→ Dave Heb Please see me 093F/03
821336

Carl E. Nelson
2360 23rd Street
Boulder, Colorado 80304
(303) 939 - 9517

October 11, 1991

Mr. Dave Heberlein
Minnova Inc.
3rd floor, 311 Water St.
Vancouver, British Columbia
V6B 1B8

Dear Dave,

I enjoyed the opportunity to get together earlier this month. Both Wolf and Clisbacko are first rate projects and should provide you with plenty of excitement in the months and years to come. Enclosed is the report that you requested, an invoice and a copy of a paper that I promised on hot spring gold deposits.

During our field tour you expressed an interest in the geochemical data that I had brought along for hot spring deposits of the western United States. I put together a 46 element database for 110 samples from McLaughlin, Buckhorn, Sleeper and Paradise Peak in 1986 and a 24 element database for 213 samples from Florida Canyon, Hycroft, Wind Mountain, Hog Ranch, Quartz Mountain and Hayden Hill in 1990. You are welcome to copies of both databases, including sample descriptions, sample location maps and floppy disks to facilitate data transfer. Cost is US $2352 for the 1986 database and US $1662 for the 1990 database. These funds (equal to one fourth of the analytical costs) will be ploughed back into additional analyses. In addition, I charge a day ($400) to cover my costs for each database. Total cost for both databases is US $4814.

Good luck with your efforts next year. I will look forward to hearing how the projects proceed.

Sincerely,

Carl E. Nelson

A report on the Clisbacko and Wolf properties, British Columbia

prepared for Minnova, Inc.

October, 1991

by:

Carl E. Nelson
2360 23rd Street
Boulder, Colorado 80304
(303) 939 - 9517

A field review of the Clisbacko and Wolf properties was carried out during October at the request of Dave Heberlein, Minnova project geologist. We visited the North area, the South area, Canyon Mountain, the Fishpot claims, the Ridge zone, the Pond zone and the Helipad zone..

All of the areas visited show evidence for felsic intrusive activity. Wolf, Clisbacko and Canyon Mountain are exogenous flow-dome complexes with variable hydrothermal alteration and associated precious metal mineralization. A schematic cross section is provided in figure 1.

I was particularly impressed by the presence of phreato-magmatic eruption blankets. Exposures of up to 4 or 5 meters thickness occur below the Ridge zone, at the Pond zone (Wolf) and in the South area (Clisbacko). They host the highest grade gold values found to date (26 ppm at Wolf, 3 ppm at Clisbacko). These eruption blankets form aprons which surround and are partially overlain by rhyolite flows and domes. Rhyolite-hosted alteration (e.g. the top of the Ridge zone and the North area) consistently runs lower grade.

Phreato-magmatic eruption blankets were deposited as a result of explosive interaction between groundwater and rising rhyolite magma. Pumice fragments and a tuffaceous matrix attest to the contribution of fresh rhyolite magma. Episodically silicified fragments indicate that the hydrothermal system was active at the time of eruption. Similar phreato-magmatic eruption blankets host gold ore at McLaughlin (California) and Santa Rosa (Panama).

I.P./Resistivity helped to locate ore at McLaughlin and may be useful at Wolf and Clisbacko as well. An I.P. section through the center of the McLaughlin deposit is shown in figure 2.

To date, the vents for these eruption blankets have not been located. Vent breccias, since they focus hydrothermal fluid throughput, are likely to be sulfidic, strongly silicified and strongly mineralized. In other shallow epithermal systems, vent breccias consistently host the highest grade ore. However, vents at Wolf and Clisbacko may be partially filled by rhyolite.

A fine-grained, thinly-bedded sediment is exposed below the Ridge zone at Wolf. The unit is altered and (based on fragments in core) locally carbonaceous. Similar sedimentary units are an important ore host at Santa Rosa (Panama) and Pueblo Viejo

(Dominican Republic). This sedimentary section may be part of the pyroclastic apron at Wolf or, it may indicate that the entire Wolf zone (Pond zone and Ridge zone) are inside a crater margin.

The exogenous felsic flow-dome complex with associated pyroclastic aprons is an established setting for epithermal precious metal mineralization. Similar deposits include Hog Ranch and Sleeper in Nevada, La Coipa in Chile, Summitville in Colorado and Quartz Mountain in Oregon. Geochemical data collected at Wolf and Clisbacko attests to the strength of the hydrothermal system and is reminiscent of the stockworks surrounding the Sleeper deposit (see table).

Overall, I am impressed with the gold potential at both a district and a local scale. Wolf is currently the highest priority target. It has the highest gold values, the thickest eruption blanket and the largest areal extent of alteration.

