TELKWA GOLD CORP.

Exploration of the Del Santo Prospect A Volcanogenic Massive Sulfide Occurrence Near Telkwa, British Columbia

Omineca Mining Division, British Columbia

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December 8, 1998

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SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The Del Santo prospect is a Besshi-type volcanogenic massive sulfide (VMS) copper-silver occurrence in mafic flows, tuffs and sedimentary rocks of the Lower Jurassic Nilkitkwa Formation of the Hazelton Group. VMS mineralization is exposed in backhoe trenches, which were cut in July, 1998, and consists of chalcopyrite, pyrrhotite, pyrite and magnetite with minor amounts of sphalerite. No silver minerals were identified, although silver values are from 2.5 to 4.0 ounces per tonne (70 to 115 grams) for each percent of copper.

The prospect area lies 15 kilometers east of the village of Quick, British Columbia and is accessible by 4WD vehicles during the summer.

Metallic mineralization is strongly bedded and occurs over widths up to 15 meters, although some thickening of beds by folding is noted. Faulting has displaced the beds, and magnetic and MaxMin electromagnetic surveys were employed to trace the bedded massive sulfides beneath the glacial overburden. These surveys show a strong, linear magnetic feature lying west and northwest of the trench area and broader and also linear magnetic features lying east and north of the trenches.

MaxMin electromagnetic surveys identified eleven relatively strong conductors, seven relatively weaker conductors and three dipping conductors. The largest and strongest conductors are linear and appear to be steeply dipping beds which are offset by faults. All anomalies are easily accessible from existing roads and trails.

An exploration program is proposed which is to consist of backhoe trenching of the anomalies, followed by diamond drilling, where drilling is appropriate. The cost of the proposed exploration program is estimated to be, from a minimum of $197,650 to a maximum of $278,350.

Exploration of the Del Santo Prospect
A Volcanogenic Massive Sulfide Occurrence
Near Telkwa, British Columbia
Omineca Mining Division, British Columbia

PROPERTY AND LOCATION

The Del Santo group of mineral claims lies 23 kilometers easterly from Telkwa, British Columbia (Figure 1) and covers a volcanogenic massive sulfide prospect which was discovered and first explored prior to 1915.

Access to the claim area is from Highway 16 (Figure 2) near the settlement, Quick, British Columbia. From Kerr Road at Quick, an improved gravel road traverses easterly to an unimproved 4WD dirt road known locally as, Deception Lake Road. The 4WD road begins at Kerr Road, about 5 kilometers east of Highway 16 and traverses easterly to the Del Santo group, a distance of about 8 kilometers (Figure 3).

The claim area is in the Babine Range and is characterized by low to moderate relief with elevations of 860 to 1460 meters. The main channel of Deep Creek and 3 small tributaries occur on the claims as well as four small lakes, which are from 1 to 7 hectares. Mature stands of spruce, balsam and lodgepole pine cover the area, and according to British Columbia Forest Service maps, are from 100 to 400 years old and from 10 to 28 meters tall.

Glacial drift is widespread and most rock outcrops are glacially polished. Overburden depths vary from a thin edge on higher hill slopes to unknown depths in areas of low relief. Outcrops are rare below elevations of 1380 meters (4500 feet). A layer of heavy, gray to buff-colored glacial clay occurs intermittently throughout the area and is observed to be up to 1 1/2 meters thick at the site of the 1998 trenches, and here it directly overlies massive sulfide mineralization.

HISTORY AND EXPLORATION RECORD

The earliest record of work on the occurrences at Deep Creek is in 1915. In that year the B.C. Minister of Mines noted that claims were staked at Deep Creek. The next mention in the literature is 13 years later (B.C. Min.of Mines, 1928) when it was reported that open cuts were made on pyrite-chalcopyrite occurrences by claim owners, Tom Brewer and Tom Brandon.

Thirty-nine years passed before the next work was recorded, when in 1967, claim owner Mel Chapman cut several bulldozer trenches. Texas Gulf Sulfur Co. (L'Orsa, 1968) optioned the claims from Chapman, and in 1968 conducted a ground magnetometer survey and a limited geochemical soil survey.

The first recorded use of the name, "Del Santo" for the prospects at Deep Creek was by L'Orsa (1968) and subsequently by B.C. Ministry of Energy, Mines and Petroleum Resources in 1969 (GEM, p. 120).

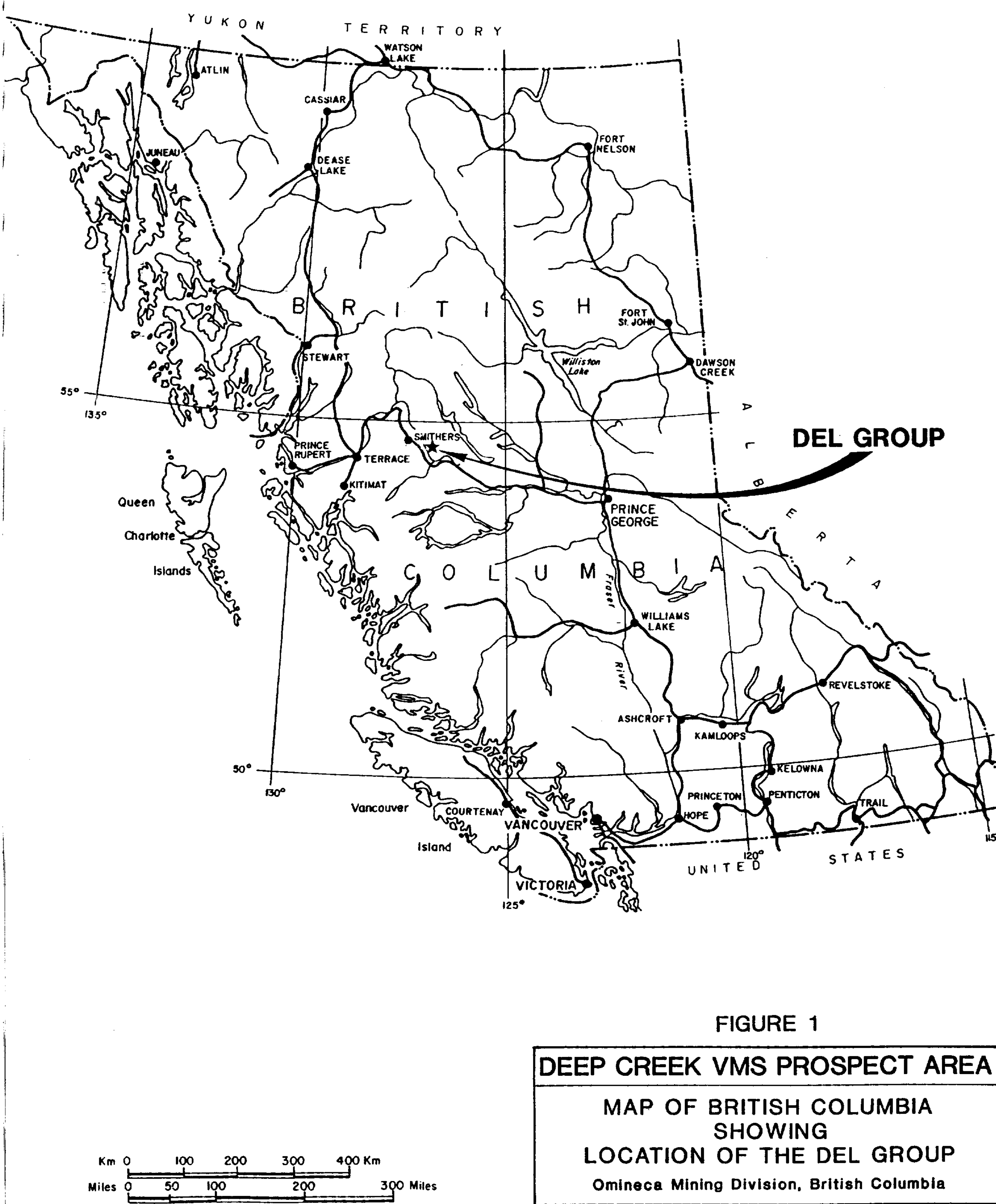


FIGURE 1

DEEP CREEK VMS PROSPECT AREA	
MAP OF BRITISH COLUMBIA SHOWING LOCATION OF THE DEL GROUP **Omineca Mining Division, British Columbia**	
Willard D. Tompson	January 4, 1993

SCALE – 1 : 2 000 000

Kilometres 20 0 20 40 60 80 100 120 140 160 180 200 Kilometres

Figure 2.- Map of Smithers-Telkwa area showing impotrant cultural features and the location of the Del Santo group and the Ken claim.

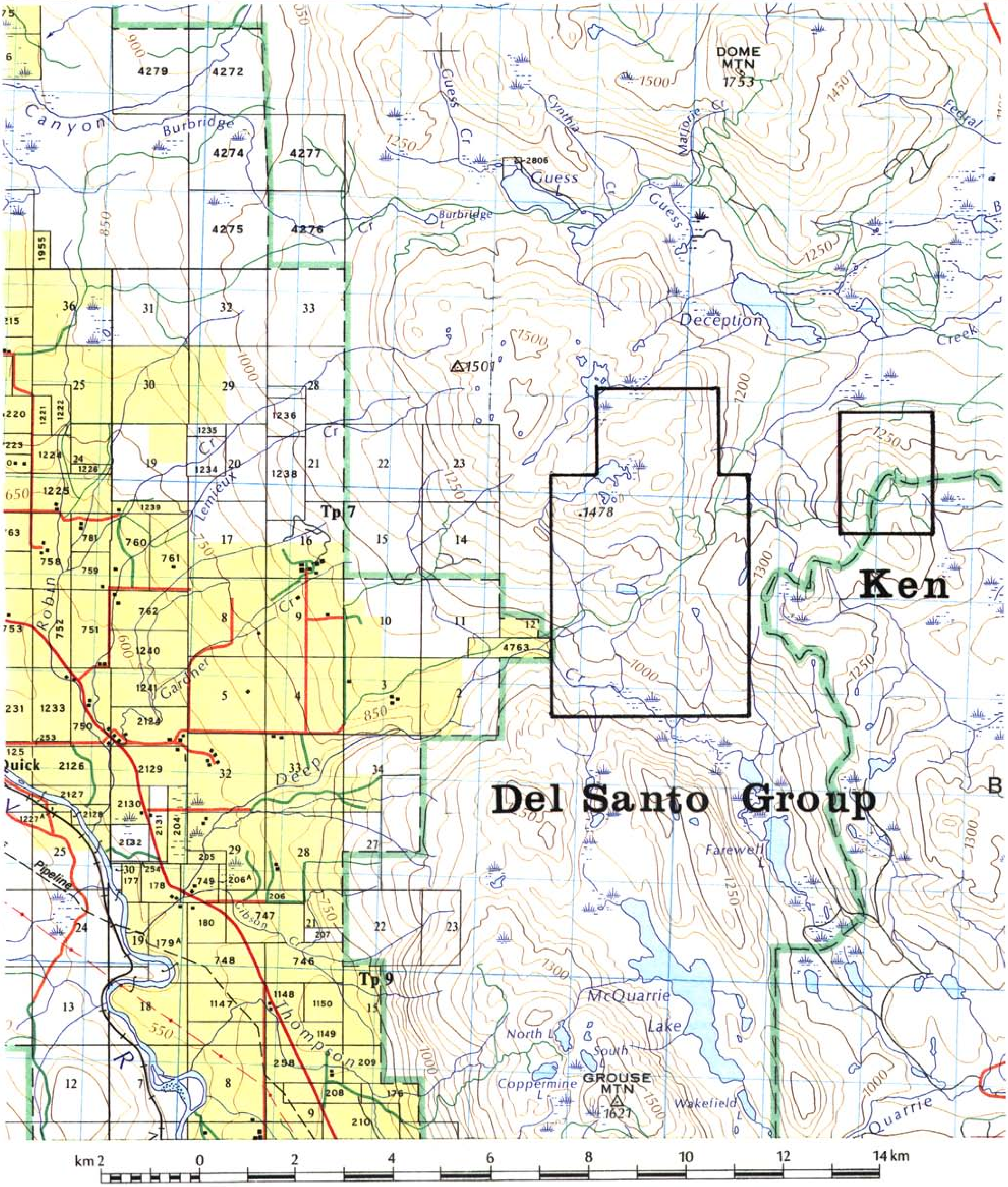


Figure 3.- Topographic map showing location of Del Santo group and Ken claim. Map shows access to claim areas from Highway 16 and village of Quick, British Columbia.

In 1969, Falconbridge Nickel Mines Ltd. optioned the claims from owners, Mel Chapman and Francis Madigan (Brown, 1970; Helgesen, 1970 and Harper, 1970) and in 1969 and 1970 conducted geochemical soil surveys, geological mapping, magnetometer surveys and electromagnetic surveys using a Ronka E.M.-16 and Ronka Mark IV equipment and drilled three short EX diamond drill holes for a total of 129.5 feet (B.C. Dept. Mines GEM, 1969 and B.C. Min. Energy Mines and Petrol. Res.GEM, 1970).

In 1970(?) Bovan Mines Ltd. drilled one BX diamond drill hole from a drill site near the trenched area (D.C.Plecash, personal communication). The hole was drilled to a depth of about 140 feet(?) but no records exist for that hole.

Union Minere Explorations and Mining Corporation, under an agreement with Mel Chapman, cut four bulldozer trenches in 1976 (B.C. Min. Energy, Mines and Petrol. Res., 1976, p. E150) each about 3 by 20 meters and 0.3 meters deep.

Petra Gem Explorations of Canada, Ltd. acquired an option from Mel Chapman and Francis Madigan and staked an additional block of claims contiguous with Del Santo. They conducted geological work (Price, 1979) over the previously-cut grid lines and surveyed the trench area with a McPhar M-700 fluxgate magnetometer and conducted a pulse EM survey over a small (120 by 180 meters) area near the trenches (White, 1978).

In 1979 four diamond drill holes were drilled by D. Groot Logging in the area of the previous work. About 1000 feet (328 meters) were drilled, but no records exist for that drilling.

In 1992, Willard D. Tompson and Alan Burrows acquired the prospects by staking and in 1993 mapped and sampled the old trenches (Tompson, 1993).

CLAIMS

The Del Santo group of claims (Figure 4) is composed of 10 claims, comprising 100 units. A non-contiguous claim, the Ken, lies about one kilometer east of the Del Santo group and consists of 20 units.

Claim Name	Tenure No.	Units	Expiry Date
Del	314603	10	Nov. 10, 1999
Santo	318125	10	June 14, 2000
Grouse No. 1	363353	20	June 8, 1999
Grouse No. 2	363354	20	June 12, 1999
Grouse No. 3	364356	20	June 24, 1999
Grouse No. 4	364355	16	June 29, 1999
Gap No. 1	365143	1	Sept. 1, 1999
Gap No 2	365144	1	Sept. 1, 1999
Gap No. 3	365145	1	Sept. 1, 1999
Gap No. 4	365146	1	Sept. 1, 1999
	Total units	100	
Ken	364540	20	August 6, 1999

The claims of the Del Santo group cover an area of 2500 ha (6178 acres). The expiry dates of all of the claims described above will be advanced as a result of the exploration work which was performed during 1998 and which will be applied as assessment work, according to the Mining Act of British Columbia.

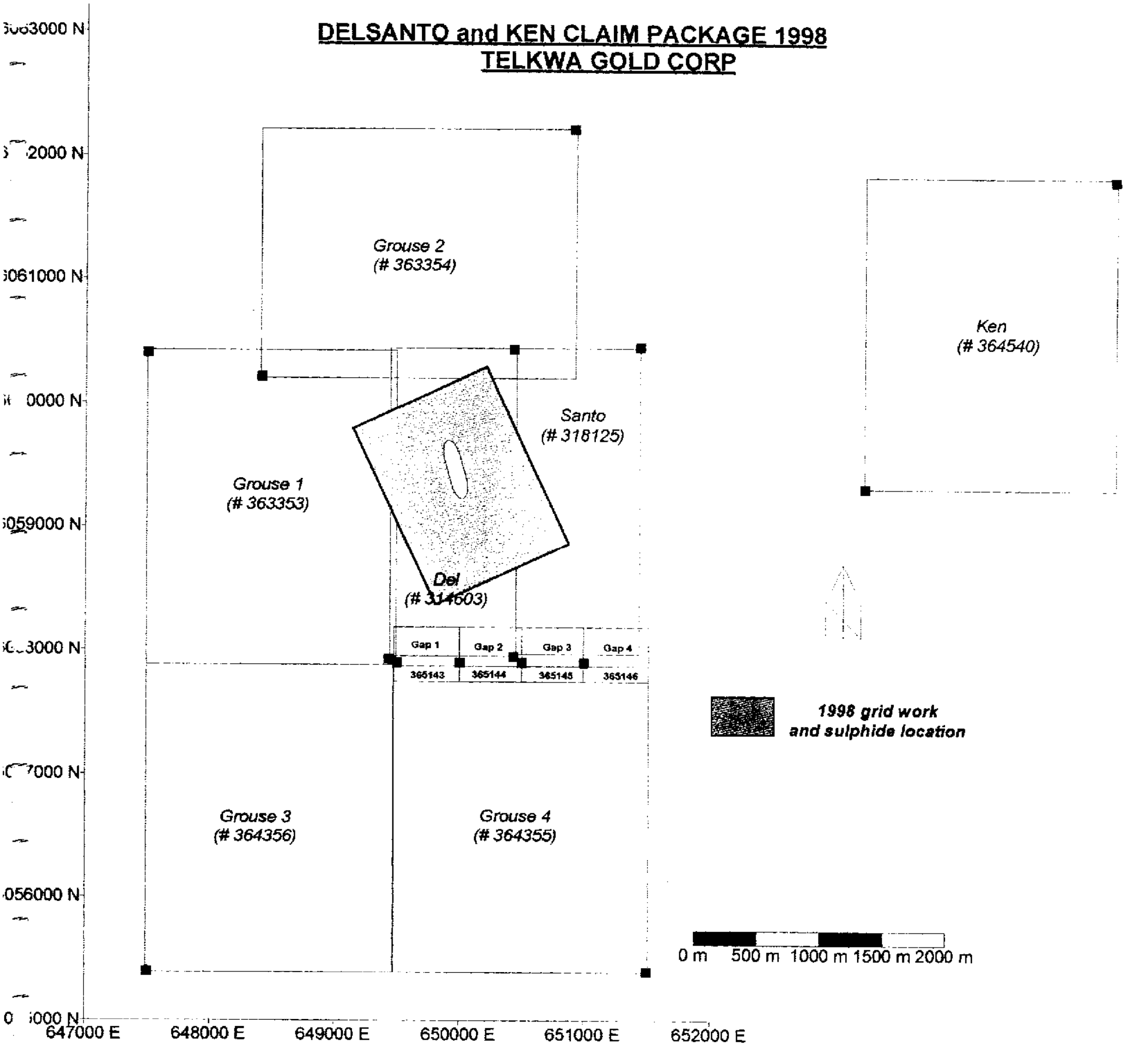


Figure 4.- Claim map of the Del Santo group and the Ken claim.

REGIONAL GEOLOGY

The Del Santo claim group is located in the southern portion of the Babine Mountain Range where the property and surrounding area is underlain by a folded and faulted assemblage of island arc subaerial to sub marine volcaniclastic and sedimentary rocks known as the Hazelton Group. The early to mid Jurassic volcanic and sedimentary rocks were deposited in the northwest trending Hazelton trough and were later bound to the east and west by grabens of younger Cretaceous and Eocene volcanic and sedimentary rocks. The Jurassic Hazelton Group can be divided into three conformable to disconformable formations as described below (MacIntyre,et. al. 1986 and Tipper and Richards, 1976). The rock unit descriptions and rock unit map abbreviations which follow are from MacIntyre, et.al. (1986).

JURASSIC HAZELTON GROUP

Smithers Formation

mJS *Poorly bedded tuffaceous greywacke, cherty siltstone, fossiliferous sandstone and pebble conglomerate. Commonly includes small centimeter scale intercalated felsic intermediate and mafic tuff. This formation disconformably overlies the Nilkitkwa Formation in the northern part of the Babine Range. In the south and west of the range it is generally found to rest directly on the older Telkwa Formation.*

Nilkitkwa Formation

lJN4 *Thin bedded black argillaceous tuff, slates, limy manganiferous shales and siltstone, chert and gray limestone. Zones are locally laminated with light pink manganiferous beds and display highly variable and pervasively mixed and bedded limy, silty and/or cherty zones.*

lJN3 *Tuffaceous conglomerate, fossiliferous siltstone and volcanic wackes. The wackes commonly contain felsic clasts in a silty matrix which may represent erosional debris from the underlying lJN2 and a close proximity to local felsic domes.*

lJN2 *Dacitic to rhyolitic volcanic tuff and flows with cherty slates and siltstone. Generally seen as a 10m to 200m-wide unit of limited strike length. It occurs as localized intermediate flows and ash tuff flanked by associated sedimentary cherts, slates and siltstone beds.*

lJN1 *Maroon and green amygdaloidal mafic flows and tuffs. Highly vesicular in places with calcite/quartz fills and abundant pillow structures. Tuffaceous textures are locally graded and clast size varies from ash and lapilli through agglomerate.*

Subaerial maroon beds are less often phyllitic in composition while deep-water submarine green mafic basalts and andesites are ordinarily pervasively altered to epidote, particularly around meter-scale pillow features. These structures are characterized by intense secondary quartz/calcite fracture fills. Subvolcanic varieties are coarse-grain equivalents of mafic flows and are mildly magnetic. Pervasive mixing of both maroon and green ash tuff is common and highly fractured chlorite schists occur locally in areas near prominent northeast-trending block faulting. Contacts with the underlying Telkwa Formation are conformable to disconformable.

lJNa *Maroon colored varieties differentiated within basalt unit of Nilkitkwa Formation.*

Telkwa Formation

lJT *Undivided phyllitic maroon tuffs, porphyritic andesite, fragmented volcanics and polymictic conglomerate. It is known to be the thickest and most extensive unit within the Hazelton Group.*

Three general ages of granitic to dioritic intrusive dikes, sills and plugs are known to cut the Nilkitkwa and Smithers Formations of the Bulkley Range. Two granitic to dioritic intrusions have isotopic age dates of Cretaceous and Eocene and the dike rocks have chemical and lithological similarities to young Tertiary feeders.

