WORK DONE AND RESULTS

Personnel employed by Serem Limited were on the property from June 11 to June 26, September 8 to October 7 and intermittantly throughout the summer of 1976 for a total of 220 man days. Most work was done during the June and September periods. The camp was unoccupied between these two periods except for 32 man days spent by Eric and Jack Denny to open the 2310 level portal which appears to have been blasted shut.

Other efforts were directed toward: establishing a metric grid, clearing three portals of snow, surveying previous underground development, chip sampling cross-cuts and drifts, geological mapping, geochemical soil sampling, conducting a magnetometer survey and horizontal-loop electromagnetic survey.

Work was performed on the Wall # 1 to # 4 claims, Echo, Celebration, Montana and Bald Mountain mineral leases and the Montana Fraction crown grant.

#### 1. Grid

The main baseline and grid stations were located with compass, chain, lath pickets and flagging. Baseline stations are 30 meters apart. Cross lines are 60 meters apart with stations every 30 meters.

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Baseline A was located with compass, chain and flagging. Baseline stations are 30 meters apart. Cross lines are 120 meters apart with stations every 30 meters. All grid stations were located using horizontal distances. A total of 10.7 line-kilometers of baseline and cross lines have been established.

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#### 2. Control Survey

A Sokkisha Model TD-60 theodolite was used to survey three levels of underground development totalling 630 meters (Fig. #12, map pocket). The open traverses were by the angle-to-right method using doubled angles. Survey stations were established by hammering spads into cracks in the back. Drift widths were measured at waist height every meter. The three levels were tied together and located relative to a north-south reference line established by Brunton compass between two wooden pegs labelled N and S. The location of these reference posts to the west of the baseline are shown on the geology map (Fig. #5, map pocket) due to the large scale of the composite plan.

#### 3. Geological Survey

#### a) Regional Geology

Late Precambrian sediments of the Upper Purcell and Windermere Series, each characterized by a thick sequence of conformable sediments, occupy a belt some 60 to 100 miles wide paralleling the west side of the Rocky Mountains. The Upper Purcell consists of the Dutch Creek and Mount Nelson Formations, the latter cropping out on the Wall property. The Dutch Creek Formation is conformably overlain by the Mount Nelson Formation which consists of grey, green and black argillites, magnesian limestone, argillaceous limestone and quartzite. The base of the Mount Nelson is marked by a thick band of light-coloured siliceous quartzite and argillaceous quartzite in beds up to four feet thick. The Toby Formation, which also crops out on the Wall property, is the basal member of the Windermere Series and unconformably overlies the Mount Nelson Formation.

#### b) Property Geology

#### (1) Method

Surface mapping was done at a scale of 1 cm = 20 m and controlled by the grid lines. Bedrock exposure at higher elevations is good. Outcrop within the more favourable dolomite unit is fair to poor as shown on the geologic plan (Fig. # 5, map pocket).

#### (ii) Lithology

The main rock types exposed are fine grained argillites, dolomite, locally brecciated, limestones, quartzites and greenstone dykes. Following is a description of lithologic units to accompany the geologic plan.

- Unit 10 ARGILLITE: resistant, black and green weathering, green siliceous argillite.
- Unit 9 LIMESTONE: white and blue weathering, recrystallized bluish-grey limestone, locally brecciated and conglomeratic

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Unit 9 (cont'd) containing mainly quartzite pebbles, cobbles and angular fragments. Composition varies rapidly along strike and 5 km to the southwest on the ridge between La France and Lockhart Creeks the unit is not present. It is likely this unit is part of the Toby Formation.

Unit 8 CONGLOMERATE: brown and green weathering foliated conglomerate with cobbles of quartzite, blue-grey limestone and buff weathering dolomite. Composition varies rapidly along strike.

Unit 7 ARGILLITE: green and black weathering argillite locally containing lenses of calcite up to 1 cm thick.