Table
Analytical data for a suite of samples from the Sleeper deposit

Sampleno	Description	Au (ppb)	Ag (ppm)	As (ppm)	Hg (ppb)	Sb (ppm)	Ba (ppm)	Tl (ppm)
124	altered host	480.000	7.700	695.000	1350.000	41.000	1500	2.000
111	altered host	380.000	2.400	344.000	3000.000	18.000	1100	2.400
146	altered host	700.000	10.700	528.000	9000.000	56.000	1400	2.400
204	altered host	25.000	0.700	15.000	2300.000	7.000	190	0.100
158	altered host	110.000	1.000	40.000	3200.000	39.000	930	1.000
167	altered host	180.000	1.000	12.000	2400.000	26.000	590	0.200
128	altered host	10.000	0.250	47.000	150.000	8.000	650	0.100
219	altered host	75.000	3.200	61.000	1300.000	24.000	1200	2.500
164	altered host	40.000	1.100	2.500	2300.000	40.000	1300	1.600
140	altered host	45.000	0.600	100.000	137500.000	63.000	930	3.100
212	hydrothermal breccia	260.000	4.600	290.000	5250.000	40.000	1400	4.100
131	hydrothermal breccia	350.000	1.800	279.000	3550.000	75.000	1400	3.600
184	hydrothermal breccia	150.000	1.300	91.000	4500.000	76.000	970	1.600
109	hydrothermal breccia	130.000	1.400	211.000	2300.000	80.000	360	7.100
197	unaltered host	30.000	0.250	2.500	1500.000	31.000	980	0.100
134	unaltered host	65.000	0.250	2.500	3000.000	69.000	1000	0.400
107	unaltered host	20.000	1.200	39.000	160.000	2.500	250	0.300
217	unaltered host	60.000	1.600	5.000	1300.000	43.000	17000	0.300
129	veins and vein stockworks	720.000	13.400	361.000	4000.000	957.000	1200	6.400
157	veins and vein stockworks	95.000	3.600	323.000	4200.000	60.000	260	2.200
147	veins and vein stockworks	130.000	2.600	142.000	7000.000	74.000	1300	4.200
121	veins and vein stockworks	60.000	1.300	116.000	950.000	51.000	1500	3.300
159	veins and vein stockworks	660.000	10.000	218.000	5000.000	500.000	870	3.000
112	veins and vein stockworks	120.000	10.600	126.000	1650.000	59.000	290	1.200
152	veins and vein stockworks	50.000	1.000	51.000	3500.000	14.000	1200	2.600
215	veins and vein stockworks	360.000	3.300	629.000	3200.000	123.000	1300	3.800
172	veins and vein stockworks	460.000	4.600	284.000	4000.000	121.000	180	4.500