INTRUSIVE ROCKS

Eocene Nanika Intrusives

Tgd *Biotite-rich granodiorite stocks, dikes and sills. Strongly magnetic, unfoliated and generally fine to medium grained (age dated at 47.1 Ma).*

Td *Various unaltered rhyolitic, andesitic and basaltic dikes cut the younger rocks of the Babine Range. They are believed to be possible feeders to Tertiary porphyritic flows in the area.*

Late Cretaceous Kasalka Group (Tahtsa Lake Area)

Kd *Diorite to diabase dikes and sills. Highly magnetic, commonly 1 to 5 meters wide, relatively fresh, dark and fine grained. Some are slightly foliated. Locally intrudes along northwesterly-trending thin limonite/Fe carbonate-altered shear zones in lJN1.*

Recent work has identified most of the argillaceous units of the Hazelton Group. In the Babine Range they exhibit well-developed slaty cleavage that was developed during the Cretaceous Period, into asymmetric and plunging folds, plunging about 30 degrees to the southwest, These folds in turn have been cut and offset by a series of younger northeast-trending block faults which are related to Tertiary extensional movements. It is believed that most of the unit contacts of the Hazelton Group are high angle normal and reverse faults.

LOCAL GRID GEOLOGY

During August, 1998 the main grid (Grid 1) was prospected and mapped in detail by Jim Cuttle (Plate 4) extending 600 meters northwest and 1000 meters southeast from the prospect and trench area and along the suspected extensions of the Del Santo volcanogenic massive sulfide occurrence and extending over a width of more than 1000 meters. In this area outcrops occur along small knolls, steep creek gullies and fault breaks, otherwise most of the wide, low valleys and hillsides are swamp or tree covered, leaving about 10 percent rock exposure. Overburden along the hillsides is very thin and hand trenching is sufficient to locate underlying bedrock. In valleys, overburden is deep and contains considerable heavy glacial clay. Within the grid area two formations of the Hazelton Group have been identified, the Nilkitkwa Formation and the overlying Smithers Formation. The volcanic units of the older and more extensive Telkwa Formation were not identified, although the unit was mapped recently (MacIntyre, 1986) as occurring as extensive fault blocks to the south and east of the grid area. Two and possibly three younger granitic to diabase intrusive events have also been observed cutting the Hazelton rocks.

The Nilkitkwa Formation is known to host several syngenetic and epigenetic mineral occurrences in the Babine Range. It is the dominant formation at and around the Del Santo prospect. The Nilkitkwa Formation is subdivided into four members (MacIntyre, 1986) according to rock type, from the lowermost volcanic members of lJN1 and lJN2 to marine sedimentary environments of lJN3 and lJN4. This transition from a bimodal volcanic environment to a sedimentary environment hosts several base metal syngenetic VMS prospects in the area, including Del Santo, Ascot and Grouse Mountain. It is this environment of lithological change that forms an important prospecting zone and constitutes a broad marker horizon for location of additional copper-silver-zinc ores at and around the Del Santo prospect.

Unit lJN1

A majority of the grid area is underlain with green to lesser maroon amygdaloidal mafic flows, tuffs and agglomerates. They are commonly highly vesicular with calcite/quartz fills and meter-scale pillow structures which are prominently rimmed with epidote. Tuffaceous sections are locally graded, and tops are generally hard to identify, but younging is to the east. Fine tuffaceous material usually forms the matrix of the coarser volcanic rocks. Subaerial maroon beds are tuffaceous and less often phyllitic, while deep water submarine green mafic basalts and andesites are ordinarily pervasively altered to epidote.

Mixing of both maroon and green ash tuff is common. An area of strong pervasive epidote alteration occurs flanking the footwall zone of the main Del Santo prospect, although it is not clear if this is related to mineralization. True bedding is difficult to distinguish, even though ash units appear to strike at about 140° to 185°, with dips moderate to steep to the east.

Unit lJN2

This Nilkitkwa member forms narrow outcrops of more resistant dacitic to rhyolitic (?) members of the upper part of the lower bimodal volcanic sequence. It includes an interfingering of siliceous slates, cherts and ash tuffs, but these are not common. Four locations on the grid were mapped as lJN2 and should be prime prospecting areas for future exploration. Three small, narrow VMS occurrences are in the west of the grid and one thicker occurrence is located in the northeast of the grid. There are faint bedding features in these outcrops, although the westerly contact with the underlying lJN1 mafic volcanic unit and/or the overlying lJN4 unit strikes 155 to 160 degrees. Dips are steep to the east.

Unit lJN4

This important member occurs in four locations on the grid. The thin bedded argillaceous tuff, limy manganiferous shales, cherts and gray silty limestones cap copper-silver mineralization at the Del Santo showings and represent the upper sedimentary member of the Nilkitkwa Formation. Because the manganiferous and silty limestones occur within tens of meters from bedded copper-silver ores, specific unit is probably the best marker horizon on the grid area, for identifying other potential mineralized horizons. Four areas on the grid are underlain with similar rock types and should be prime locations for follow-up geological work. Two occurrences, both with silty limestones are located in the western part of the grid and a third is located 100 meters east of the Del Santo showing. Unit lJN3 has yet to be recognized on the property and this may be a direct result of a lack of outcrop. Unit lJN3 consists of a felsic pebble conglomerate with intercalated volcanic tuff and fossiliferous siltstone. These fossils have helped to identify and correctly position the Nilkitkwa Formation in the current stratigraphic column.

Unit Tgd

Small biotite granodiorite stocks and dikes (Plate 4) occur as north to northwesterly trending intrusive bodies in the southern part of Grid 1 (Main Grid) This unit has recently been age dated (MacIntyre, 1986) at 47.1 ±1.6 Ma suggesting a correlation with Eocene Nanika Intrusives and is most likely not related to Jurassic bedded copper-silver-zinc mineralization at Del Santo. The intrusive unit is generally fresh, medium-grained and dominated with platy biotite. It is highly magnetic and is readily identified with air and ground magnetics.

Unit Kd

Only two small outcrops of this unit were identified on Grid 1 while mapping during the summer of 1998. The outcrops occur as dark, fine-grained, highly magnetic, meter-scale diabase dikes occupying small north to northwesterly shear zones. They are related to the earliest volcanic rocks of the Kasalka Group.

THE VOLCANOGENIC MASSIVE SULFIDE MODEL

Volcanogenic massive sulfide (VMS) deposits are a major source of copper, zinc, lead, silver and gold plus several by-product metals and as a result of their economic importance, have received more attention from geoscientists than any other deposit-type in recent years (Lydon,1988). The geological literature contains more than 5,000 VMS-related articles published during the 1960's to the early 1990's.

VMS deposits form on the sea floor as a result of specialized types of hydrothermal activity which develop in the submarine environment. The discovery of "black smokers" and mound chimney sulfide deposits on the East Pacific Rise in 1977 (Francheteau, et.al., 1979) provided new insights into the mechanisms by which they may form.

VMS deposits are most likely to form in island arcs at plate margins (Franklin, et. al., 1998; Lydon, 1988; Sawkins, 1976 and Sillitoe, 1973): at divergent plate margins; at convergent plate margins and associated with intra-plate oceanic islands.

Hoy (1991, p.89) presents an idealized cross section, which he modified after Hutchinson (1980) demonstrating the various submarine geological environments in which volcanogenic massive sulfide deposits may form. That cross section is reproduced herein as Figure 7.

There are several systems currently in use which permit classification of the various kinds of VMS deposits. These classification are based upon morphology, mineralogy, geological age and kinds of host rocks in which the deposits occur.

Hoy (1991) summarized the characteristics of the several classification systems, and consistent with the findings of other investigators, presents a description of the classifications: Cu-Zn deposits-**Cyprus -type**; Cu-Zn deposits-**Besshi-type** and Zn-Pb-Cu (±Au,Ag) deposits-**Kuroko-type.**

Cu-Zn Deposits-Cyprus-Type

Cyprus-type copper-zinc deposits occur in tholeiitic basalt (basalt poor in olivine and containing orthopyroxene and having a glassy matrix) and were formed in a mid-ocean ridge or marginal basin. The type deposits are those of the Troodos Complex in Cyprus. The deposits consist of a lens of massive, fine-grained pyrite, chalcopyrite and lesser marcasite, sphalerite and galena, occurring in pillow lava, which is commonly overlain by deep-water marine sedimentary rocks.

Cyprus-type deposits are typically underlain by a pipe-like stockwork zone of alteration and mineralization.

Cu-Zn Deposits-Besshi-Type

Besshi-type copper-zinc deposits occur in mafic volcanic rocks and in mafic, water-lain clastic tuffs and sedimentary rocks, interlayered with volcanic flows or sills. These volcanic and sedimentary rocks were deposited in a rift environment near continental margins.

Sulfide mineralization is typically banded pyrite and chalcopyrite with lesser pyrrhotite, sphalerite, magnetite and hematite.

The pipe-like footwall alteration zone which occurs in the Cyprus-type deposits,is poorly developed or absent in Besshi-type deposits.

Besshi-type deposits take their name from the Besshi mine, the largest of more than one hundred mines which occur in Upper Paleozoic volcanic and sedimentary rocks in the Shikoku and Iimori districts of Japan. The Besshi mine produced 33mt containing 2.6 percent copper (Hoy, 1991, p.98), but the type locality Besshi deposits average 220,000 tonnes, containing 1.5 percent Cu and 2-9gpt Ag (Lefebure and Ray, 1995, p. 50).

The Del Santo prospects are classified as "Besshi-Type".

Zn-Pb-Cu (± Au,Ag) Deposits-Kuroko-Type

Kuroko-type zinc-lead-copper deposits are associated with explosive submarine felsic volcanism in arc related rifts, which develop in association with convergent plate margins (Hoy, 1991).

These deposits take their name from the Japanese term, "kuroko" (black ore) (Lambert and Soto, 1974) which consists of sphalerite-galena-chalcopyrite-barite stratiform ore. The type Kuroko deposits occur in the Miocene Green Tuff belt of Honshu and Hokkaido, Japan. The idealized Kuroko-type deposit consists of three zones:"siliceous ore"(keiko) a low grade quartz stockwork zone with pyrite and chalcopyrite; "yellow ore"(oko), consisting of pyrite and chalcopyrite; and overlying massive "black ore" (kuroko), which consists of galena, sphalerite and barite and variable amounts of chalcopyrite and pyrite. This upper lens may be overlain by barite or chert.

THE DEL SANTO VMS PROSPECTS

General Geology of the Prospect Area

The Del Santo prospects occur in the Lower Jurassic (Pliensbachian) Nilkitkwa Formation of the Hazelton Group. Tipper and Richards (1976, p. 9-27) show that the Hazelton Group is an island arc volcanic assemblage which was deposited in the Hazelton trough during Early to Middle Jurassic time. MacIntyre (1986, p. 205) subdivided the Nilkitkwa Formation into four map units: (1) interbeded red epiclastics and amygdaloidal flows; (2) rhyolitic volcanic rocks; (3) tuffaceous conglomerate, cherty tuff and siltstone; and (4) thin-bedded argillite, chert and limestone. The Del Santo prospects occur in Unit 1, the interbedded red epiclastic and amygdaloidal flow unit and/or in Unit 4, the thin-bedded argillite,(which at Del Santo include argillaceous tuffs and agglomerates) chert and limestone unit.

Description of the Prospects

The Del Santo prospects lie along a fairly gentle east-facing slope at elevations, 1270 to 1285 meters. The mineralized exposures occur along a north-south strike length of 110 meters and width of 40 meters. All exposures were produced by trenching, starting from the earliest discovery of pyrrhotite-quartz-chalcopyrite at the sites of present trenches, 98-2 and 98-5 (Plate 1). The earliest (1915) work on what is now the site of trench 98-5, was propably a short trench which was dug following the discovery of mineralized float.

Geology of the Prospects

The area of the trenches is underlain mostly by intermediate to mafic volcanic rocks; a few narrow, thin-bedded limestone beds, minor dacitic and felsic tuff beds and minor and very narrow (1-2m) granodiorite and quartz-dacite porphyry dikes or sills.

The tops of beds were not determined.

Massive sulfide mineralization and disseminated sulfide mineralization occur over widths up to 15 meters. The mineralization is strongly controlled by bedding, with beds dipping mostly at 65 to 75 degrees east. The zone of mineralization and bedding strikes about N. 15° W., but has many flexures (Plate 1). The massive sulfide mineralization appears to be thickened by folding where it is exposed in trenches 98-1 and 98-4 (Plate 1). The axes of minor folds and drag folds plunge 60 to 65 degrees to the east and to the south. An isoclinal synclinal drag fold in the narrow limestone bed in trench 98-4 plunges 60° to the S. 80° E.

Pyrrhotite and pyrite are dominant sulfide minerals, with pyrrhotite commonly in greater volumes than pyrite. Chalcopyrite occurs in nearly equal volumes to pyrrhotite/pyrite in some exposures, but commonly is subordinate to the other sulfides. A pyrrhotite bed of 0.2-0.3 meters thickness in trenches 98-1 and 98-4 (Plate 1) is nearly 100 percent pyrrhotite, but contains scattered masses of chalcopyrite. The pyrrhotite is strongly magnetic, and along with magnetite, which occurs in major to minor amounts throughout the mineralized rocks, should offer excellent opportunities for identifying blind ore zones with a magnetometer.

Host rocks of the strongest massive sulfide mineralization are patchy skarn and banded skarn and are composed of chalcopyrite, magnetite, pyrrhotite, clinopyroxene, epidote, garnet, ankerite, minor quartz and biotite.

Sphalerite occurs in minor amounts in a few places in the trenches.

Pyrolusite is widespread throughout the trench area and most rock exposures display prominent pyrolusite staining. Geochemical values for Mn are commonly >10,000ppm in rock samples from the trench area.

Rhodochrosite occurs in narrow bands in the thin-bedded limestone in trench 98-1. Rhodochrosite mineralization is weak, but the prominent pink color signifies its'presence.

A pale, bluish-white fibrous mineral formed on the surface of the freshly blasted massive sulfide rocks in trenches 98-1 and 98-4, within a few days after the rocks were exposed to the warm, dry summer days of July, 1998. This mineral has not been positively identified, but an initial guess is ransomite, a hydrous copper-iron sulfate [$CuFe'''_2\ (SO_4)_4 \cdot 7H_2O$] (description from Winchell, and Winchell, 1956).

A prominent fault traverses the length of the trenches and apparently has a distinct control on the position of the mineralized beds (Plate 1). The fault strikes about N. 30° W. and dips 45 degrees east and has a sinuous pattern. The sense of displacement on the fault has not been determined.

The strike of bedding is somewhat variable, as the beds are folded, but bedding strikes mostly from north to N. 15° W. and dips from near-vertical to 60 to 70 degrees east.

It is apparent from mapping the trenches that the fault which is described above, has displaced and/or thinned the mineralized zone as it occurs in trenches 98-2, 98-3 and 98-5. It is also apparent that the small granodiorite dike, which is mapped in trenches 98-4 and 98-6 has displaced the mineralized zone in trench 98-6 (Plate 1).

Assay Values in the Trenches

Assay values from trench sampling are variable, with the best results coming from trenches in which the mineralized zone was not displaced by faulting, e.g.,trenches 98-1 and 98-4 (Plates 1 and 3). It is noted that mineralization in trenches 98-1 and 98-4 appears to be thickened by folding.

Only copper and silver values are significant and the best of these are tabulated below. Trench assays are tabulated from northernmost in trench 98-6 to southernmost in trench 98-5 Plate 3). Assays are grouped and weighted and are contiguous, except where mineralized zones are separated by unmineralized rock, as shown on Plates 1 and 3.

Trench Number		Width Interval(m)		Ag(ppm)		Cu(%)
98-6		3.0		14.3		0.09
98-4		3.5		37.3		0.65
		2.0		21.8		0.31
		2.0		10.3		0.21
		1.6		66.8		0.78
		5.0		25.9		0.22
	Total width	14.1m	Avg. Ag	30.5	Avg. Cu	0.50
98-1		2.2		64.1		1.30
		4.0		75.2		0.47
		9.0		154.3		1.00
	Total width	15.2m	Avg. Ag	120.4	Avg. Cu	0.90
98-3		2.3		16.3		0.17
		2.0		11.5		0.08
98-2		7.0		20.5		0.23
		3.0		15.6		0.14
98-5		3.0		22.7		0.40

Several one-meter samples contained good copper and silver values:

Sample Number	Sample Width(m)	Ag(ppm)	Cu(%)
61728	1.0	71.8	0.745
61731	1.0	98.0	1.160
61736	1.0	40.3	0.788
61738	0.5	77.5	1.100
61686	1.0	86.3	0.732
61687	1.0	454.0	3.840
61688	1.0	281.0	2.260
61689	1.0	221.0	1.710
61704	1.0	435.0	3.980
61705	1.0	321.0	2.310
61706	1.0	95.2	1.260
61714	1.0	229.0	1.580

THE 1998 EXPLORATION PROGRAM

Grid Preparation

Two grids were prepared during the summer of 1998; Grid 1, the "main grid" over the known Del Santo copper-silver showing and Grid 2 over a circular airborne magnetic anomaly, which lies about 1.2 kilometers east of the Del Santo prospect (Plate 4). Grid 1 is well cut out and is well marked with picketed base line and grid lines. Line 1 is at the north end and Line 16 is at the south end of the baseline. The base line strikes at azimuth 155 and is 1600 meters long, with grid lines at 100 meter intervals with several infill lines at 50 meters. Grid lines were run 500 meters east and 500 meters west of the baseline. All lines were picketed and marked at 50 meter intervals and many were marked at 25 meter intervals for detailing some of the geophysical survey. Several grid lines were run at 50 meter intervals between the cut grid lines and these were controlled by chain and compass. The infill lines are from Line 0.5 to Line 7 and generally cover the strong magnetic low east of the baseline.

In order to position this grid within the UTM coordinate system, one DGPS location reading was made at Line 7 at the baseline, and other GPS readings were taken along the baseline and at the four corners of the rectangular grid.

North	East	Location
6059500	650000	L7S-B/L
6060040	649750	L1S-B/L
6058686	650382	L16S-B/L
6059830	649300	NW corner grid
6060258	650200	NE corner grid
6058470	649930	SW corner grid
6058890	650835	SE corner grid

Grid 2 is a smaller reconnaissance geochemical grid located in the eastern section of the Santo claim. Its location is shown on the geological map (Plate 4) in this report. The baseline was cut and picketed and grid lines were run with chain and compass, from Line 21 at the north end, through line 27 at the south end and 600 meters east of the baseline. Lines are spaced 100 meters apart and are picketed at 50 meter intervals.

Sampling Procedure

Soil samples were collected at 50 meter intervals on grid lines which are 100 meters apart, on both grid number 1 and grid number 2. Soil samples were collected from the top of the "B" soil horizon. Sample site preparation was done with a mattock and samples were collected with a stainless steel spoon from the face of the fresh cut and were placed in Kraft gusseted sample bags. In instances where the sample site was in a swamp or a peat-covered area, no sample was taken. In rare cases where the sample site was outcrop, rock chips were taken.

Analytical Procedure

The samples were analyzed by MinEn Laboratories, Ltd. (see Appendix III for assay certificates) of Vancouver, British Columbia.

Analyses for Ag, Cu, Pb and Zn are performed on 0.5 grams of the dried, pulverized sample which is digested in an aqua regia mixture, cooled and diluted to standard volume and analyzed by AA

Results of the geochemical survey are displayed on Figures 9 to 12 for grid 1 and on Figures 13 to 16 for grid 2 and on supplemental maps immediately following page 21 (the page which displays Figures 13 to 16).