Unit 6 LAMINATED DOLOMITE: buff weathering, fine grained laminated dolomite with minor interbedded fine grained sucrosic limestone.

- Unit 5 ARGILLITE: black weathering, fine grained resistant green and grey laminated siliceous argillites.
- Unit 4 DOLOMITE: buff weathering, fine grained dolomite grading into siliceous blue limestone at top of unit and also containing calcite cemented dolomite breccia.
- Unit 3 GREENSTONE: green weathering foliated greenstone, locally porphyritic and magnetic.
- Unit 2 ARGILLITE: predominantly brown weathering calcareous argillites with minor members of limestone and muscovite-chlorite argillite.
- Unit 1 QUARTZITE: white weathering, fine grained quartzite with interbedded argillaceous quartzite. This unit is likely the basal member of the Mount Nelson Formation.

### (iii) Structure

The Wall property is on the west limb of a regional anticlinorium. Measurement of structural features on the property indicate an axial plane striking 336° dipping 72° NE. The fold axis plunges 15° toward 341°. Bedding generally strikes northerly and dips moderately to steeply to the west. Dip and strike vary due to a north-south compressive stress which has buckled the units into open "S" shaped folds observable only on a megascopic scale. On both microscopic and macroscopic scale the argillites display isoclinal folding parasitic to the main northeasterly fold and a well developed axial plane cleavage. The more competent dolomites show no sign of folding but are strongly fractured parallel to the axial plane. Orientation of quartz veins, joints and fractures are numerous but strongest development of fractures and quartz veins occur parallel to the axial plane.

#### (iv) Mineralization

Underground and surface examinations have located sulphide mineralization consisting of pyrite, galena and sphalerite with minor tetrahedrite and chalcopyrite. Assays indicate the presence of silver, which is probably associated with both argentiferous galena and tetrahedrite.

Mineralization occurs as fine grained thin discontinuous envelopes on quartz-carbonate veins within the greenstone, dolomite and siliceous limestone. The Mineralization also occurs as disseminated grains and blebs within the veins. Locally within the siliceous limestone the mineralization has a streaked appearance and is associated with intense silicification. Galena and occasionally sphalerite chalcopyrite and tetrahedrite can be found in quartz filled fractures throughout the dolomite, siliceous limestone and white weathering limestone to the west. Mineralization occurs preferentially in the dolomite and limestone units as quartz veins in the argillites are barren. However, all mineralization is localized and discontinuous.

Open space filing is evidenced very locally by coxcomb textures. This and the fact of high silver values does not preclude the interpretation that the mineralization appears to be due to remobilization of syngenetic sulphides rather than hydrothermal.

#### 4. Underground Sampling

Prior to sampling it was necessary to remove snow from two portals and remove blasted rock and timber the middle portal.

Intensive sampling of the crosscuts was undertaken to determine the extent and grade of disseminated mineralization in the dolomite and siliceous limestone which were originally hoped to contain potential low grade stratiform mineralization.

A total of 95 chip samples and 2 selected grab samples were obtained using a single jack, moil and plastic sheets to ensure inclusion of fines in the sample. Most samples were 2 meters long and about 2 cm wide and deep. A composite plan of the three levels shows sample numbers and locations (Fig. # 6, map pocket). Assay results for Pb and Zn, in %, and for Ag, in oz/ton, are shown on Figure # 7 in the map pocket.

Assays were done by Min-En Laboratories Ltd. in North Vancouver. The laboratory method used is the same as that described in the section on the geochemical survey with the exceptions that the sample size is minus 100 mesh and an additional digestion is done using hydrochloric acid.

Results show that the dolomite and siliceous limestone are very weakly mineralized except in a few very narrow shears and veinlets. Results from the samples taken across the vein structure in the drifts support underground observations of very localized, discontinuous mineralization.