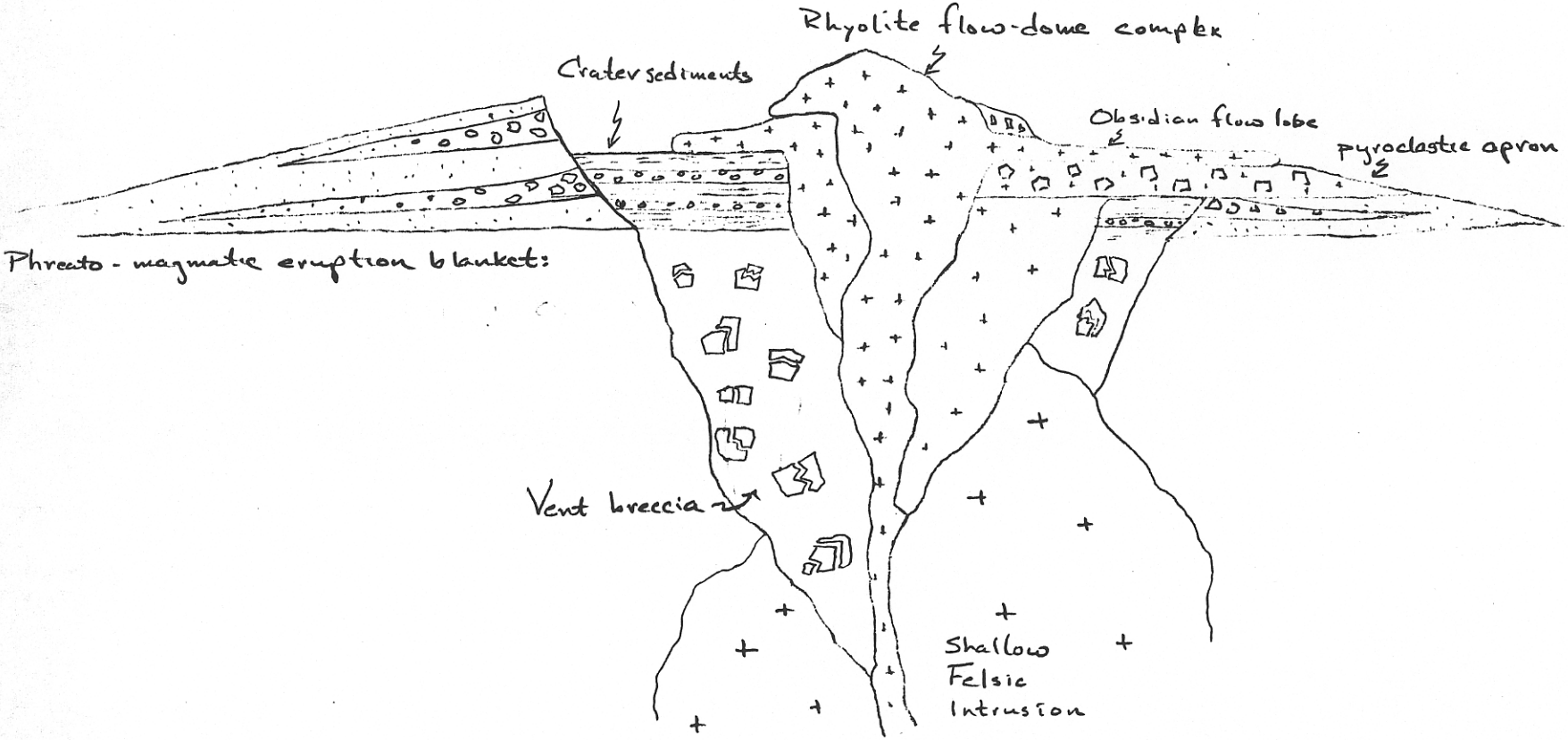

Figure 1

Schematic Section for Wolf, Clisbecko and Canyon Mountain British Columbia

C. Nelson 1991

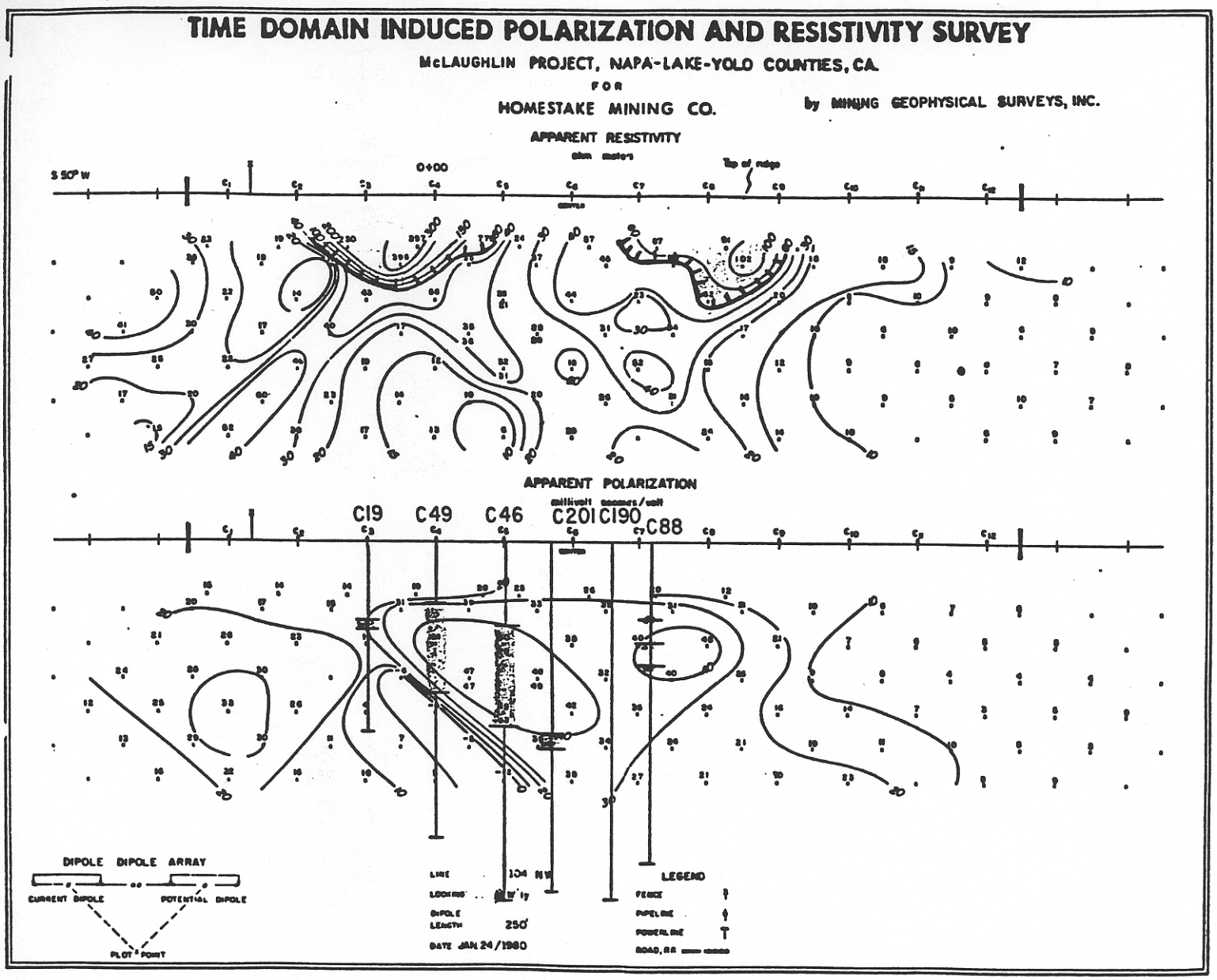

FIGURE 2

Resistivity and Induced Polarization profile
Section 104
McLaughlin Project