Geochemical Surveys

Grid 1 (Main Grid)

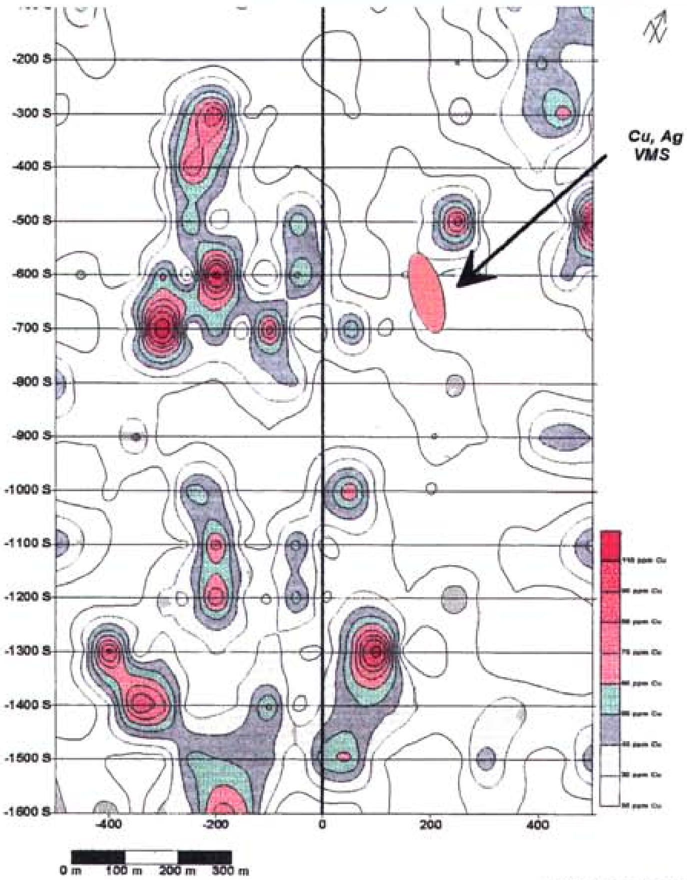
During the 1998 field season a total of 313 soil samples were collected on Grid 1 and analyzed for gold, silver, copper, lead and zinc. Analyses were by MinEn Laboratories of Vancouver, British Columbia. Surprisingly,the survey did not identify any highly anomalous base metal or precious metal anomalies around the Del Santo prospect, except for the sample at L 5-250E. It did however, identify several low amplitude and subtle linear to concentric copper, zinc and silver anomalies away from the known mineralization. It is not clear whether these slightly anomalous zones are a function of different geochemical backgrounds of underlying sedimentary and volcanic rocks or whether mineralization is masked by glacial clay.

A promising, but low order copper-zinc anomaly (Cu up to 110 ppm and Zn to 300ppm) occurs between L3 and L7 at 200 meters west and should be investigated, especially as it occurs in starta similar to strata at the Del Santo prospect (Units IJN2 and IJN4). A second low order copper-zinc-silver anomaly (Cu to 110 ppm, Ag to 1.9ppm and Zn to 160ppm) occurs between L 13 and L 16, on the west side of the baseline. Its form is linear and trends at about azimuth 115°. This anomaly appears to transect the regional strike of the strata and is open and needs to be prospected in detail. Of the 313 soil samples taken from Grid 1, correlation coefficients for the five elements listed below show a positive relationship between lead to zinc and copper to silver (See Figures 9,10,11 and 12).

	Au(ppb)	Ag(ppm)	Cu(ppm)	Pb(ppm)	Zn(ppm)
Au(ppb)	1.00				
Ag(ppm)	0.079	1.00			
Cu(ppm)	<0.003	0.595	1.00		
Pb(ppm)	0.030	0.283	0.362	1.00	
Zn(ppm)	0.065	0.289	0.331	0.910	1.00

Grid 2

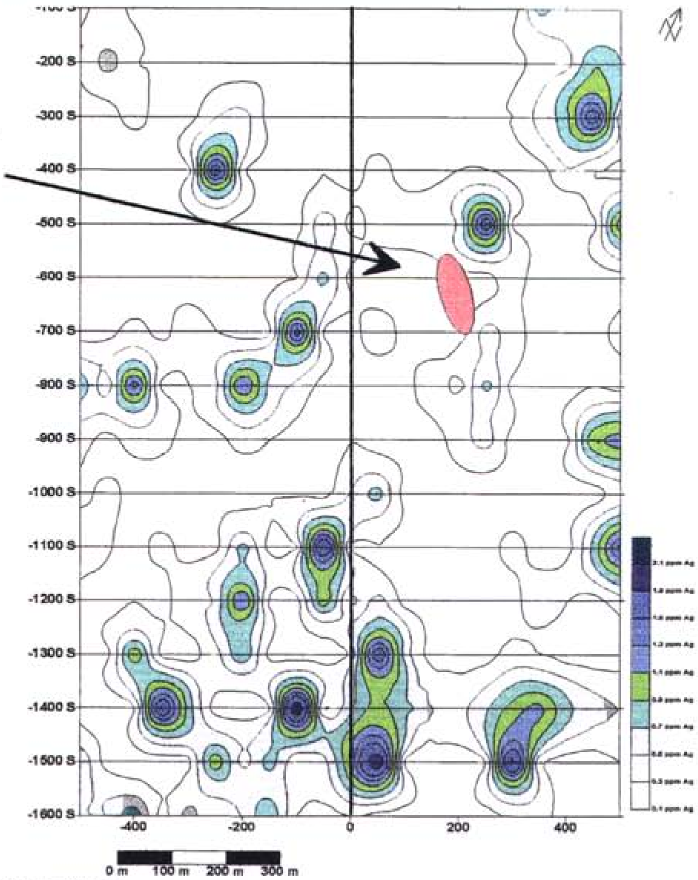
This grid is located on the east side of the Santo claim (Plate 4). Seventy-nine soil samples were collected from the Grid 2 and were analyzed for gold, silver, copper, lead and zinc. Analyses were by MinEn Laboratories in Vancouver. This area was selected for follow-up exploration work because of a significant and promising circular airborne magnetic anomaly (the airborne survey was conducted in March, 1997, Candy, 1997) with a diameter of about 700 meters. Results of this soil survey show a single coincident, low amplitude Cu-Pb-Zn-Ag anomaly (Cu to 90ppm, Pb to 33ppm, Zn to 205 ppm and Ag to 1.7ppm) in an area with little or no outcrop (Figures 13-15). The anomaly is 600 meters north and south and 100 meters wide and is open to the north and south. It is not clear whether this anomaly reflects different geological units or a minerailzed bed. A strong correlation coeffecient exists for all the elements, except gold.



Cu soil geochemistry 1998

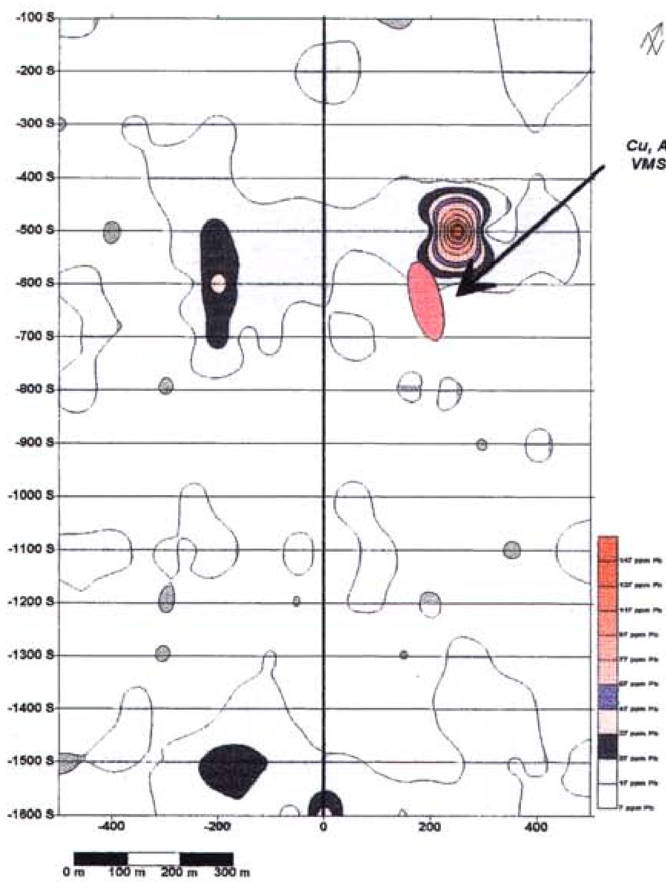
DELSANTO PROPERTY
(Main grid)

Figure 9.



Ag soil geochemistry 1998

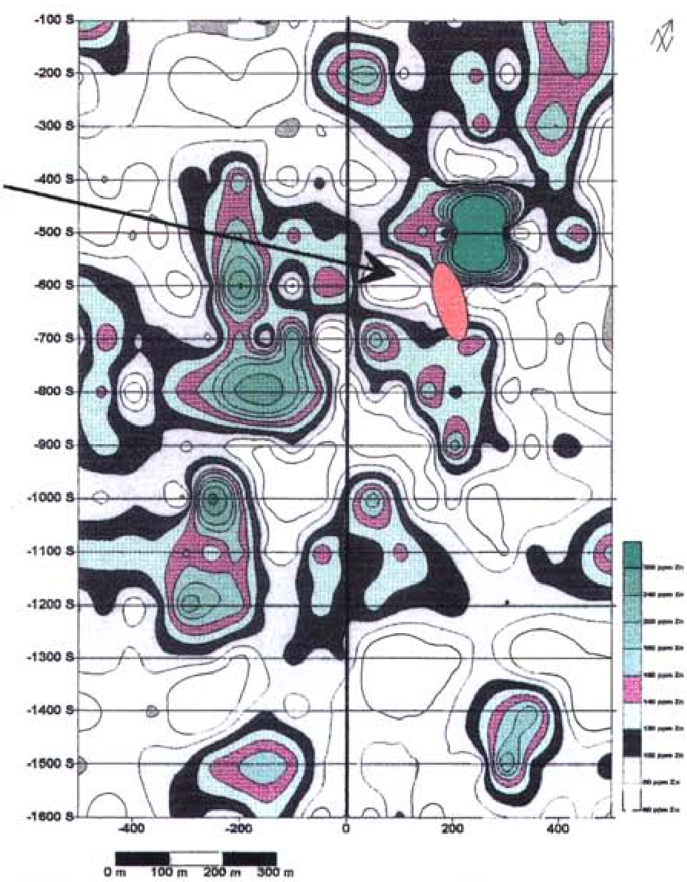
Figure 10.



Pb soil geochemistry 1998

DELSANTO PROPERTY
(Main grid)

Figure 11.



Zn soil geochemistry 1998

Figure 12.

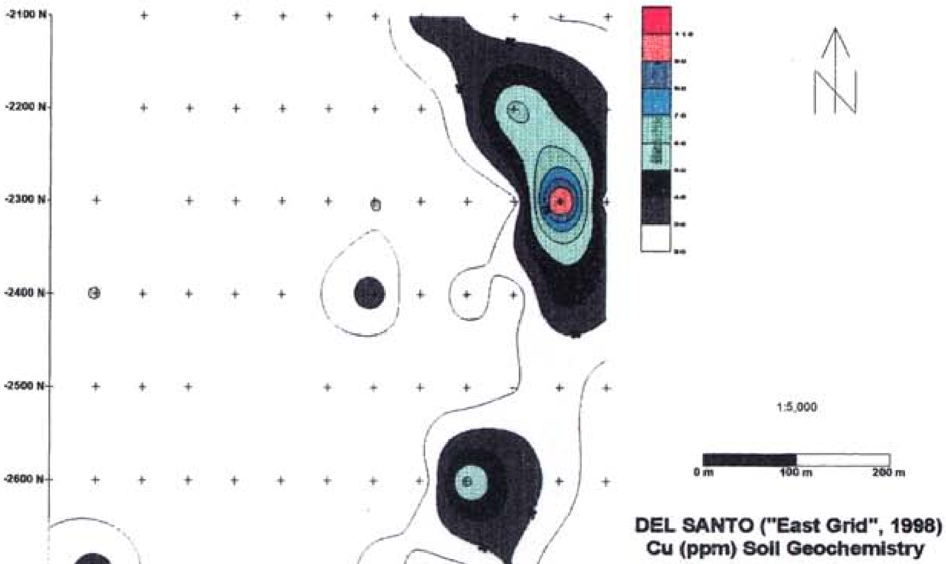


Figure 13.

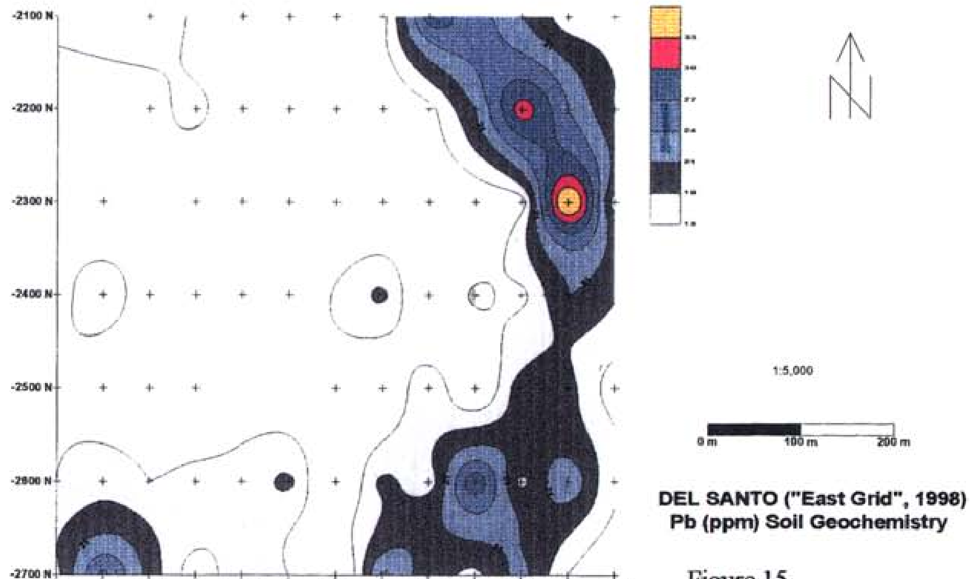


Figure 15.

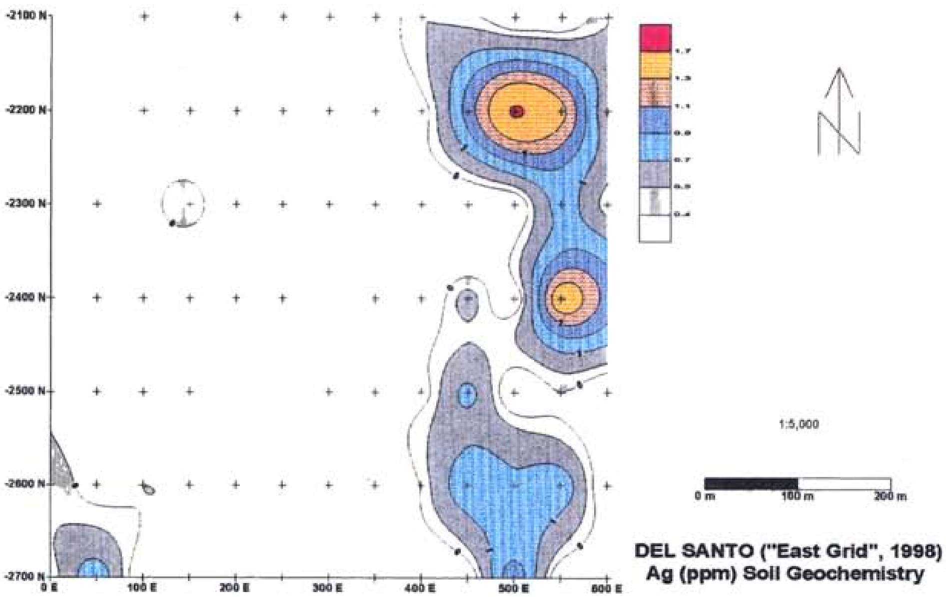


Figure 14.

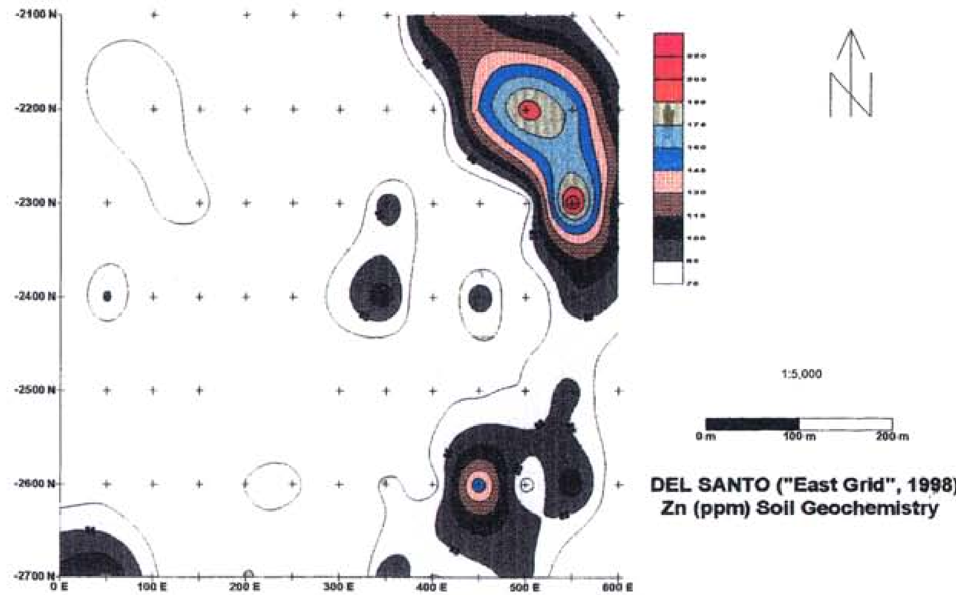
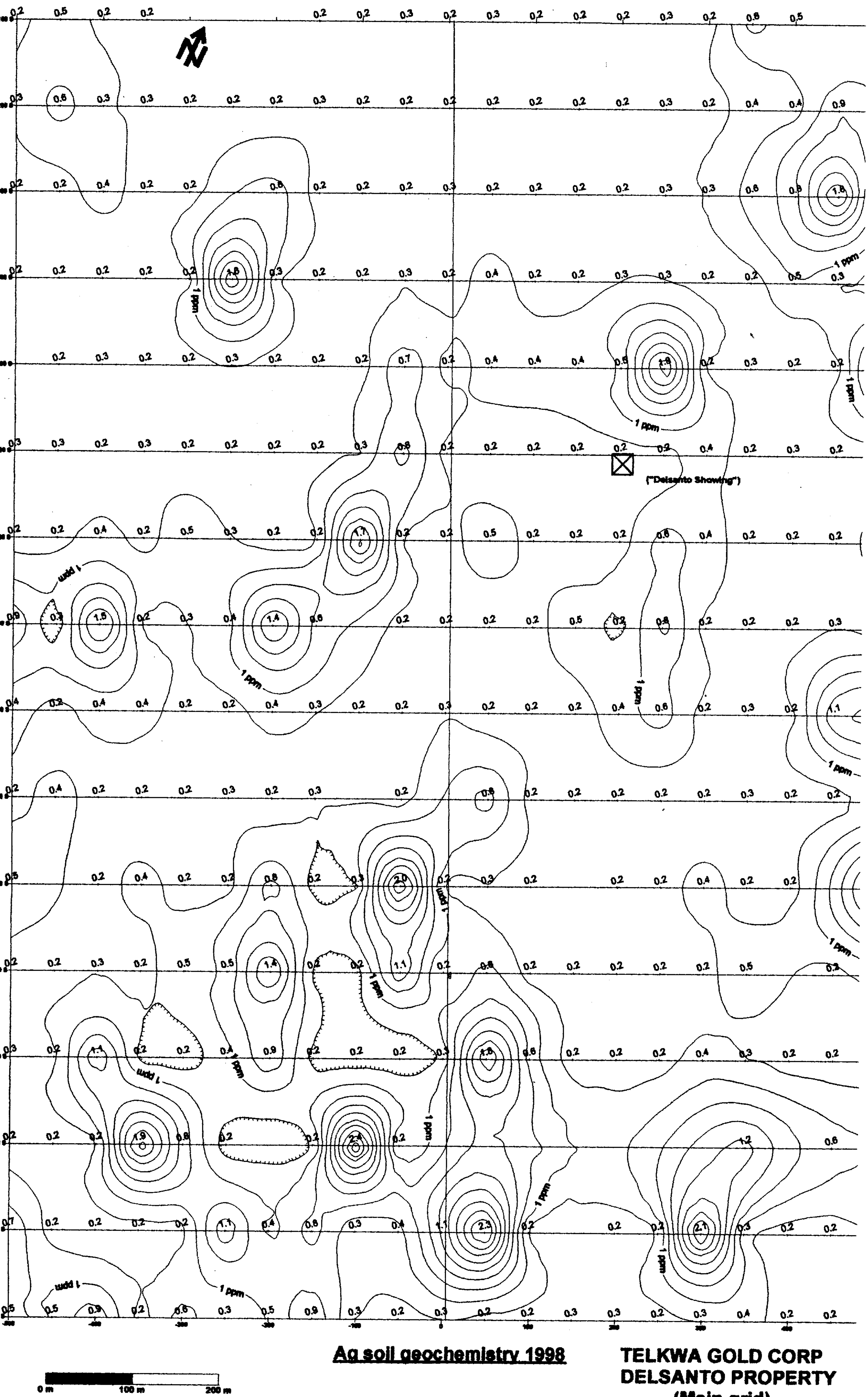
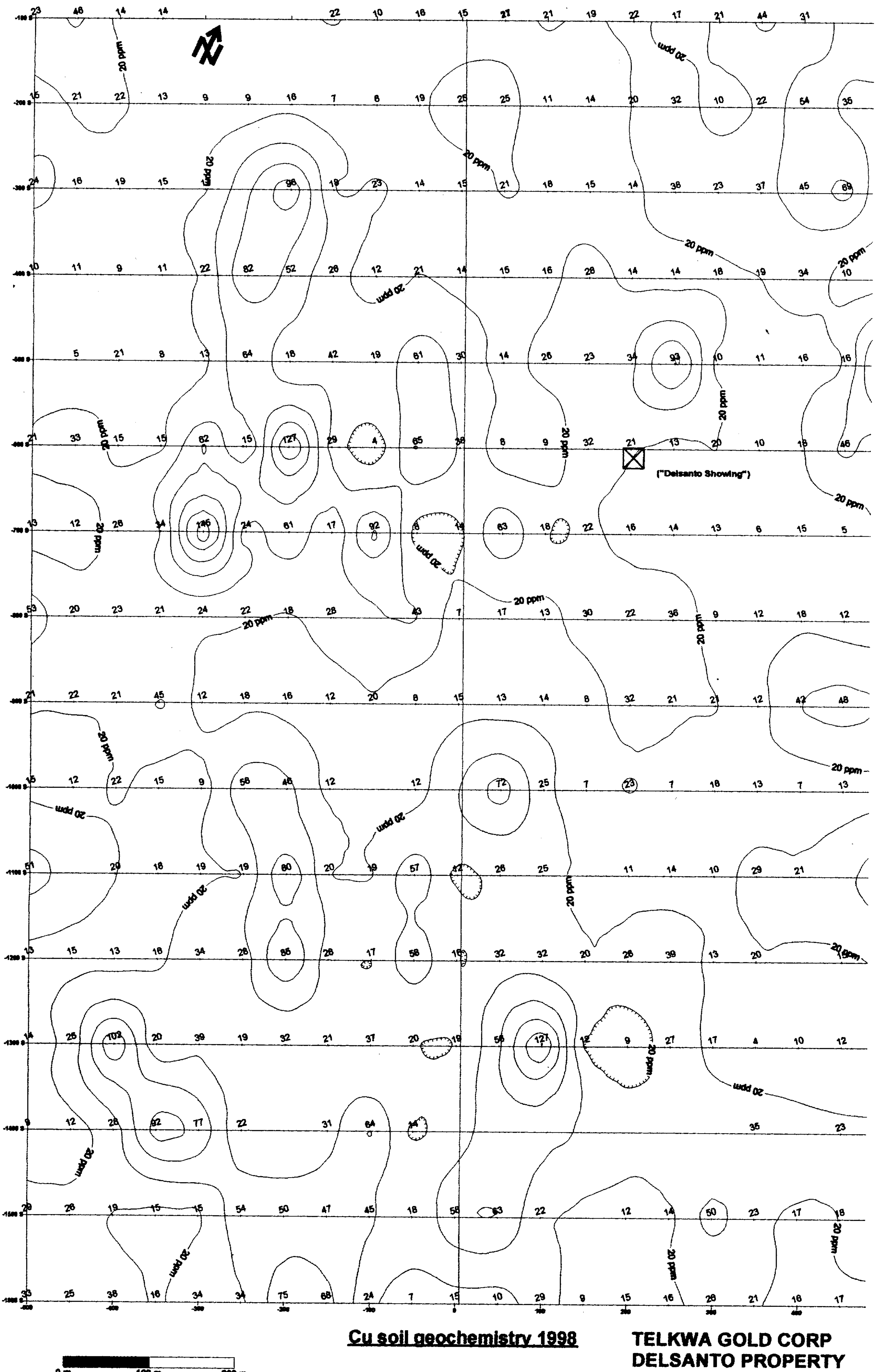