#### 5. Geochemical Survey

A total of 242 soil samples were obtained at about 30 cm depth from the B horizon using a mattock. Samples were placed in Kraft bags and shipped to the lab for analysis.

Samples were analysed by Min-En Laboratories Ltd, North Vancouver, B.C. Following drying and sieving, one gram of the minus 80 mesh fraction was digested with nitric-perchloric acids, diluted to 10 ml and analysed on a Varian Tectron atomic absorption unit, model AA-5. 181 samples were analysed for Cu, Pb, Zn, Ag and 61 for Pb and Zn. Sample locations and analytical results in ppm are shown on Figures # 8 - 11 in the map pocket. Statistical treatment of results was done using the method of Lepeltier (Economic Geology, Vol. 64, 1969, pp. 538 -550). This method allows a lognormally distributed population to be displayed graphically as a straight line by plotting the cumulative percent frequency on logarithmic-probability paper. Graphs of the Cu, Pb, Zn and Ag distributions are included as Figures # 2 and # 3, pages 18 and 19.

That portion of the samples with higher values due to mineralization are labeled on each graph. In all cases but copper the part of the population reflecting mineralization contains over 16% of the values. (16% is that part of the population greater than the mean plus 1 standard deviation.) Therefore threshold for Pb, Zn and Ag was chosen to be at a cumulative % frequency of 16% and for Cu at the break of slope or 10% cumulative % frequency.

From the graph the thresholds for Cu, Pb,Zn and Ag are 60, 150, 440 and 16 ppm respectively and these values have been used to contour the geochemical plans.

The anomalous zones indicate the favourability of the dolomite unit. There is good correlation of Pb, Zn and Ag anomalies with lesser correlation with Cu. They also





accurately reflect areas of known mineralization and it can be assumed that the anomalous zone at line 24 N 60 E, which is completely covered by overburden, reflects mineralization similar to that observed elsewhere within the dolomite unit.

## 6. Geophysics

#### a) Magnetometer Survey

A magnetometer survey was conducted with a McPhar GP-70 proton precession magnetometer. This instrument measures the relative intensity of the total magnetic field in gammas. Readings are displayed on a digital readout. The instrument was operated on rechargeable nickel-cadmium batteries which were recharged nightly to ensure reading repeatability. At each station the consul was oriented grid east, although readings are independent of orientation and temperature, with the sensing head separated a constant distance of 4 feet by use of an attached staff. The instrument was preset for latitude. A total of 215 readings were taken along 5.67 line-km of base and cross lines. Readings were every 30 m with intermediate 15 m readings where required for a more precise definition of anomalies. Each baseline station was established as a base station enabling frequent tie-ins. All readings were corrected graphically for diurnal variation assuming a linear change over time. The relative values plotted in gammas on the magnetometer survey plan (Fig. # 12, map procket) represent the diurnally corrected intensity of the total magnetic field. Note that a constant of 57672 (the lowest reading obtained) has been subtracted from each reading to make presentation of readings more legible. The values have been contoured at 541, 771 and 1000 gammas which are the arithmetic mean, mean plus one standard deviation and mean plus two standard deviation respectively.

A strong magnetic anomaly is present from line 30 N to at least line 36 S and indicates a narrow westerly dipping structure. Outcrop examination indicates that the anomaly is due to a magnetite and pyrrhotite bearing foliated greenstone, unit 3 on geology map. North of line 36 N the discontinuous anomalies are less intense and indicate a steep easterly dip. It is known from good exposure that the greenstone here is continuous,

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so the lack of intensity and continuity is interpreted to reflect a much thinner unit and perhaps more inhomogeneity in distribution of magnetic minerals. On line 36 N no anomalous reading was obtained leaving the possibility that the greenstone responsible for the anomaly on the south end of the surveyed area is a separate lense of greenstone. The overburden in this area of the basin is thicker than adjacent areas and this increased cover could possibly account for a break in the continuity of the anomaly. The author supports the first interpretation, that the southern anomaly reflects a separate greenstone unit. This is also supported by the geology map which shows the northern greenstone unit to be in contact with the dolomite unit and the southern unit to be at least 90 m to the east of the dolomite unit.