Figure 16.



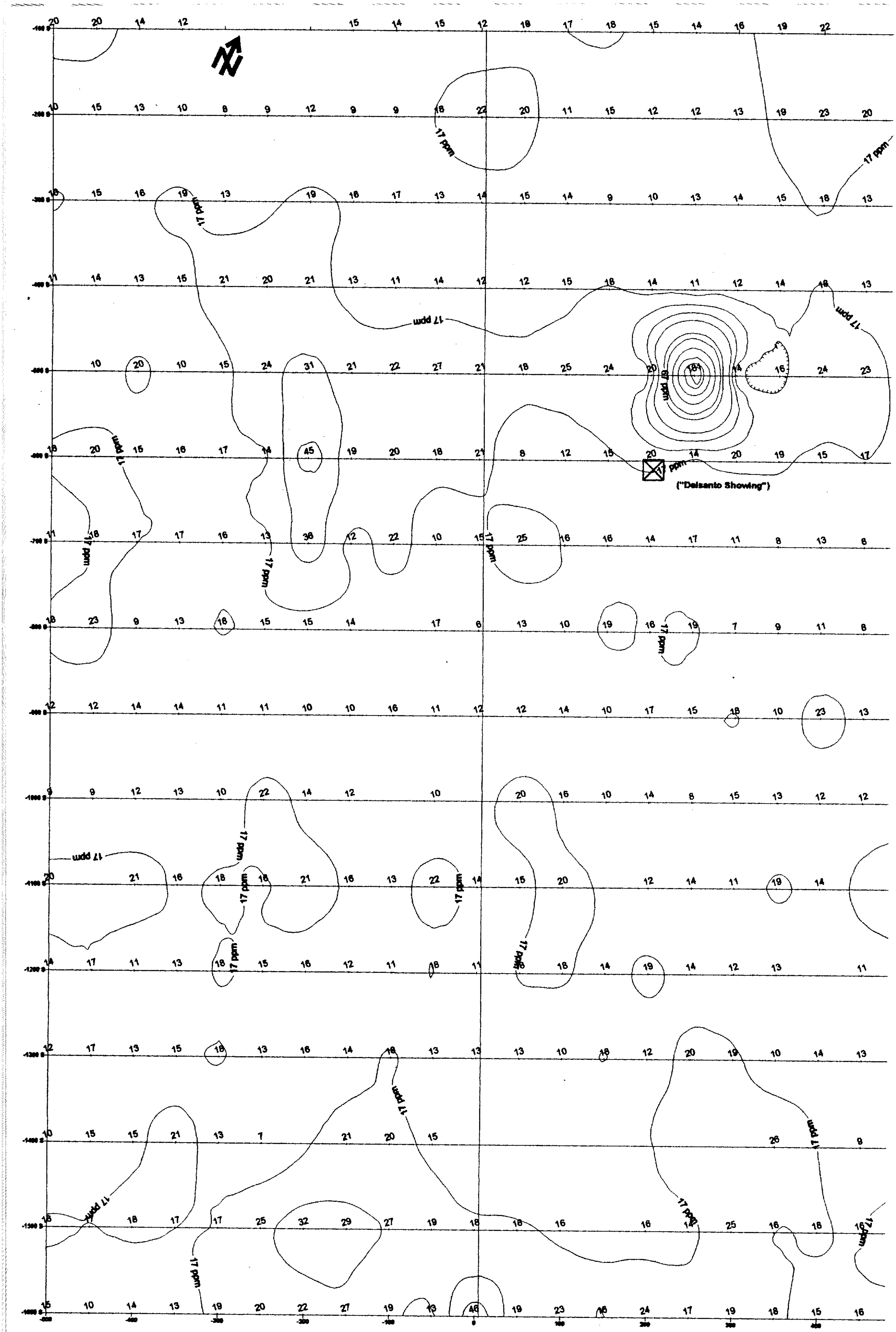
Ag soil geochemistry 1998

TELKWA GOLD CORP
DELSANTO PROPERTY
(Main grid)



<u>**Cu soil geochemistry 1998**</u>

TELKWA GOLD CORP
DELSANTO PROPERTY
(Main grid)



0 m 100 m 200 m

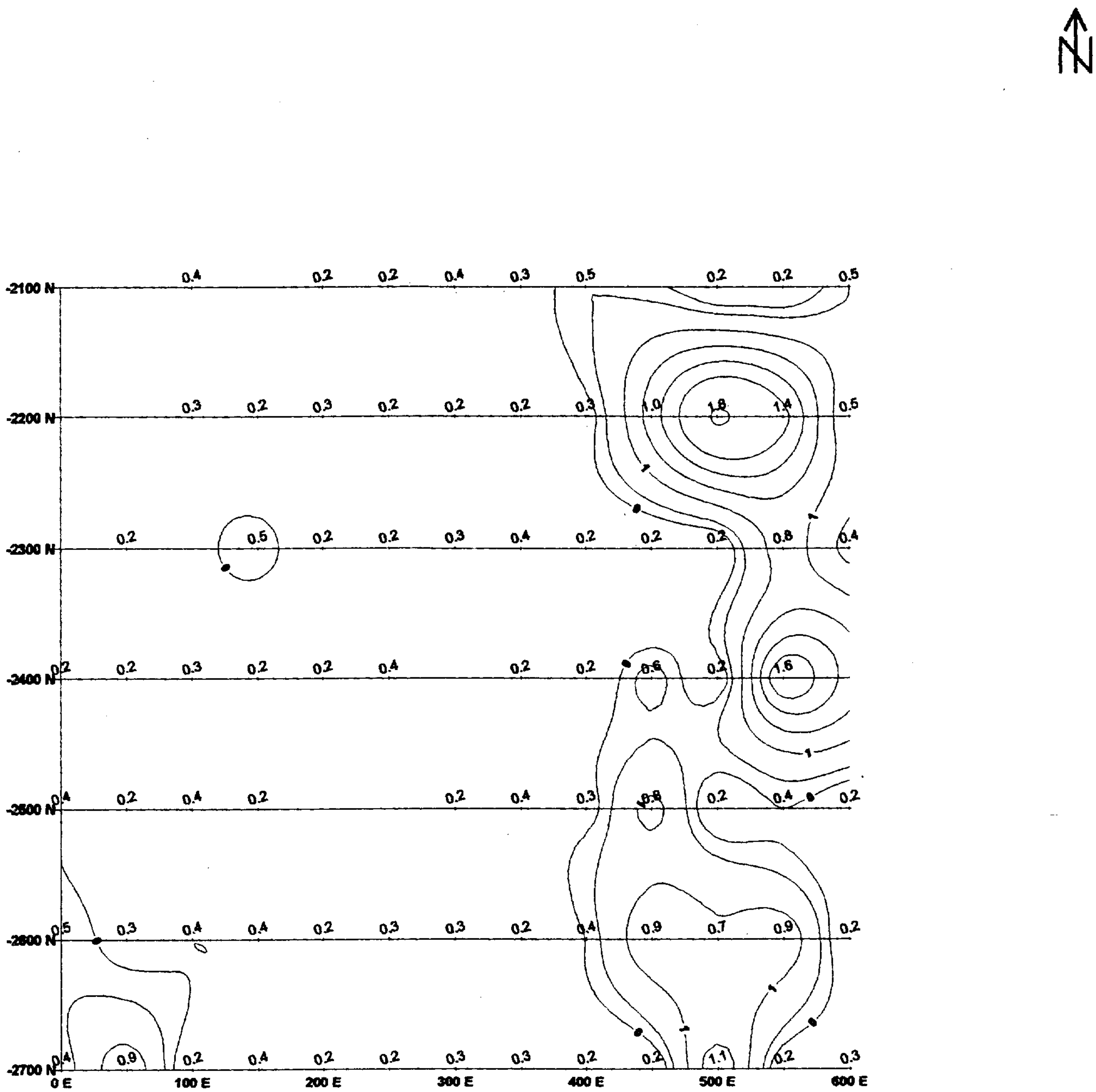
Pb soil geochemistry 1998

TELKWA GOLD CORP
DELSANTO PROPERTY
(Main grid)

Zn soil geochemistry 1998

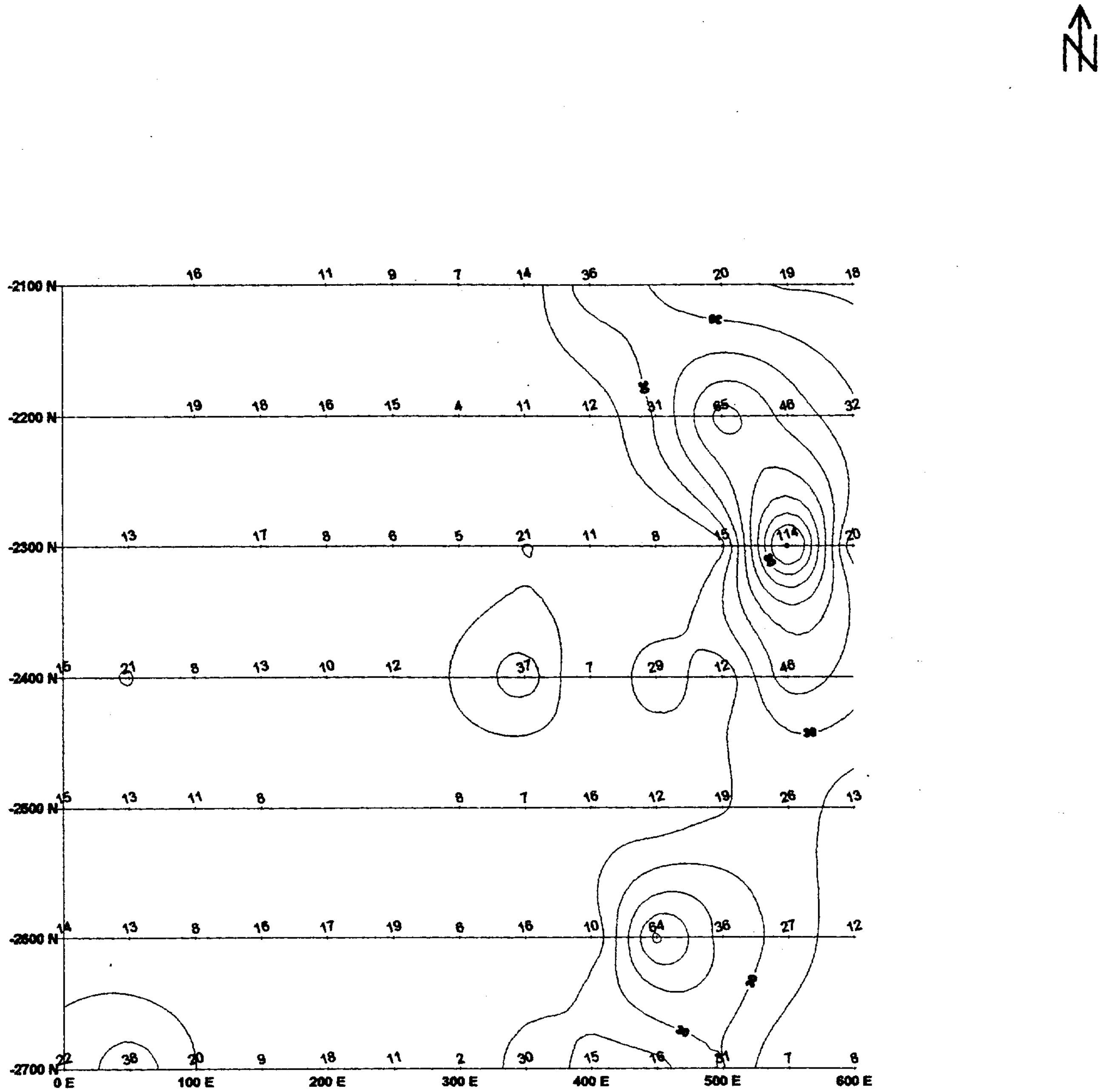
0 m 100 m 200 m

TELKWA GOLD CORP
DELSANTO PROPERTY
(Main grid)



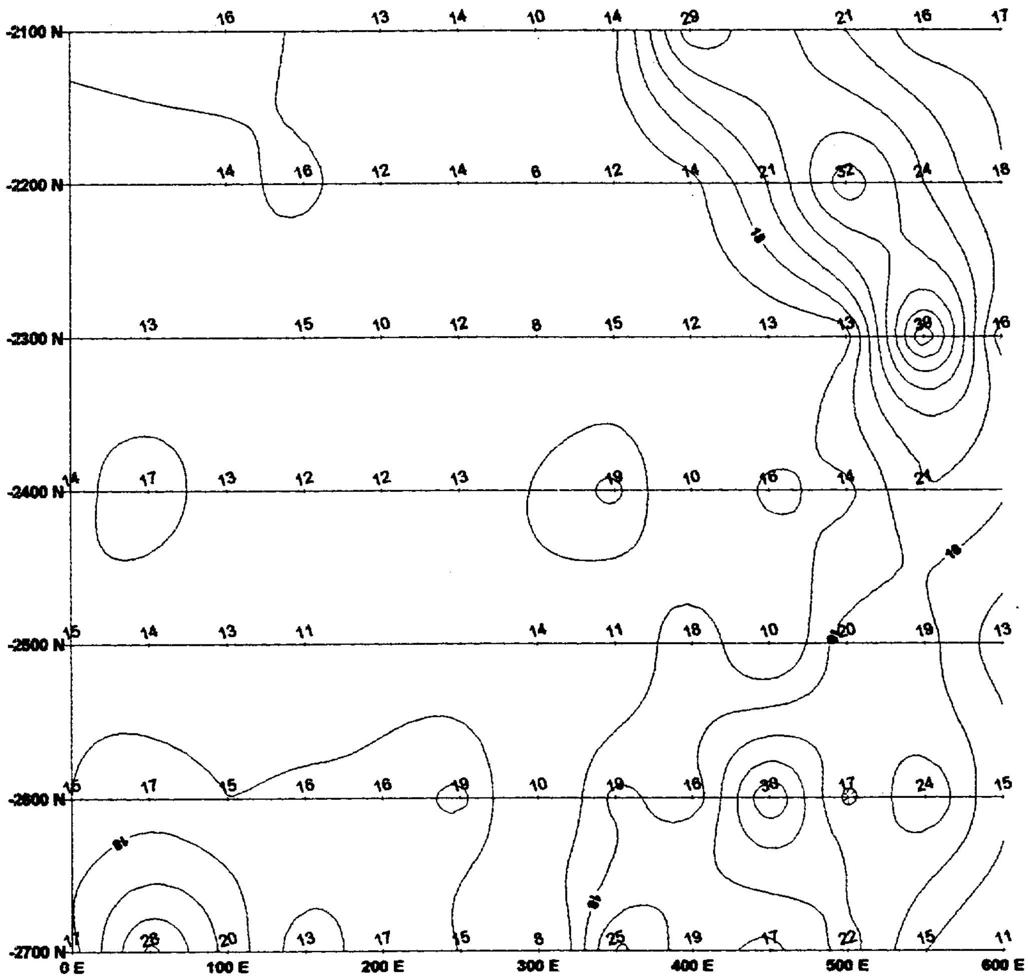
Ag geochemistry 1998

TELKWA GOLD CORP
DEL SANTO PROPERTY
(East Grid, 1998)



Cu geochemistry 1998

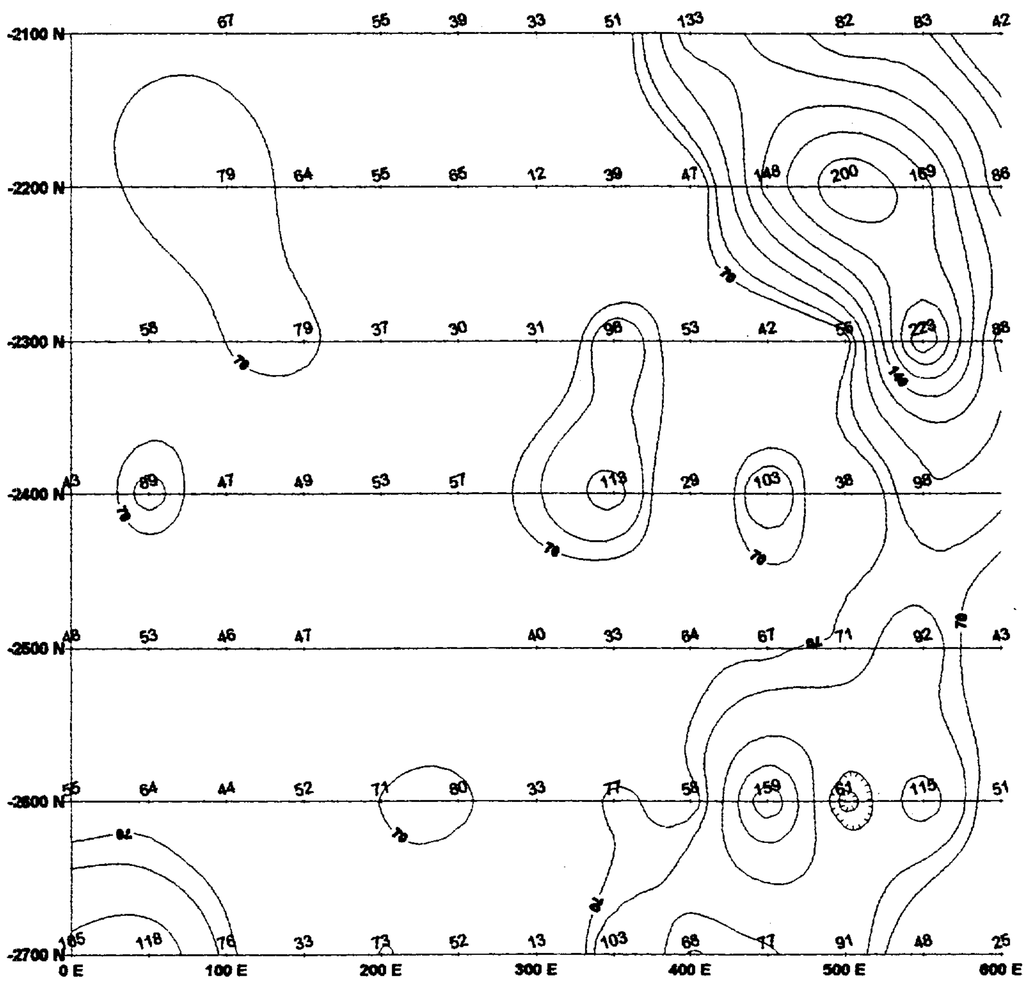
TELKWA GOLD CORP
DEL SANTO PROPERTY
(East Grid, 1998)



Pb geochemistry 1998

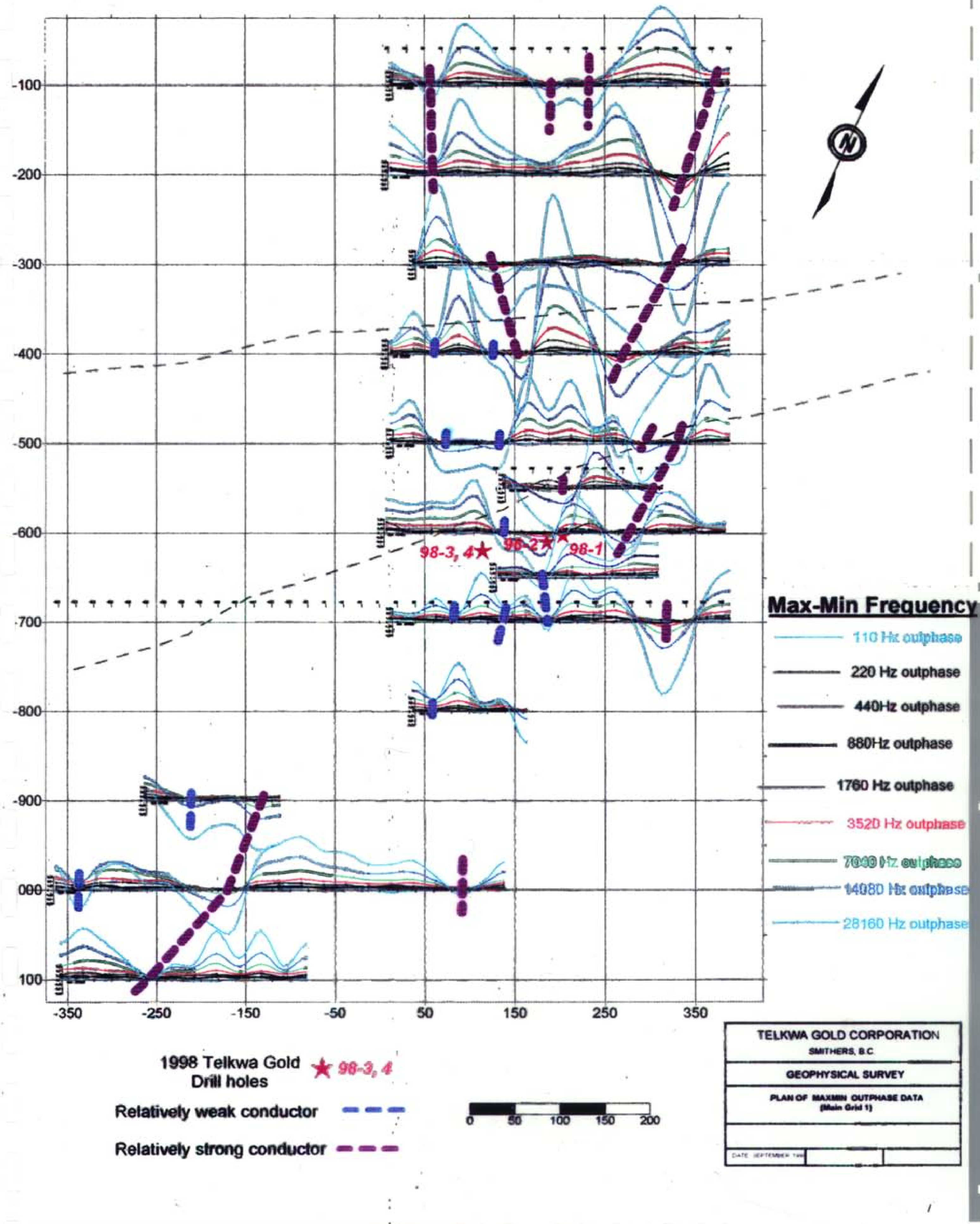
0 m 100 m 200 m

TELKWA GOLD CORP
DEL SANTO PROPERTY
(East Grid, 1998)



Zn geochemistry 1998

TELKWA GOLD CORP
DEL SANTO PROPERTY
(East Grid, 1998)



Max-Min Frequency
110 Hz outphase
220 Hz outphase
440Hz outphase
880Hz outphase
1760 Hz outphase
3520 Hz outphase
7040 Hz outphase
14080 Hz outphase
28160 Hz outphase
98-3, 4
98-2
98-1
1998 Telkwa Gold Drill holes
Relatively weak conductor
Relatively strong conductor
TELKWA GOLD CORPORATION
SMITHERS, B.C.
GEOPHYSICAL SURVEY
PLAN OF MAXMIN OUTPHASE DATA
(Main Grid 1)

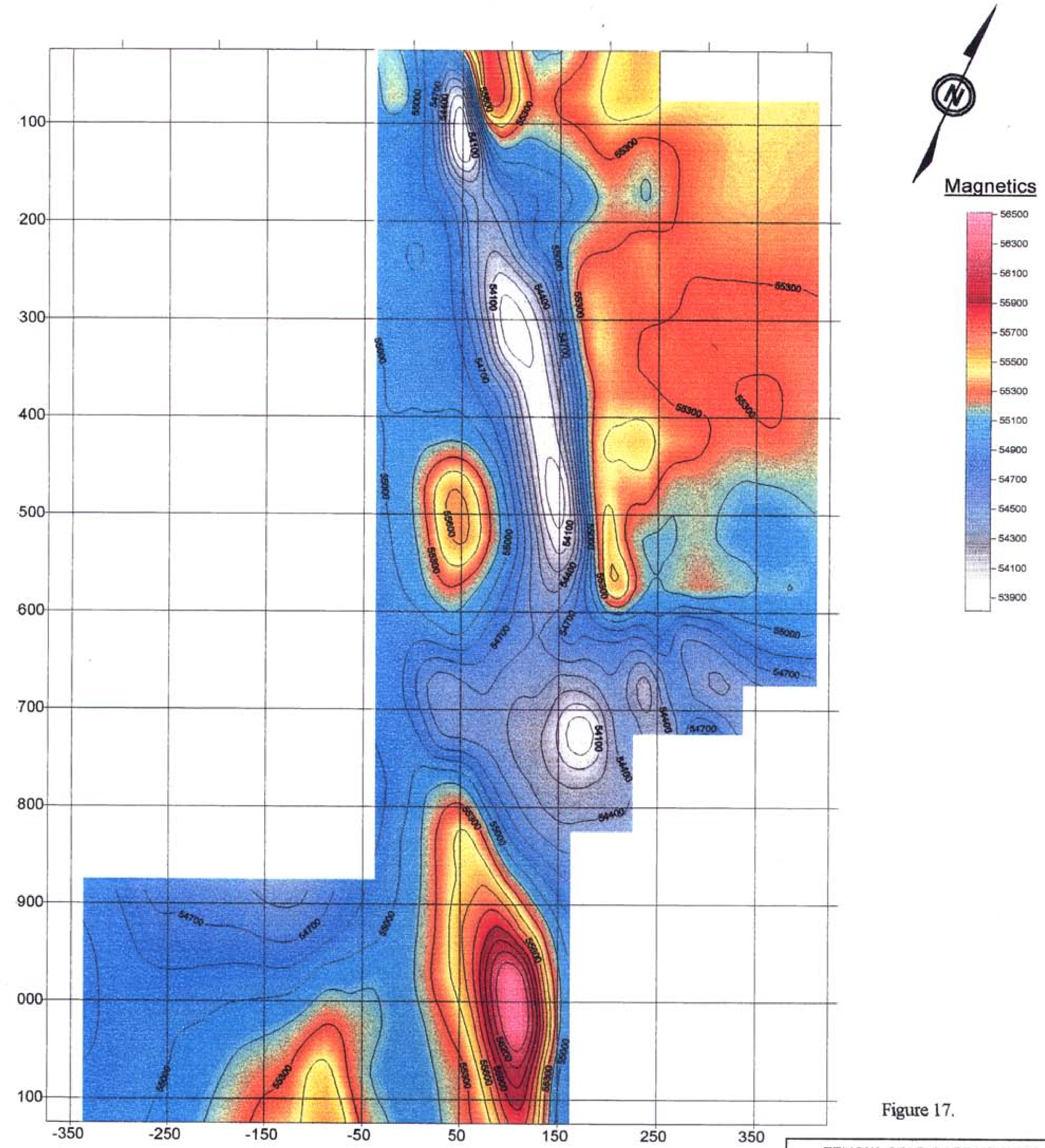


Figure 17.

TELKWA GOLD CORPORATION
SMITHERS, B.C.

GEOPHYSICAL SURVEY

MAGNETIC SURVEY
(Main Grid 1)

DATE: SEPTEMBER 199

	Au(ppb)	Ag(ppm)	Cu(ppm)	Pb(ppm)	Zn(ppm)
Au(ppb)	1.00				
Ag(ppm)	<0.089	1.00			
Cu(ppm)	<0.070	0.655	1.00		
Pb(ppm)	<0.055	0.589	0.882	1.00	
Zn(ppm)	<0.109	0.673	0.903	1.00	

Geophysical Surveys

During September 3 to September 11, 1998 Frontier Geosciences of North Vancouver, British Columbia completed 5.26 kilometers of magnetic surveys, 4.0 kilometers of MaxMin electromagnetic surveys and 183 meters of downhole transient electromagnetic (TEM) surveys in three of the Telkwa Gold drill holes (9801, 9803 and 9804). This work was located along the middle and northeastern sections of the main grid (Grid 1) and was designed to test the potential northerly extensions of copper-silver-zinc (chalcopyrite-pyrrhotite-pyrite-magnetite) volcanogenic massive sulfide (VMS) mineralization at the Del Santo prospect.
The magnetic data were collected on a 50m x 12.5m array on and around the Del Santo showing and on a 100m x 12.5m array over favorable geology to the southwest of the showing. The survey identified a strong magnetic low (Figure 17) lying coincident with the Del Santo showings (Liu and Candy, 1998, Plate 3). It is open to the north and appears to be faulted off at the south end of the showing. The magnetic low anomaly is directly coincident with known magnetic minerals (pyrrhotite and magnetite) at the prospects and it is suggested that a strong geomagnetic field reversal may exist, thus creating a strong magnetic low. Oriented rock samples were taken from outcrops and these are being tested in laboratories for possible geomagnetic reversal. Other strong magnetic anomalies are directly coincident with young (Eocene) granodiorite plugs and dikes (unit Tgd), as well as mafic flows and tuffs of unit lJN1.

The MaxMin survey produced 21 continuous or isolated anomalies (Figure 17) over the same general area which was surveyed for magnetic features. Three strong EM conductors on Line 3 to Line 4 and Line 6 correlate well with the intense north-northwest magnetic low, which is described above. Two of the EM anomalies were modeled and show dips of 55 to 65 degrees east and depth extents between 40 and 100 meters and represent the continuation of conductive ores from the Del Santo showings. There may be minor offsets of the anomalies, due to northeasterly faulting. Three other promising anomalies occur in a large area with a high magnetic signature, in the northeast part of the grid. These three conductive zones are open to the north and are hosted in dacitic units of the Nilkitkwa member, which is described as unit lJN2.

Three diamond drill holes were surveyed for TEM response (9801, 9802 and 9803). The strongest anomaly is from the east loop at 52 meters in hole 9803 (DDH 98-3) suggesting that the conductor is on the east side of the hole and dips toward the east. This is also consistent with the MaxMin models.

Figure 5.-View looking westerly up Trench 98-1. Dark colored rocks in trench bottom are massive sulfides containing pyrrhotite, pyrite and chalcopyrite.

Figure 6.- View looking westerly up Trench 98-2. Geologist Jim Cuttle examining rocks mineralized with pyrrhotite, pyrite and quartz.

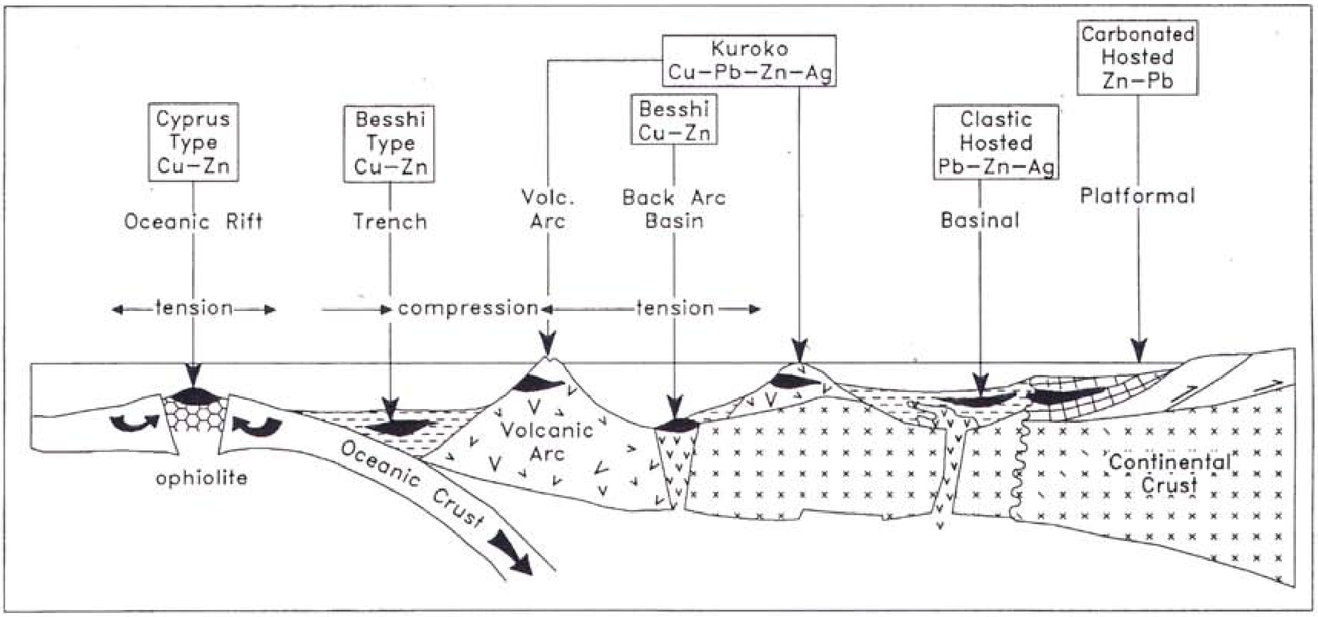


Figure 7.- Idealized cross section demonstrating the various environments in which volcanogenic massive sulfide deposits may form. From Hoy (1991, modified after Hutchinson, 1980).

Figure 8.- Diamond drill working on DDH 98-3. Drill hole is being drilled at minus 45 degrees to the N. 65° E.

Trenching

Six new trenches were cut in the area of the previous (1960's-1970's) trenching in order to produce better exposures of the mineralization and to determine the width of the mineralized zone.

Trenching was accomplished with a Caterpillar D5 bulldozer with a rear-mounted backhoe, aided by drilling and blasting, which was done in order to achieve adequate depths. Trenching was by Jim Hutter, P.Geo. and mining contractor. The trenches were cut 3 to 5 meters wide, 1.5 to 3.5 meters deep and from 23 to 50 meters long. They strike approximately normal to the strike of bedding and mineralization, or about S. 75° W. (Figures 5 and 6).

The trenches were mapped at scale, 1:100, using tripod mounted Brunton and chain. Mineralized zones were sampled on one meter intervals. Most samples filled a 12 x 20 inch (30.5 x 50.8 cm.) polyethylene sample bag and weighed about 15 pounds (7 kg). All samples were either cut from bedrock with hammer and moil, or were broken from freshly-blasted bedrock, prior to removal of the blasted rock by backhoe.

Geology of the trenches is described above (p. 13-15). Assays were done by MinEn Laboratories of Vancouver, British Columbia.

Diamond Drilling

Four diamond drill holes were drilled for an aggregate length of 374.6 meters (1229 feet). The drilling was done by J.T. Thomas Drilling of Smithers, British Columbia using a JT 3000 diamond drill, recovering NQII core. Core was boxed in standard 5-foot trays and removed to Smithers daily and placed in core racks in a storage facility and was logged and sampled. Sampled sections were split with a diamond saw and were assayed by MinEn Laboratories of Vancouver, British Columbia.

Diamond drill hole 98-1 was drilled at -45° and was positioned to intersect the mineralized beds 100 feet (30m) down dip from the exposures in trench 98-4, but failed to do so. Drill hole 98-2 was moved nearer the known exposures (Plates 1 and 2) and was also drilled at -45° to intersect at 55 feet (17m), but it too failed to intersect mineralization.

Diamond drill hole 98-3 (Figure 8) was placed on the same drill section, but 74 meters WSW from DDH 98-1, and was drilled in the opposite direction (Plates 1 and 2). It intersected 4.0 meters of massive sulfide mineralization at 52.2m to 56.2m, but that mineralization is not part of the same beds which are exposed in the trenches and is composed of pyrrhotite and pyrite with very little chalcopyrite. It is apparent that faulting with undetermined displacements is responsible for the failures of DDH 98-1 and 98-2 to intersect the massive sulfide mineralization which occurs in the trenches.

Diamond Drill hole 98-4 was drilled from the same set-up as 98-3, but was drilled at a bearing 15 degrees south of the previous section, and also at -45°. It intersected 2.8 meters of massive sulfide mineralization and quartz at 58.7 to 61.5 meters, but again the sulfides were pyrrhotite and pyrite. This mineralization lies between faults which occur at 49.0-52.5 and 62.5-65.5 meters.

Petrographic Studies

Twenty-two rock and core specimens were submitted to Vancouver Petrographics Ltd. for petrographic analysis. The petrographic work was performed by John G. Payne, Ph.D.

The petrographic analyses show that virtually all of the rocks are mafic to intermediate volcanic tuffs and lesser flows. Chlorite-quartz-carbonate-ankerite alteration occurs in many of the rocks.

The ore specimens which were submitted (samples Tr-3, Tr-101, X-1 and X-2 in the petrographic report, Appendix 1) are partly skarn which developed in a breccia or tuff, containing fragments of basalt, andesite and hypabyssal mafic rocks. Ore minerals are chalcopyrite, pyrrhotite, pyrite and magnetite which occur with epidote , garnet, ankerite and clinopyroxene. Quartz is locally abundant. Sphalerite occurrences are spotty and rarely exceed one percent Zn.

Appendix 1 in this report, is the complete petrographic report by Dr. Payne. Samples JC 1-11 were taken by Jim Cuttle in mapping the geology of the prospect area. The sample locations are shown on the geological map by Jim Cuttle (Plate 4 of this report). Samples with the prefix "98" are drill core samples, e.g. "98-1, 22.7", is from DDH 98-1 at depth 22.7 meters. Samples with the "Tr" prefix are from trenches and their locations are shown on Plate 1.

CONCLUSIONS

Information Gained from Trenching

The Del Santo prospect is a Besshi-type Cu-Ag VMS occurrence in mafic tuffs, flows and sedimentary rocks of the Lower Jurassic Nilkitkwa Formation of the Hazelton Group and is located about 23 kilometers east of Telkwa, British Columbia and is accessible by 4WD vehicles.

Volcanogenic massive sulfide mineralization is exposed in backhoe trenches which were cut in July, 1998. The metallic mineralization consists of chalcopyrite, pyrrhotite, pyrite and magnetite with minor amounts of sphalerite. No silver minerals were identified, although silver values average about 2.5 to 4 ounces (70 to 115 grams) for each percent of copper.

The metallic mineralization is bedded and bedding strikes northerly and dips east, from 60 degrees to nearly vertical. The beds are folded and some drag folds display tight, isoclinal folding.

Massive sulfide mineralization occurs over widths which are up to 15 meters in trenches 98-1 and 98-4. It is noted that folding may have amplified the widths of the mineralized beds in these exposures. A prominent fault which strikes N. 30° W., is nearly parallel to the strike of bedding (N. 15° W.), dips 45 degrees east, and has displaced the mineralized beds in trenches 98-2, 98-3 and 98-5. A very small granodiorite dike displaced the mineralization in trench 98-6.

Information Gained from Diamond Drilling

Diamond drilling failed to prove continuity of the mineralization at depth, but did establish that the rocks which form the outcrops of the Del Santo prospect are complexly folded and faulted and are displaced from their original site. Complex folding and faulting are common in VMS deposits.