#### b) Electromagnetic Survey

A McPhar VHEM unit was used for this survey. A horizontal loop method was used. Transmitter and receiver were moved along the same cross line at a constant 30 m spacing maintained by the interconnected reference cable. The operator of the receiver measured the percent in-phase and out-of-phase components for frequencies of 600 cps and 2400 cps, after ensuring the separation distance was 30 m and that the plane of each coil was contained in one plane which would be horizontal only if both the transmitter and receiver were on a horizontal plane.

A total of 1.5 km of orientation were conducted over known mineralization. Results have not been presented in this report because values did not vary by more than 2 percent which is within the range of error likely to be experienced due to the critical nature of both instrument separation and coil orientation.

The interpretation of these results is that the conducting sulphides are not sufficiently interconnected and not of sufficient strike length to generate a secondary electromagnetic field.

# STATEMENT OF EMPLOYMENT AND EXPENSES

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Name	Address	Dates W On Property	orked Off Property	Total Days	Pay Rate	Employment Expense
Eric Denny	R.R. # 1, Nelson, B.C.	11/6 17/6 - 21/6 25/6 - 27/6 Part of 28/6 10 days in July 12 days in Aug. 8/9 - 12/9 16/9 - 20/9 2/10 - 7/10		46.3	\$60/day	\$ 2,780.00
Jack Denny	R.R. # 1 Nelson, B.C.	11/6 Part of 21/6 6 days in July 4 days in Aug. 8/9 - 29/9 1/10 - 7/10	10/6	41.17	\$60/day	2,470.00
Peggy Denny	R.R. # 1 Nelson, B.C.	11/6 17/6 - 21/6 8/9 - 12/9 16/9 - 20/9		16	\$20/day	360.00
Dan Freeman	c/o Serem Ltd.	11/6 - 26/6	9/6 - 10/6	18	\$800/month	480.00
Dave Pugh	4640 W. 9th Ave., Vancouver, B.C.	11/6 - 30/6	1/6 - 10/6	30	\$1200/month	1,200.00
Ken Ralfs	c/o Serem Ltd.	11/6 - 30/6 6/9 - 7/10	1/6 - 10/6 8/10 11/10 - 13/10 18/10 - 22/10 25/10 - 29/10	76	\$1300/month	3,293.33
Peter Ronning	c/o Serem Ltd.	11/6 - 26/6	8/6 - 10/6	19	\$1300/month	823.33
Peggy Wasyk	Trout Lake, B.C.	22/9 - 28/9		7	\$262.50	262.50
William Wasyk	Trout Lake, B.C.	22/9 - 28/9		7	\$262.50	262.50
v	-				TOTAL	\$ 11,931.66

# Payroll Expense

Temporary personnel Permanent personnel Temporary payroll burden, Permanent payroll burden,	.15 x 7815.00 .75 x 4116.66	\$ 7,815.00 4,116.66 1,172.25 3,087.50	\$ 16,191.41
Accommodation and meals			418.57

Accommodation and means Groceries 4 wheel drive rental Truck operation Supplies & Equipment (actual purchases only) Freight (including shipment of samples) Helicopter Geophysical rentals	884.62 1,763.22 209.86 1,151.51 265.65 1,115.40 490.00
Geochemical analysis (includes preparation charges) Soil geochem. 181 samples @ \$3.40 \$ 615.40 61 samples @ \$2.20 134.20 95 samples @ \$17.00 1,615.00	2,364.60
Bank Service B.C. Telephone Postage Parking Maps Radio crystals, antennae & batteries Duplicating	2.25 203.32 4.10 1.60 6.50 144.66 20.00
TOTAL EXPENSES	\$ 25,237.27

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