Information Gained from Geophysical Surveys

A geophysical survey was conducted by Frontier Geosciences Inc. (Liu and Candy, 1998) for the purpose of discovering the continuation of the massive sulfide beds which, because of extensive overburden, do not outcrop. Liu and Candy (1998, p. 7) note that, "higher magnetic data show generally good correlation with mapped showings of granodiorite and volcanic tuff", and they further record that, "Additional magnetic high areas are indicated in areas generally mapped as 1JN1...". These rocks (1JN1) are identified by MacIntyre (1986) as, "red epiclastics, amygdaloidal flows and foliated lapilli tuffs." MacIntyre (p.217) also notes that the Del Santo prospect occurs in sedimentary strata (which here include mafic volcanic tuffs and thin limestone beds) overlying the amygdaloidal flow or rhyolitic volcanic units.

The strong, linear magnetic high at L.200 S. to L.600 S. and 200 E. (Liu and Candy, 1998, Plate 3) must be tested in order to identify the source of the magnetics; e.g., does the magnetic anomaly result from magnetite and pyrrhotite in massive sulfide mineralization or is it a magnetic dike (none of which have been identified in the immediate prospect area).

Liu and Candy (1998, p.7) show that the very strong magnetic low at L.200 S. to L.600 S and 100 E to 1+50 E. is being examined as a possible incidence of geomagnetic field reversal.

The MaxMin Electromagnetic survey (Liu and Candy, 1998, p.8) identified eleven relatively strong vertical conductors, seven relatively weaker conductors and three dipping conductors. Three of the conductors correlate well with the strong north-south trending magnetic low, and many of the other EM conductors correlate well with areas of high magnetic intensity.

Three diamond drill holes were surveyed using the downhole transient electromagnetic (TEM) method. A TEM response in DDH 98-3 at 52 meters suggests that there is an east-dipping offhole conductor on the east side of the drillhole. There is also some response in DDH 98-4, which though weaker than DDH 98-3, indicates that mineralization extends close to this depth point in the drillhole.

Liu and Candy (1998) conclude that there is a series of well-defined conductors lying north of the present drilling, which represent important follow-up exploration targets.

Information Gained from the Geochemical Survey

The geochemical soil survey was not diagnostic due to the existence of a widespread layer of heavy, glacial clay which covers bedrock throughout much of the area. It is noted that the copper and silver geochemical maps in this report (Figures 9-12) show that samples which were taken in the near vicinity of massive sulfide subcrops, had assay values of low background only, which must be due to the masking of bedrock by the heavy glacial clay.

RECOMMENDATIONS

A two-phase exploration program is recommended to test the strongest and largest of the MaxMin Electromagnetic conductors, which were reported by Liu and Candy (1998). The anomalies are identified in figures 3 and 4 in their report; they are anomalies A1, A2, A3, A4, A5, A8, A10, A11 and C1.

It is proposed that the electromagnetic anomalies be first explored with a backhoe by cutting trenches across the anomalies. Additionally, zones of metallic mineralization which may be discovered in the trenches should be further tested by diamond drilling.

Backhoe Trenching

The backhoe trenches should be cut normal to the strike of the anomalies and initially, should be about 25 meters long. They must penetrate bedrock to at least one to two meters of depth. Blast hole drilling and blasting will be required for penetrating bedrock.. Each anomaly requires at least two test trenches.

Each trench must be surveyed and geologically mapped and the mineralized zones must be sampled. It is estimated that 15 samples may be cut from each trench and each sample will cost $50 to $60 for assays.

Diamond Drilling

It is further proposed that mineralized zones which may be discovered in the backhoe trenches, be tested by diamond drilling. It is recommended that 10 diamond drill holes be drilled, each to a depth of 200 feet (61m) for a total of 2000 feet (610m).

Cost Estimate for Trenching

Mobilization and demobilization of bulldozer and backhoe, plus road maintainence	$2,000	
Clear trails and/or cut roads to sites of EM anomalies and clear brush and trees preparatory to trenching	7,000	
Drill and blast for trenches, estimate $1200 per trench for labor, powder and compressor x 18 trenches	21,600	
Cut trenches with backhoe, est 25 hrs./trench x$60/hr. x 18 trenches	27,000	
Survey, map and sample trenches	14,850	
Assay trench samples. Estimate 15 samples/trench x 18 trenches x $50 per sample	13,500	
Planning and management, final report and drafting	13,000	
Truck rental. One 4WD @ $1600/mo +$400 insurance	2,000	
Reclamation bond, estimate	5,000	
Total cost for trenching		**$105,950**

Cost Estimate for Diamond Drilling

Mobilization and demobilization of drill and equipment	1,500	
Maintain road during drilling	1,000	
Drill site preparations	1,200	
Management, planning and geological	6,000	
Log core, final report and drafting	9,500	
Diamond drill contract, 2000 ft. @ $23.00 per ft.	46,000	
Field costs, estimate	10,000	
Sample and split core	2,000	
Truck rental. One 4WD @ $1600/mo + $400 insurance	2,000	
Reclamation bond, estimate	5,000	
Assays, 15/hole x 10 holes x $50	7,500	
Total cost of drilling		**91,700**
TOTAL		**$197,650**

Optional Supplemental Drilling

Drill site preparation	$1,200
Management, planning, geological	4,000
Log core, final report, drafting	10,000
Diamond drill contract, 2000 ft. @ $23.00	46,000
Field costs, estimate	10,000
Sample and split core	2,000
Assays, 15/hole x10 holes x $50	7,500

Total cost for supplemental drilling **$80,700**

Respectfully submitted

W.D. Tompson

Willard D. Tompson, P.Geo.

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CERTIFICATE

I, Willard D. Tompson, of Smithers, British Columbia, do hereby certify:

1. THAT I am a consulting geologist residing at 1380 Cronin Place, Smithers British Columbia;
2. THAT I hold a Master of Science degree (Geology) from Montana State University, Bozeman, Montana;
3. THAT I am registered as a Professional Geoscientist by the Association of Professional Engineers and Geoscientists of British Columbia;
4. THAT I am a Fellow of the Geological Association of Canada;
5. THAT I have practiced my profession for more than 30 years;
6. THAT I was manager of the exploration work which was performed on the Del Santo group and the Ken claim during the summer of 1998 and am familiar with the work done by earlier workers on the claims, that I am informed regarding the current research concerning the geology of VMS deposits, and that the information contained herein is a result of my own observations, as well as the geological work which was performed by geologist, Jim Cuttle, P.Geo.
7. THAT I am an officer of and have a financial interest in Telkwa Gold Corp;
8. THAT Telkwa Gold Corp. may use this report for any purposes which they may require, including submission to Governmental regulatory agencies.

Dated at Smithers, British Columbia, this 8th day of December, 1998.

W.D. Tompson

Willard D. Tompson, P.Geo.

I, **Jim Cuttle**, of the Municipality of Whistler, British Columbia, do hereby certify:

1. THAT I am a graduate of the University of New Brunswick (1980) with a Bachelor of Science degree in geology;

2. THAT I am presently working as a private consultant at the home address of, 86 Cloudburst Road, Blacktusk, Whistler, British Columbia;

3. THAT I have practiced my geological profession in Canada, Norway, Portugal and Africa for the last eighteen years;

4. THAT I am a registered member of The Association of Professional Engineers and Geoscientists of British Columbia (19313);

5. THAT parts of this report are based upon a review of available data and onsite field observations of the Del Santo claim group for Telkwa Gold Corp by myself during July 16 through September6, 1998;

Jim Cuttle, B.Sc., P.Geo.

APPENDIX I

Vancouver Petrographics Ltd.

8080 GLOVER ROAD, LANGLEY, B.C. V3A 4P9
PHONE (604) 888-1323 • FAX (604) 888-3642

Report # 980479 for:

Willard D. Tompson,
Consulting Geologist,
P.O. Box 395,
Smithers, B.C., V0J 2N0

September 1998

Samples: **Tr 3, Tr 35, Tr 51, Tr 101,**
JC-1 to JC–11,
98-1 22.7 m,
98-2 9.5 m, 25.7 m, 53.9 m,
98-3 48.6 m,
Sample X (2 sections)

Summary:

Carbonates were distinguished in part on the style and rate reaction on contact with dilute, cold HCl. Calcite begins to react immediately, and after a few seconds effervesces vigorously. Dolomite reacts immediately, but the reaction continues as a slow bubbling on the surface. Ankerite reacts more slowly than dolomite, with bubbles forming on the surface after several seconds' contact with the acid. Dolomite/calcite has a reactivity intermediate between that of calcite and dolomite. As well, the refractive index increases from calcite to dolomite to ankerite, although the presence of dusty inclusions in many samples changes the apparent relief and makes this not as useful a method to distinguish the carbonates as the reactivity with cold, dilute HCl.

Sample JC-1 is a slightly porphyritic andesite dike containing phenocrysts of plagioclase and pyroxene in an extremely fine-grained groundmass of plagioclase and ankerite. Pyroxene phenocrysts are altered completely to chlorite-carbonate-quartz, and plagioclase phenocrysts are altered moderately to sericite-(ankerite). A few amygdules are of chlorite-(quartz). A patch may be an early accumulation of plagioclase and pyroxene crystals. Veinlets are of ankerite with lesser quartz and locally chlorite and opaque.

Sample JC-2 is a bedded, mafic to intermediate, lithic-crystal tuff containing fragments of basalt/andesite, plagioclase phenocrysts, and minor chlorite lenses in a sparse, cryptocrystalline, semi-opaque groundmass, probably dominated by plagioclase. One layer contains abundant dolomite. The rock has a weak foliation parallel to bedding, in part defined by wispy seams of carbonaceous opaque. Irregular replacement patches are of calcite and pyrite.

Sample JC-3 is an intermediate ash tuff containing extremely fine crystal fragments of plagioclase and minor quartz in a cryptocrystalline to extremely fine-grained groundmass of plagioclase and possibly much less abundant chlorite with minor disseminated opaque (mainly pyrite), ankerite, and leucoxene. A brecciated and sheared zone near one side contains seams of opaque and patches of illite/sericite. A few veinlets are of ankerite-quartz-limonite.

Sample JC-4 is a strongly altered mafic flow dominated by lensy intergrowths of ankerite and sericite. A moderate foliation is defined by lenses of sericite, ankerite, and leucoxene; this may represent a relic flow-foliation. The ratio of ankerite to sericite varies moderately. A few replacement patches and veinlets are of dolomite-quartz and a veinlet is of quartz-(dolomite).

Sample JC-5 is a strongly altered rock, probably an intermediate to mafic flow, which has a strong foliation of probable metamorphic origin. Pervasive replacement is to ankerite and sericite. Coarser patches are of dolomite and quartz. Contorted veinlets are of quartz-dolomite.

Sample JC-6 is an andesite flow/dike containing one plagioclase phenocryst in a groundmass dominated by lathy plagioclase grains and interstitial patches of finer-grained plagioclase and ankerite. A set of subparallel lenses is of chlorite-ankerite. Veinlets are of calcite with minor envelopes of ankerite. A few late seams are of hematite with thin envelopes containing moderately abundant limonite.

Sample JC-7 is an andesite/basalt ash tuff containing crystal fragments of plagioclase and pyroxene and abundant fragments of basalt/andesite flow in a well foliated groundmass containing crystallites of plagioclase in a cryptocrystalline material of uncertain composition. A few elongate lenses are of chlorite. Irregular to lensy replacement patches are of dolomite and opaque (magnetite and pyrite), in part with minor to moderately abundant muscovite and locally with minor quartz.

Sample JC-8 is an intermediate crystal tuff containing fragments of plagioclase phenocrysts, andesite, and hypabyssal andesite in a cryptocrystalline groundmass dominated by plagioclase and replaced strongly by calcite/dolomite. The replacement obscures much of the original texture, and makes distinction difficult between some andesite fragments and the groundmass. One large, complex fragment contains zones of quartz/plagioclase-opaque, calcite/dolomite-(sericite), and opaque (oxide). Several veinlets are of calcite-(pyrite).

Sample JC-9 is a basalt dike containing minor plagioclase phenocrysts (altered partly to quartz) and pyroxene phenocrysts (altered to chlorite or to quartz-chlorite) in an unfoliated matrix of lathy plagioclase and equant clinopyroxene with minor interstitial chlorite. A set of subparallel, braided veins and veinlets is of quartz, calcite, and chlorite with minor clinozoisite.

Sample JC-10 is an andesite tuff containing minor crystal fragments of plagioclase and a few of andesite flow in a cryptocrystalline groundmass, which may represent in part devitrified glass. It has a moderate foliation possibly formed during metamorphism; locally this is contorted moderately.

Sample JC-11 is a very fine felsic/intermediate crystal tuff containing fragments of plagioclase, intermediate volcanic rocks, and minor ones of many other types are set in a cryptocrystalline groundmass of uncertain composition. A few skeletal replacement patches are of dolomite. At one end of the section is a layer of ash tuff; a few large fragments of similar composition occurs in the coarser grained tuff.

Sample 98-1 22.7 m is a hybrid rock composed of several zones of different texture and mineralogy. It probably represents a contaminated border phase of an intrusion, which was later replaced. One zone is of hypabyssal diorite dominated by lathy plagioclase grains and lesser pyroxene grains in a groundmass of finer-grained, anhedral plagioclase, with minor chlorite and magnetite/ ilmenite. Interstitial patches are of quartz and calcite. In much of this zone, plagioclase is replaced moderately to strongly to sericite, and pyroxene is replaced completely by tremolite and sericite. A replacement patch contains a zone dominated by very fine-grained quartz and another dominated by medium-grained quartz and medium to coarser-grained calcite. At the other end of the sample is a complex zone of fine-grained diorite, partly replaced by quartz' this zone also contains patches of extremely fine-grained plagioclase-quartz, which may represent hybridized country rock. .

Sample 98-2 9.5 m is a gabbro containing subhedral clinopyroxene grains and interstitial plagioclase, with much less interstitial patches of ilmenite/magnetite and minor K-feldspar grains. Clinopyroxene is replaced moderately to strongly by tremolite/actinolite, calcite, and sericite. Coarse interstitial patches are of calcite-quartz-tremolite/actinolite. Much smaller interstitial patches are of chlorite.

Sample 98-2 25.7 m is a well foliated, basalt/andesite ash tuff containing lathy plagioclase grains and minor fragments of andesite/basalt in a groundmass dominated by cryptocrystalline to extremely fine-grained plagioclase with moderately abundant dusty opaque. The rock is moderately magnetic. Some layers contain abundant dolomite. An early lens parallel to compositional banding is of secondary dolomite with lesser quartz. Veinlets are of calcite/dolomite.

Sample 98-2 53.9 m is a basalt flow containing minor plagioclase phenocrysts are set in a groundmass of much finer-grained plagioclase and minor ankerite, chlorite, and leucoxene/opaque. Very irregular replacement patches, lenses, and veinlets are of ankerite/dolomite, chlorite, and much less abundant quartz and pyrite. Veins are of calcite-(quartz).

Sample 98-3 48.6 m is an intermediate ash tuff dominated by cryptocrystalline to extremely fine-grained plagioclase with lesser sericite and ankerite. Replacement patches are of ankerite-pyrite. Veins and coarser replacement patches are of calcite/dolomite-quartz-(pyrite). A few veinlets are dominated by quartz. A few late veinlets are of calcite.

Sample Tr-3 is a patchy skarn, one half of, which is rich in epidote, and the other half of which contains patches rich in one or more of ankerite, garnet, and clinopyroxene. Minor minerals are quartz, K-feldspar, tremolite, and magnetite. Both contain patches of and intimate intergrowths with chalcopyrite and pyrrhotite. Late, commonly banded veins are of hematite/limonite-ankerite.

Sample TR-35 is a basalt tuff/lapilli tuff containing fragments up to 2 cm in size of a variety of basalt flows and hypabyssal basalt/andesite are set in a sparse cryptocrystalline to extremely fine-grained groundmass of basaltic composition. The rock is moderately to strongly magnetic, indicating that much of the opaque is magnetite.

Sample TR-51 is a basalt lapilli tuff containing fragments up to several mm long of a variety of types of basalt and andesite in a basaltic groundmass. In parts of the sample it is difficult to distinguish fragments from groundmass. Ankerite forms a few replacement patches. Veinlets are of dolomite, and some contain patches of quartz(?).

Sample TR-101 is a patchy skarn composed of chalcopyrite, magnetite, pyrrhotite, clinopyroxene, garnet, carbonate, and biotite. Much of the clinopyroxene is too fine-grained to distinguish it from epidote. A few relic(?) patches of altered rock are dominated by sericite/muscovite and lesser ankerite and biotite. A veinlet is of carbonate and pyrrhotite with much less abundant chalcopyrite and chlorite. Carbonate appears in section to be dolomite, but it is not reactive with cold, dilute HCl, suggesting that it is ankerite.

Sample X-1 is a patchy, partly banded skarn dominated by clinopyroxene with lesser chalcopyrite and ankerite, and much less pyrrhotite/pyrite, magnetite, and garnet. A zone 5 mm wide contains several veins and veinlets dominated by limonite/hematite. Bordering the vein on the skarn side is a tremolite-rich zone, and on the other side is a breccia with fragments of andesite and basalt flows and hypabyssal rocks and plagioclase phenocrysts.

Sample X-2 is finer-grained than Sample X1, and has some important differences. Ankerite and biotite are more abundant, and may represent in part an alteration of clinopyroxene. A large replacement patch is dominated by quartz with lesser ankerite and biotite. It is cut by veinlets of quartz, some of which contain patches of chalcopyrite, pyrite, and lesser pyrrhotite.

Secondary minerals on the surface of Sample X include a white fibrous mineral (probably a hydrous iron sulfate, and a massive, pale blue mineral, probably chrysocolla. These minerals were not present in the thin section. The presence of abundant chalcopyrite in both samples indicates that the blue mineral is a secondary copper mineral. Positive identification could be made by X-ray diffraction.

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Sample JC-1 Slightly Porphyritic Andesite Dike

Phenocrysts of plagioclase and pyroxene are set in an extremely fine-grained groundmass of plagioclase and ankerite. Pyroxene phenocrysts are altered completely to chlorite-carbonate-quartz, and plagioclase phenocrysts are altered moderately to sericite-(ankerite). A few amygdules are of chlorite-(quartz). A patch may be an early accumulation of plagioclase and pyroxene crystals. Veinlets are of ankerite with lesser quartz and locally chlorite and opaque.

phenocrysts	
plagioclase	4- 5%
pyroxene	2- 3
groundmass	
plagioclase	60-65
ankerite	30-35
opaque	1
leucoxene	0.5
amygdules	
chlorite-(quartz)	0.3
fragment	
plagioclase-pyroxene	0.1
veinlets	
carbonate-(quartz-opaque-chlorite)	0.5

Plagioclase forms anhedral to subhedral, equant to prismatic phenocrysts mainly from 0.3-0.7 mm in size and a few up to 1.3 mm long. Alteration is slight to moderate to cryptocrystalline sericite and minor patches of ankerite.

Pyroxene forms subhedral to euhedral, equant to prismatic phenocrysts mainly from 0.7-1 mm in size and two clusters 2 mm long of 2 to 4 phenocrysts. Alteration is complete to patchy intergrowths of very fine-grained chlorite and carbonate, and others of extremely fine-grained quartz.

In the groundmass, plagioclase forms equant grains mainly from 0.02-0.05 mm in size and lathy grains mainly from 0.07-0.1 mm in size, with a few up to 0.15 mm long. Ankerite forms anhedral grains mainly from 0.01-0.02 mm in size interstitial to and overgrown on plagioclase; some of the ankerite probably is secondary after pyroxene.

Opaque forms disseminated clusters mainly from 0.1-0.2 mm in size and a few up to 0.6 mm across anhedral, equant grains mainly from 0.03-0.07 mm in size.

Leucoxene forms disseminated patches mainly from 0.01-0.02 mm in size.

A few amygdules up to 0.6 mm across are of pale green chlorite with minor quartz grains mainly from 0.03-0.05 mm in size along their borders

One fragment(?) 2 mm across consists of very fine-grained plagioclase and clinopyroxene with a few interstitial patches of secondary chlorite and of quartz. Pyroxene is altered strongly to cryptocrystalline carbonate, with minor relic cores of fresh pyroxene. This patch may represent an early accumulation of phenocrysts.

A few veinlets up to 0.1 mm wide are of very fine to extremely fine-grained carbonate and much less abundant quartz. One veinlet up to 0.4 mm wide at or near one end of the section also contains patches of opaque (pyrite?) and of chlorite; in this vein, quartz and chlorite are concentrated as comb-textured aggregates growing outwards from borders of pyrite patches.

Sample JC-2 Bedded Mafic/Intermediate Crystal Tuff, Tuff; Minor Calcite-Pyrite Replacement

The sample is a bedded, mafic to intermediate, lithic-crystal tuff containing fragments of basalt/andesite, plagioclase phenocrysts, and minor chlorite lenses in a sparse, cryptocrystalline, semi-opaque groundmass, probably dominated by plagioclase. One layer contains abundant dolomite. The rock has a weak foliation parallel to bedding, in part defined by wispy seams of carbonaceous opaque. Irregular replacement patches are of calcite and pyrite.

fragments		**groundmass**	
basalt/andesite	30-35%	plagioclase	40-45%
hypabyssal basalt/andesite	2- 3	chlorite	4- 5
plagioclase phenocrysts	3- 4	dolomite	4- 5
chlorite	minor	(concentrated in one layer)	
		dusty opaque	1- 2
replacement patches		pyrite	0.3
calcite-pyrite	0.7	sericite	0.2

Basalt/andesite fragments show a variety of textures. Many have a cryptocrystalline groundmass, which may in part represent devitrified glass. It commonly contains abundant dusty opaque/semi-opaque, which gives it a medium grey colour. Some fragments contain crystallites of plagioclase, some contain lathy plagioclase grains mainly from 0.04-0.07 mm long, and some contain plagioclase phenocrysts ranging from 0.2-0.5 mm in size.

Some volcanic fragments are replaced in irregular patches by cryptocrystalline dolomite/ankerite

A few fragments are of hypabyssal andesite. These are dominated by intergrowths of plagioclase grains mainly from 0.02-0.05 mm in size. Some contain up to 20% interstitial patches of chlorite. Opaque forms minor to abundant, disseminated grains from 0.01-0.05 mm in size.

Fragments of plagioclase phenocrysts are similar to plagioclase phenocrysts in the volcanic rocks, and range from 0.3-0.7 mm in size. These are concentrated moderately in the coarser layer near one end of the section. Alteration is variable from absent to moderate to patches and veinlets of dolomite.

Chlorite forms scattered patches and lenses up to 0.8 mm in size of extremely fine grains.

The groundmass is dominated by cryptocrystalline material, probably dominated by plagioclase and much less abundant chlorite. Plagioclase also forms minor to moderately abundant disseminated, extremely fine grains. Moderately abundant dusty opaque/semi-opaque obscures the optical properties of silicates

Pyrite forms a few patches up to 0.3 mm in size. Some of these have a thin rim of extremely fine-grained calcite. In some layers, it also forms up to 3% disseminated grains mainly from 0.01-0.03 mm in size.

One layer 2 mm wide contains abundant extremely fine-grained dolomite in the groundmass.

At one end of the section, a layer up to 2 mm thick contains 3-5% disseminated sericite flakes in the groundmass.

One large replacement patch 1.5 mm across in the dolomite-rich layer consists of pyrite grains from 0.01- 0.08 mm in size intergrown with about the same amount of extremely fine-grained calcite.

Sample JC-3 **Intermediate Ash Tuff; Sheared/Brecciated Band with Seams of Opaque and Patches of Illite/Sericite; Veinlets of Ankerite-Quartz-Limonite**

Extremely fine crystal fragments of plagioclase and minor quartz are set in a cryptocrystalline to extremely fine-grained groundmass of plagioclase and possibly much less abundant chlorite with minor disseminated opaque (mainly pyrite), ankerite, and leucoxene. A brecciated and sheared zone near one side contains seams of opaque and patches of illite/sericite. A few veinlets are of ankerite-quartz-limonite.

crystal fragments	
plagioclase	3- 4%
quartz	minor
groundmass	
plagioclase	60-65
chlorite(?)	20-25
pyrite	1- 2
ankerite	1
leucoxene	0.5
seams and lenses	
opaque	1- 2
sericite/illite	3- 4
veinlets	
ankerite-quartz-limonite	0.3

Plagioclase forms equant to prismatic crystal fragments mainly from 0.06-0.08 mm in size with a few up to 0.15 mm long. One anhedral equant fragment is 0.3 mm across.

Quartz forms a few equant, angular grains mainly from 0.05-0.1 mm in size and a few up to 0.15 mm across.

The groundmass is dominated by equant plagioclase grains mainly from 0.005-0.008 mm in size. Interstitial to this may be cryptocrystalline chlorite intergrown with disseminated grains/patches of leucoxene and of ankerite.

Pyrite forms disseminated cubic grains mainly from 0.05-0.1 mm in size, and a few up to 0.15 mm across. A few lenses of anhedral opaque are up to 0.4 mm long.

A sheared and brecciated zone along one side of the vein contains anastamosing seams of dusty opaque and lenses up to 1 mm in size of cryptocrystalline illite/sericite.

Veinlets up to 0.15 mm wide are of cryptocrystalline ankerite, quartz, and limonite.

Sample JC-4 Mafic/Intermediate Flow(?) with Strong Ankerite-Sericite Alteration Replacement Patches of Dolomite-Quartz

The sample is a strongly altered mafic flow dominated by lensy intergrowths of ankerite and sericite. A moderate foliation is defined by lenses of sericite, ankerite, and leucoxene; this may represent a relic flow-foliation. The ratio of ankerite to sericite varies moderately. A few replacement patches and veinlets are of dolomite-quartz and a veinlet is of quartz-(dolomite).

ankerite	35-40%
sericite	17-20
opaque	0.5
leucoxene	0.3
replacement patches, veinlets	
dolomite	30-35
quartz	4- 5

A few anhedral lenses up to 0.5 mm long of cryptocrystalline to extremely fine-grained sericite may be secondary after plagioclase phenocrysts.

Scattered, equant patches up to 0.3 mm across dominated by one to a few grains of ankerite may be secondary after pyroxene and/or plagioclase phenocrysts.

The groundmass consists of cryptocrystalline ankerite with subparallel lenses and patches of cryptocrystalline sericite; the latter probably are after plagioclase.

Opaque (pyrite) forms disseminated patches mainly from 0.05-0.2 mm in size and several lenses up to 0.6 mm long of similar grains. In some patches, pyrite has euhedral outlines. Patches without euhedral outlines may be oxides. Leucoxene/opaque forms disseminated patches mainly from 0.01-0.03 mm in size.

A few large replacement patches up to several mm across are dominated by fine- to medium-grained dolomite with patchy zones of very fine- to medium-grained quartz. Some coarser grains of both dolomite and quartz are strained and recrystallized slightly to moderately.

Irregular replacement patches and a few veinlike zones are of very fine- to fine-grained quartz and lesser dolomite, and a few contain minor chlorite. In these, coarser dolomite grains were recrystallized to irregular, sub-grain mosaic to irregular aggregates.

A discontinuous vein 1-mm wide is of fine to medium-grained dolomite and much less, very fine-grained quartz.

**Sample JC-5 Altered Volcanic Rock: Strong Ankerite-Sericite Alteration
Replacement Patches of Quartz-Dolomite; Veinlets of Quartz-Dolomite**

The sample is a strongly altered rock, probably an intermediate to mafic flow, which has a strong foliation of probable metamorphic origin. Pervasive replacement is to ankerite and sericite. Coarser patches are of dolomite and quartz. Contorted veinlets are of quartz-dolomite.

ankerite	40-45%
sericite	20-25
leucoxene	0.5
opaque	0.2
feldspar	trace
replacement patches	
dolomite	20-25
quartz	4- 5
veinlets	
quartz-dolomite	1- 2

One plagioclase or K-feldspar grain is 0.25 mm long. A few patches up to 0.3 mm in size of cryptocrystalline sericite may be secondary after plagioclase phenocrysts.

Ankerite forms equant grains mainly from 0.01-0.02 mm in size. It is intergrown intimately with cryptocrystalline sericite, which is concentrated in lenses parallel to foliation

Leucoxene forms disseminated patches mainly from 0.01-0.03 mm in size of cryptocrystalline grains, mainly intergrown with ankerite.

Pyrite is concentrated in a few clusters up to 0.6 mm across in which subhedral to euhedral grains mainly from 0.03-0.1 mm in size. Larger clusters of pyrite commonly are intergrown with lesser quartz and minor ankerite and sericite; quartz commonly forms comb-textured intergrowths.

Replacement patches mainly from 0.5-1.5 mm in size are of fine- to very fine-grained dolomite. Some of these have outlines suggesting that they may be replacements of pyroxene phenocrysts.

One dolomite patch contains a lens up to 0.3 mm long of opaque. Another 1 mm long has an irregular core of extremely fine-grained sericite. Several contain irregular patches and seams of cryptocrystalline sericite.

An early, contorted vein 0.2-0.3 mm wide is of cryptocrystalline to extremely fine-grained dolomite and quartz.

A lens up to a few mm long and 2 mm wide is of fine-grained dolomite and lesser quartz; both minerals are strained slightly to moderately. One lens up to 2 mm across is of fine- to medium-grained quartz and lesser fine-grained dolomite.

A few patches up to 0.7 mm across contain disseminated reddish brown hematite, probably formed by surface weathering.

Sample JC-6 **Andesite Flow/Dike; Chlorite-Ankerite Lenses; Calcite Veinlets**

One plagioclase phenocryst is set in a groundmass dominated by lathy plagioclase grains and interstitial patches of finer-grained plagioclase and ankerite. A set of subparallel lenses is of chlorite-ankerite. Veinlets are of calcite with minor envelopes of ankerite. A few late seams are of hematite with thin envelopes containing moderately abundant limonite.

plagioclase	75-80%	(including one phenocryst)
ankerite	10-12	
leucoxene	1	
chlorite	0.3	
pyrite	minor	
lenses		
chlorite	4- 5	
ankerite	1	
muscovite	trace	
veinlets		
calcite-(ankerite)	2- 3	
hematite-(limonite)	0.1	

Plagioclase forms one prismatic phenocryst 1.8 mm long. It is altered slightly to moderately to irregular patches and seams of ankerite.

Plagioclase forms prismatic grains mainly from 0.1-0.2 mm long. Interstitial to these are intergrowths of extremely fine-grained plagioclase and extremely fine-grained to cryptocrystalline ankerite.

Leucoxene forms disseminated patches ranging from 0.01-0.05 mm in size

Chlorite forms disseminated patches mainly from 0.03-0.07 mm in size of cryptocrystalline to extremely fine grains.

Pyrite forms a few euhedral cubic grains from 0.2-0.3 mm across.

A set of subparallel lenses from 0.05-0.4 mm wide and up to 2.5 mm long are dominated by single chlorite grains oriented parallel to the length of the lens. Some larger ones also contain a few muscovite flakes up to 0.5 mm long parallel to intergrown with chlorite. Some contain discontinuous seams up to 0.05 mm wide of ankerite commonly along one margin of the lens. One large lens contains a core up to 0.3 mm wide of chlorite-ankerite, in which very fine-grained chlorite flakes are oriented subperpendicular to the length of the lens and ankerite forms irregular seams and lenses.

Late, discontinuous veinlets and lenses, mainly from 0.07- 0.2 mm wide are of calcite; many of these are subparallel to the chlorite-rich lenses. A few larger, slightly braided lenses up to 0.5 mm wide are of very fine-grained calcite. Some calcite-rich lenses have a thin border of ankerite.

Late seams mainly from 0.02 mm wide are of hematite; bordering these is an envelope 0.1-0.2 mm wide containing moderately abundant, light orange, extremely fine-grained limonite. Many of these seams are parallel to the chlorite-rich lenses.

Sample JC-7 **Andesite/Basalt Ash Tuff; Replacement Patches of Dolomite-Pyrite**

Crystal fragments of plagioclase and pyroxene and abundant fragments of basalt/andesite flow are set in a well foliated groundmass containing crystallites of plagioclase in a cryptocrystalline material of uncertain composition. A few elongate lenses are of chlorite. Irregular to lensy replacement patches are of dolomite and opaque (magnetite and pyrite), in part with minor to moderately abundant muscovite and locally with minor quartz.

fragments		
basalt/andesite	30-35%	
plagioclase	2- 3	
pyroxene	0.1	
chlorite lenses	0.1	
muscovite	0.1	
epidote	trace	
groundmass		
cryptocrystalline	40-45	
plagioclase	12-15	
replacement		
dolomite	3- 4	
opaque	1- 2	(magnetite and pyrite)
muscovite	0.3	
quartz	minor	

Basalt/andesite forms fragments mainly from 0.08-0.2 mm in size, and a few up to 0.6 mm long. Most larger fragments are flattened parallel to foliation. Some of these are dominated by extremely fine-grained plagioclase. Others contain minor to moderately abundant plagioclase crystallites in a cryptocrystalline groundmass, probably devitrified volcanic glass with disseminated dusty opaque. The relatively uniform, slightly magnetic character of the rock suggests that some of the opaque is magnetite.

Plagioclase forms crystals and crystal fragments, mainly from 0.05-0.2 mm in size. Two euhedral prismatic phenocrysts are 0.5 mm long. A few patches up to 0.35 mm across are of very fine-grained plagioclase.

Pyroxene forms equant crystal fragments mainly from 0.03-0.07 mm in size.

Several lenses up to 1 mm long and 0.05 mm wide parallel to foliation are of chlorite aggregates; in most of these, flakes are in parallel orientation along the length of the lens.

A few patches up to 0.4 mm in size are of very fine-grained muscovite. The origin of these is uncertain; they may represent replaced plagioclase.

A few patches up to 0.2 mm in size are of very fine-grained epidote.

The groundmass is dominated by cryptocrystalline material, probably volcanic glass, containing moderately abundant plagioclase crystallites.

Lensy to irregular replacement patches mainly from 0.3-1.5 mm in size are of very fine-grained dolomite/calcite, some of which contain minor to moderately abundant dusty to very fine-grained opaque (magnetite?). A few patches and lenses up to 2 mm long consist of extremely fine- to very fine-grained opaque (magnetite/pyrite?) intergrown with calcite and minor quartz or muscovite of similar grain size. Opaque (magnetite/pyrite?) also forms abundant irregular replacement patches up to 0.5 mm in size.

Sample JC-8 **Intermediate Crystal Tuff; Strong, Patchy Carbonate-Quartz Replacement**

Fragments of plagioclase phenocrysts, andesite, and hypabyssal andesite are set in a cryptocrystalline groundmass dominated by plagioclase and replaced strongly by calcite/dolomite. The replacement obscures much of the original texture, and makes distinction difficult between some andesite fragments and the groundmass. One large, complex fragment contains zones of quartz/plagioclase-opaque, calcite/dolomite-(sericite), and opaque (oxide). Several veinlets are of calcite-(pyrite).

fragments		
plagioclase	7- 8%	
andesite	2- 3	
quartz	minor	
large fragment	7- 8	(quartz/plagioclase-carbonate/sericite-opaque)
groundmass		
plagioclase	40-45	
calcite/dolomite	30-35	
pyrite	0.2	
veins		
calcite-(pyrite)	2- 3	

Plagioclase forms crystal fragments mainly from 0.05-0.1 mm in size, with a few from 0.3-0.8 mm across.

Quartz forms angular fragments mainly from 0.05-0.1 mm in size.

A few fragments of aphanitic andesite are up to 0.6 mm across. Some contain minor plagioclase phenocrysts up to 0.1 mm long. A few fragments of andesite are dominated by lathy plagioclase grains mainly from 0.05-0.1 mm in length.

One fragment 15 mm across of hypabyssal andesite contains three main types of assemblage. One is of equant, interlocking quartz/plagioclase grains mainly from 0.015-0.025 mm in size, with moderately abundant interstitial opaque grains and scattered replacement patches up to 0.5 mm across of calcite/dolomite. The second is of cryptocrystalline calcite/dolomite intergrown with lesser sericite. The third is wispy to dense patches of dusty to extremely fine-grained opaque, which occur mainly in the carbonate-sericite patches and along borders of these and the quartz/plagioclase-rich patches.

A few patches (fragments?) up to 0.5 mm in size are of extremely fine-grained opaque (probably oxide).

The groundmass is dominated by cryptocrystalline to extremely fine-grained plagioclase. Calcite/dolomite forms strong pervasive replacement, which commonly obscures the original texture. Some carbonate patches contain 1-2% disseminated grains mainly from 0.005-0.01 mm in size. Pyrite forms a few euhedral grains and clusters of a few grains from 0.07-0.2 mm in size.

A few veins from 0.3-0.8 mm wide are of very fine- to medium-grained calcite with minor patches up to 0.15 mm in size of pyrite. Some medium-sized grains have wavy extinction.

Sample JC-9 **Basalt Dike; Quartz-Calcite-Chlorite-(Clinozoisite) Veins**

Minor plagioclase phenocrysts (altered partly to quartz) and pyroxene phenocrysts (altered to chlorite or to quartz-chlorite) are set in an unfoliated matrix of lathy plagioclase and equant clinopyroxene with minor interstitial chlorite. A set of subparallel, braided veins and veinlets is of quartz, calcite, and chlorite with minor clinozoisite.

phenocrysts	
plagioclase	1- 2%
pyroxene	minor
groundmass	
plagioclase	50-55
pyroxene	40-45
chlorite	1
opaque	0.2
quartz	trace
veins, veinlets	
quartz-calcite-chlorite-sericite	2- 3

Plagioclase forms subhedral, prismatic phenocrysts mainly from 0.3-0.7 mm in length, and a few up to 1 mm long. Smaller phenocrysts are fresh. Larger ones are replaced moderately to completely by extremely fine-grained quartz.

Pyroxene forms subhedral to euhedral phenocrysts mainly from 0.3-0.6 mm in size. Alteration is complete to cryptocrystalline chlorite. A few phenocrysts from 0.7-1.2 mm long are replaced by quartz and much less chlorite; quartz forms very fine grains, in large part oriented perpendicular to seams of chlorite.

In the groundmass, plagioclase forms unoriented, lathy crystals mainly from 0.07-0.12 mm long. Pyroxene forms equant grains mainly from 0.015-0.025 mm in size.

Opaque forms scattered patches up to 0.15 mm in size.

Quartz forms scattered interstitial grains mainly from 0.03-0.05 mm in size.

A few veins from 1-2 mm wide and several veinlets from 0.1-0.5 mm wide are of very fine-grained quartz, with moderately abundant to abundant lenses and patches of calcite and chlorite, and minor ones of sericite. One large vein contains scattered elongate anhedral grains of clinozoisite up to 0.2 mm long. A few veinlets from 0.03-0.05 mm wide are of very fine-grained calcite and lesser quartz.

Sample JC-10 Andesite Tuff

The sample contains minor crystal fragments of plagioclase and a few of andesite flow in a cryptocrystalline groundmass, which may represent in part devitrified glass. It has a moderate foliation possibly formed during metamorphism; locally this is contorted moderately.

fragments			
major (2-5%)		minor (<1%)	
plagioclase		opaque	1- 2%
andesite		hypabyssal diorite	0.3
sericite		hypabyssal andesite	minor
		quartz-rich	trace
groundmass			
volcanic glass		sericite	2- 3
		ankerite	1- 2
		chlorite	minor
		leucoxene	minor
veinlets			
ankerite	2- 3		
carbonate-sericite-chlorite	0.5		

Scattered crystals and fragments of phenocrysts of plagioclase are mainly from 0.07-0.15 mm in size, with a few grains up to 0.4 mm long. Other patches and lenses of similar size of cryptocrystalline sericite may be secondary after plagioclase. One elongate patch 1.3 mm long is of extremely fine-grained sericite.

A few fragments, mainly from 0.7-1.3 mm in size are of slightly porphyritic andesite. These contain minor phenocrysts of plagioclase mainly from 0.1 mm in size and a few lathy plagioclase grains up to 0.03 mm long in a groundmass of medium brown, devitrified glass with much less abundant lenses of chlorite and minor disseminated opaque. A replacement patch 0.3 mm long in one fragment is of calcite.

One lens 1.1 mm long is dominated by extremely fine-grained chlorite and minor sericite.

One fragment 1 mm in length of hypabyssal diorite(?) is dominated by very fine-grained plagioclase with less abundant irregular patches of opaque, chlorite, and calcite, and minor quartz. One fragment of hypabyssal diorite consists of plagioclase grains from 0.15-0.3 mm in size with much less abundant interstitial patches of chlorite; plagioclase is replaced

One fragment of hypabyssal andesite is dominated by lathy plagioclase grains mainly from 0.07-0.1 mm long, with irregular patches of opaque and interstitial patches of ankerite.

Opaque forms disseminated patches mainly from 0.05-0.1 mm in size.

One fragment 0.4 mm across is of equant quartz grains mainly from 0.01-0.02 mm in size, with much less abundant plagioclase and sericite.

The groundmass is dominated by medium brown, volcanic glass containing minor crystallites of plagioclase mainly from 0.02-0.04 mm long, lenses of sericite and of ankerite, minor lenses of chlorite, and minor disseminated, cryptocrystalline leucoxene.

Wispy veinlets and seams from 0.01-0.03 mm wide are of cryptocrystalline to extremely fine-grained ankerite, sericite, and chlorite. A vein 0.2 mm across on one side of the section is of cryptocrystalline carbonate with scattered clusters of pyrite grains mainly from 0.03-0.07 mm in size. Bordering pyrite are a few patches of extremely fine-grained quartz.

Ankerite forms a set of subparallel, lensy veinlets mainly from 0.02-0.05 mm in width.

Sample JC-11 Very Fine Felsic/Intermediate Crystal Tuff, Minor Ash Tuff Bed

Fragments of plagioclase, intermediate volcanic rocks, and minor ones of many other types are set in a cryptocrystalline groundmass of uncertain composition. A few skeletal replacement patches are of dolomite. At one end of the section is a layer of ash tuff; a few large fragments of similar composition occurs in the coarser grained tuff.

fragments			
plagioclase	7- 8%	volcanic glass	0.5
intermediate volcanic rocks	8-10	quartz	0.3
sericite	2- 3	chlorite	0.1
ash tuff	2- 3	opaque	0.1
biotite/muscovite	0.5		
groundmass			
plagioclase/sericite	60-65		
dolomite	2- 3		
ash tuff bed	3- 4		

Plagioclase forms equant to prismatic crystal fragments mainly from 0.07-0.15 mm in size, and a few from 0.2-0.5 mm across.

A few volcanic fragments up to 0.4 mm across contain minor, wispy, lathy phenocrysts up to 0.1 mm long in a cryptocrystalline groundmass. Others are free of phenocrysts and consist of cryptocrystalline groundmass, which is difficult to distinguish from the groundmass of the rock.

Several fragments up to 0.5 mm in size are of light to medium brown volcanic glass; some of these have a radiating texture.

Sericite forms fragments of cryptocrystalline to extremely fine grains, possibly after plagioclase or after intermediate volcanic rocks.

Mica forms a few flakes mainly from 0.1-0.15 mm in size and one 0.4 mm long. Pleochroism is from colourless to pale brown or light green.

Opaque forms anhedral patches mainly from 0.05-0.08 mm in size and a few patches up to 0.3 mm in size.

Chlorite forms scattered equant phenocrysts mainly from 0.07-0.1 mm in size. The mineral is pale green and cryptocrystalline.

Quartz forms a few fragments up to 0.2 mm in size of equant, subrounded grains mainly from 0.03-0.07 mm in size. One fragment 0.2 mm across is of cryptocrystalline quartz.

Epidote forms a few anhedral fragments mainly from 0.04-0.05 mm in size.

Apatite forms a few grains mainly from 0.03-0.07 mm in size.

A few fragments from 1.5- 4 mm across are of ash tuff as in the layer at one end of the section.

The groundmass is of cryptocrystalline material of uncertain composition. It may be dominated by plagioclase and much lesser chlorite wit minor sericite. Dolomite forms disseminated replacement patches up to 0.05 mm in size.

The ash tuff layer contains minor coarser plagioclase grains in a light brown, cryptocrystalline groundmass of plagioclase and biotite with disseminated lenses of leucoxene and opaque.

Sample 98-1 22.7 m Hybrid Rock: Hypabyssal Diorite; Fine-Grained Diorite; Host Rock Inclusions; Quartz-Calcite Replacement

The sample is a hybrid rock composed of several zones of different texture and mineralogy. It probably represents a contaminated border phase of an intrusion, which was later replaced. One zone is of hypabyssal diorite dominated by lathy plagioclase grains and lesser pyroxene grains in a groundmass of finer-grained, anhedral plagioclase, with minor chlorite and magnetite/ilmenite. Interstitial patches are of quartz and calcite. In much of this zone, plagioclase is replaced moderately to strongly to sericite, and pyroxene is replaced completely by tremolite and sericite. A replacement patch contains a zone dominated by very fine-grained quartz and another dominated by medium-grained quartz and medium- to coarse-grained calcite. At the other end of the sample is a complex zone of fine-grained diorite, partly replaced by quartz' this zone also contains patches of extremely fine-grained plagioclase-quartz, which may represent hybridized country rock.

	hypabyssal diorite	f.g. diorite	inclusions	replacement	veinlets
% of sample	35	20	5	40	
plagioclase	70-75%	50-55	75-80%	0	
clinopyroxene	12-15	1- 2	0	0	
quartz	10-12	17-20	12-15	75-80	
magnetite/ilmenite	2	0.5	minor	0	
sphene	minor	0	0	0	
biotite	minor	0	0	0.2	
calcite/dolomite	minor	10-12	0	17-20	1- 2
chlorite	1- 2	12-15	1- 2	4- 5	minor

In the hypabyssal diorite, plagioclase forms prismatic to lathy grains mainly from 0.1-0.2 mm long, with a few up to 0.5 mm long. In part of the section it is altered slightly to sericite. Elsewhere it is altered strongly to completely to sericite and lesser calcite.

Pyroxene forms subhedral prismatic grains mainly from 0.2-0.5 mm in size. Alteration is strong to complete to tremolite and/or ankerite. A few phenocrysts are from 0.7-1.2 mm in size; these are replaced completely by extremely fine-grained intergrowths of calcite, phlogopite, and abundant opaque.

In the groundmass, plagioclase forms interstitial grains mainly from 0.07-0.1 mm in size. Alteration is slight to moderate to cryptocrystalline sericite.

Quartz forms interstitial grain mainly from 0.05-0.1 mm in size. In part of the rock, patches up to a few mm across contain very abundant lathy plagioclase grains and lesser pyroxene grains are included in medium to coarse, interstitial grains of quartz. Minor calcite grains are associated with quartz. In these patches, plagioclase and pyroxene are altered completely to sericite and ankerite, respectively. A few interstitial patches up to 1.5 mm in size are of fine to medium-grained quartz and calcite with no inclusions of plagioclase or pyroxene. In a few of these, biotite forms a slender flake from 0.2-0.3 mm long. A few interstitial patches up to 1 mm in size are of intimate intergrowths of quartz and plagioclase.

Biotite forms scattered flakes mainly from 0.1-0.3 mm in size. Alteration in some grains is moderate to complete to pseudomorphic chlorite with minor disseminated Ti-oxide.

(continued)

Sample 98-1 22.7 m (page 2)

Sphene forms disseminated grains mainly from 0.03-0.15 mm in size.

Magnetite/ilmenite forms disseminated, equant grains mainly from 0.03-0.05 mm in size and locally up to 0.2 mm across. A few irregular grains are from 1-1.2 mm across. In a few patches, opaque, probably hematite, forms platy grains mainly from 0.07-0.1 mm in length.

The main replacement/vein zone is divided into two main parts. One side of the zone is dominated by mosaic quartz grains mainly from 0.03-0.05 mm in size. It contains scattered patches of extremely fine-grained calcite/dolomite and minor patches of chlorite. Enclosed in this zone is a lens over 5 mm long and 1 mm wide of a patchy intergrowth of extremely fine-grained sericite, very fine-grained chlorite, and minor opaque grains from 0.05-0.1 mm in size.

The other half of the replacement zone is 3-4 mm wide and is dominated by fine to locally medium-grained quartz. Textures suggest that original coarser grains were strained and recrystallized in part to finer, sub-grain aggregates. Calcite forms irregular grains from 0.5-2 mm in size and one grain 5 mm across. Chlorite forms minor very fine-grained patches, commonly associated with calcite. This zone contains a few irregular, partly absorbed inclusions up to a few mm across dominated by anhedral plagioclase grains mainly from 0.2-0.3 mm in size with lesser patches of chlorite.

On the other side of the coarse quartz patch is a zone dominated by anhedral plagioclase grains mainly from 0.2-0.5 mm in size intergrown intimately with patches of very fine-grained chlorite and replaced by patches of very fine- to fine-grained quartz. This grades into a finer-grained zone of anhedral plagioclase, chlorite, quartz, and calcite with somewhat similar textures. Included in this zone are several patches up to a few mm across of equant quartz and plagioclase grains mainly from 0.02-0.03 mm in grain size with minor interstitial flakes of chlorite and of sericite.

One fragment 1.7 x 0.6 mm in size in the hypabyssal diorite consists of cryptocrystalline plagioclase and ankerite, with minor calcite, opaque, and sericite, and trace chlorite.

A few veinlets up to 0.2 mm wide are of very fine-grained calcite with minor patches of chlorite.

Sample 98-2 9.5 m Gabbro, with Interstitial Calcite-Quartz-(Tremolite-Chlorite)

The sample contains subhedral clinopyroxene grains and interstitial plagioclase with much less interstitial patches of ilmenite/magnetite and minor K-feldspar grains. Clinopyroxene is replaced moderately to strongly by tremolite/actinolite, calcite, and sericite. Coarse interstitial patches are of calcite-quartz-tremolite/actinolite. Much smaller interstitial patches are of chlorite.

clinopyroxene	35-40%	
plagioclase	35-40	
opaque	4- 5	(ilmenite/magnetite)
K-feldspar	1- 2	
biotite	0.3	
apatite	0.1	
allanite	trace	
sphene	trace	
replacement, interstitial patches		
calcite	8-10	
quartz	2- 3	
tremolite/actinolite	1- 2	
chlorite	1	

Clinopyroxene forms subhedral to euhedral, prismatic grains mainly from 1-1.5 mm in size. Many grains are replaced moderately to strongly by prismatic to fibrous tremolite and patches of extremely fine-grained calcite. More intense replacement is to cryptocrystalline to extremely fine-grained calcite and muscovite with dusty inclusions of opaque (hematite?).

Plagioclase forms anhedral grains mainly from 0.5-1 mm in size, and locally up to 2.5 mm across. Some grains show concentric growth zoning. Alteration is slight to sericite and calcite. A few grains contain replacement patches of calcite up to 1 mm in size.

Ilmenite/magnetite forms interstitial grains mainly from 0.1-0.3 mm in size, and a few patches up to 1 mm in size.

K-feldspar forms interstitial grains mainly from 0.3-0.5 mm in size.

Biotite forms anhedral, interstitial flakes mainly from 0.2-0.4 mm long. Smaller, commonly more irregular grains border some opaque patches. Pleochroism is from light to medium/dark brown to reddish brown.

Apatite forms elongate prismatic grains up to 0.5 mm long. It is concentrated moderately to strongly in borders of some plagioclase, which also are characterized by containing moderately abundant dusty opaque grains.

Allanite(?) forms one subhedral, equant grain 0.1 mm long. It is pleochroic from medium to dark brown. Sphene forms minor anhedral grains mainly from 0.05-0.08 mm in size.

Calcite forms interstitial grains up to 2.5 mm in size. Quartz forms subhedral to euhedral grains mainly from 0.5-0.8 mm in size and a few up to 1.5 mm long. Intergrown with calcite, tremolite/actinolite forms ragged prismatic grains up to 1.5 mm long; its pleochroism is from pale to light green.

Chlorite forms a few interstitial patches up to 0.4 mm across of extremely fine, subradiating grains.

Sample 98-2 25.7 m Basalt/Andesite Ash Tuff; Dolomite-Rich Layers; Calcite-Veinlets

The sample is a well foliated, basalt/andesite tuff containing lathy plagioclase grains and minor fragments of andesite/basalt in a groundmass dominated by cryptocrystalline to extremely fine-grained plagioclase with moderately abundant dusty opaque. Some layers contain abundant dolomite. The rock is moderately magnetic. An early lens parallel to compositional banding is of secondary dolomite with lesser quartz. Veinlets are of calcite/dolomite.

fragments		
plagioclase	7- 8%	
andesite/basalt flow	3- 4	
hypabyssal andesite/basalt	0.3	
groundmass		
plagioclase	70-75	
dolomite/calcite	7- 8	
dusty opaque	2- 3	(magnetite, carbonaceous opaque)
opaque	minor	
veinlets		
dolomite-quartz-opaque	1	
calcite	0.5	

Plagioclase forms lathy grains mainly from 0.07-0.15 mm in length, and locally up to 0.35 mm long. Many of these are oriented parallel to foliation.

Fragments up to 0.6 m long are of a variety of andesite flows. These range from cryptocrystalline to extremely fine-grained, and a few contain small plagioclase phenocrysts. One fragment 2 mm long contains moderately abundant lathy plagioclase grains from 0.1-0.2 mm long in a groundmass of finer lathy plagioclase and abundant dusty to extremely fine-grained opaque. The texture of this fragment is similar to that of the groundmass.

A few fragments up to 2 mm long of hypabyssal andesite consist of lathy plagioclase grains up to 0.1 mm long in a sparse groundmass of plagioclase, dolomite/calcite, and minor opaque.

The groundmass is dominated by cryptocrystalline to extremely fine-grained plagioclase with moderately abundant dusty opaque, probably magnetite and carbonaceous opaque. Dolomite is concentrated strongly in some layers up to 1.5 mm wide as anhedral grains mainly from 0.03-0.05 mm in size. It also occurs in lenses up to 1.5 mm long elongated parallel to foliation. A few replacement patches up to 0.7 mm long are of very fine- to fine-grained calcite/dolomite.

Opaque (magnetite?) forms disseminated equant patches mainly from 0.05-0.1 mm in size.

One bed/vein/lens parallel to foliation up to 0.6 mm wide is dominated by extremely fine-grained dolomite/calcite, with lesser patches of very fine-grained quartz and scattered patches up to 0.5 mm long of pyrite.

A few veinlets from 0.1-0.15 mm wide of extremely fine-grained chlorite and/or calcite cut across the foliation planes at an angle of 45-60°.

Sample 98-2 53.9 m Basalt Flow; Replacement Patches, Lenses of Ankerite/Dolomite-Chlorite; Veins of Calcite-(Quartz)

Minor plagioclase phenocrysts are set in a groundmass of much finer-grained plagioclase and minor ankerite, chlorite, and leucoxene/opaque. Very irregular replacement patches, lenses, and veinlets are of ankerite/dolomite, chlorite, and much less abundant quartz and pyrite. Veins are of calcite-(quartz).

phenocrysts		**replacement**	
plagioclase	5- 7%	ankerite/dolomite	12-15%
groundmass		chlorite	12-15
plagioclase	45-50	sericite	1
chlorite	10-12	quartz	1
ankerite	2- 3	pyrite	0.3
leucoxene/opaque	2		
veins			
calcite-(quartz)	5- 7		

Plagioclase forms lathy phenocrysts mainly from 0.1-0.2 mm long, with a few up to 0.3 mm long. In the groundmass, plagioclase forms finer-grained, lathy to acicular grains intergrown with cryptocrystalline to extremely fine-grained, equant plagioclase with much less abundant ankerite and chlorite. Leucoxene forms disseminated patches mainly from 0.015-0.03 mm in size.

Irregular replacement patches up to a few mm across are composed of extremely fine- to very fine-grained ankerite/dolomite and chlorite, which commonly are segregated in separate parts of the replacement patches. A few larger patches also contain zones of extremely fine-grained to cryptocrystalline sericite. Some of these replacement patches have an envelope up to 0.3 mm wide in which the texture is moderately different from that of the rock further from the replacement patch.

One replacement patch 1.2 mm across consists of very fine-grained quartz and much less calcite enclosing a few patches up to 0.4 mm in size of pyrite; in these quartz forms poorly developed comb-textured aggregates.

One replacement lens 2 mm x 0.5 mm in size contains a core of subhedral pyrite grains mainly from 0.03-0.07 mm in size, surrounded by a zone of cryptocrystalline quartz. Calcite/dolomite and chlorite form patches along quartz-pyrite grain borders, and chlorite also occurs locally on the border of the patch adjacent to the host rock.

A few, cryptocrystalline to extremely fine-grained, interstitial patches up to 0.3 mm in size have a thin rim of chlorite and a core of quartz. One has a grain of rutile(?) 0.08 mm long in the quartz core; this grain has very high relief and a yellowish, olive-green colour.

Veins up to a few mm wide very fine- to medium-grained calcite/dolomite cut the replacement patches. Locally these veins contain patches of extremely fine- to very fine-grained quartz.

Sample 98-3 48.6 m Intermediate Ash Tuff; Calcite/Dolomite-Pyrite Alteration and Veins; Quartz Veinlets; Late Calcite Veinlets

The sample is dominated by cryptocrystalline to extremely fine-grained plagioclase with lesser sericite and ankerite. Replacement patches are of ankerite-pyrite. Veins and coarser replacement patches are of calcite/dolomite-quartz-(pyrite). A few veinlets are dominated by quartz. A few late veinlets are of calcite.

phenocrysts and fragments	
plagioclase(?)	trace
latite	trace
groundmass	
plagioclase	50-55%
sericite	15-17
ankerite	15-17
leucoxene	1
replacement and veins	
ankerite/dolomite-pyrite	3- 4
calcite/dolomite-quartz-(pyrite)	10-12
quartz-(pyrite-dolomite/calcite-sericite)	0.3
calcite	1- 2

A phenocryst(?) of plagioclase 1 mm across on one edge of the section was replaced completely by extremely fine, interlocking grains of quartz and irregular patches of ankerite-sericite. One plagioclase phenocryst 0.5 mm long is replaced completely by cryptocrystalline sericite.

In the groundmass, plagioclase forms interlocking grains mainly from 0.01-0.02 mm in size. Sericite and ankerite each form irregular patches of cryptocrystalline grains, probably in large part as an alteration of plagioclase. Leucoxene forms disseminated spots mainly from 0.01-0.02 mm in size, with a few up to 0.1 mm across. Pyrite forms disseminated grains mainly from 0.02-0.03 mm in size.

A few latite fragments up to 0.7 mm across are of interlocking, extremely fine-grained plagioclase.

Smaller replacement patches, mainly less than 1 mm in size, are dominated by extremely fine-grained ankerite/dolomite. Pyrite forms moderately abundant clusters of grains mainly from 0.02-0.05 mm in grain size.

Larger, irregular replacement patches and veinlike zones up to a few mm across are dominated by extremely fine- to fine-grained calcite/dolomite. Bordering many replacement patches are zones of extremely fine-grained chlorite. Some large replacement patches contain areas up to a few mm long of slightly interlocking quartz grains mainly from 0.02-0.05 mm in size.

Warped veinlets up to 0.2 mm wide are of slightly interlocking quartz grains mainly from 0.01-0.03 mm in size. A few veinlets up to 0.1 mm wide are of quartz with lesser pyrite and minor dolomite/calcite and sericite.

A few late veins up to 0.5 mm wide are of fine- to medium-grained calcite. One of these cuts a quartz veinlet

Sample Tr-3 **Skarn: Epidote-Chalcopyrite-Pyrrhotite-Ankerite-Garnet-(Tremolite-Quartz); Late Veins of Hematite-Limonite-(Carbonate)**

The sample is a patchy skarn, one half of which is rich in epidote, and the other half of which contains patches rich in one or more of ankerite, garnet, and clinopyroxene. Minor minerals are quartz, K-feldspar, tremolite, and magnetite. Both contain patches of and intimate intergrowths with chalcopyrite and pyrrhotite. Late, commonly banded veins are of hematite/limonite-ankerite.

epidote	30-35%	tremolite	0.2%
ankerite	20-25	K-feldspar	0.2
chalcopyrite	12-15	magnetite	minor
pyrrhotite	12-15	biotite	trace
garnet	5- 7	actinolite	trace
clinopyroxene	1- 2	galena	trace
quartz	0.3	pyrite	trace
veins			
hematite/limonite-ankerite	4- 5		

Epidote is concentrated strongly in one half of the section away from garnet. It forms equant to elongate prismatic grains mainly from 0.1- 0.5 mm long. The mineral has parallel extinction; otherwise it would be difficult to distinguish it from clinopyroxene. Coarser elongate grains of epidote occur in subparallel to slightly radiating clusters, in which grains are intergrown intimately with very fine-grained chalcopyrite and lesser pyrrhotite along grain borders of epidote.

Ankerite forms irregular patches up to a few mm across, also intergrown with sulfides.

Chalcopyrite and pyrrhotite form irregular aggregates of grains mainly from 0.02-0.07 mm in size, intergrown with each other and with silicates and ankerite. A few grains of chalcopyrite are up to 0.5 mm across. A few patches of pyrrhotite are up to 2 mm across. Pyrrhotite is altered moderately to strongly to secondary pyrite, which shows a variety of textures, including concentric zones outwards from fractures and parallel, very dusty zones between fractures. Alteration is most intense in pyrrhotite-rich patches.

Garnet is concentrated strongly in one half of the section as clusters of anhedral to euhedral equant grains, mainly from 0.1-0.3 mm in size. Most are colourless, but a few are pale orange. Where interstitial patches of ankerite surround garnet and of quartz, it tends to be subhedral to euhedral in outline.

Clinopyroxene forms clusters of equant grains mainly from 0.1-0.15 mm in size, intergrown with ankerite and sulfides.

Tremolite forms disseminated grains mainly from 0.2-0.4 mm long. It may be secondary after clinopyroxene. Where it is intergrown with ankerite, commonly it is fibrous in texture. Intergrown with some patches of pyrrhotite-chalcopyrite are interstitial patches of light to medium green, cryptocrystalline to extremely fine-grained actinolite.

Magnetite forms scattered equant, anhedral grains from 0.1-0.2 mm in size. It also forms disseminated grains from 0.01-0.025 mm in size intergrown with elongate patches of epidote.

Biotite forms scattered anhedral flakes mainly from 0.07-0.1 mm in size, mainly associated with borders of quartz and garnet. Pleochroism is from light to medium, brownish olive green.

Quartz and K-feldspar form interstitial grains mainly from 0.03-0.05 mm in size.

(Continued)

Galena forms a few anhedral grains up to 0.1 mm long, commonly associated with chalcopyrite. On the chalcopyrite-galena borders in a few patches are grains of a pale yellow mineral up to 0.015 mm in size; these grains were too small to test for hardness. The mineral probably is pyrite, but if the sample contains values in gold and silver, it might be a precious-metal phase, and could be tested using the scanning electron microprobe (SEM).

At one end of the sample is a zoned, patchy vein up to 1.5 mm wide dominated by opaque and reddish brown hematite? Part of the vein is composed of massive, opaque hematite, which also replaces irregularly the adjacent host rock. The rest of the vein is banded finely, with an outer zone of extremely finely laminated ankerite stained orange by limonite, and a core of more coarsely banded hematite. The latter contains several colloform patches up to 0.2 mm in size of radiating ankerite. Bordering the vein are wispy braided stringers of hematite. A parallel veinlet 0.3 mm wide is of similar composition and texture.

Sample TR-35 Basalt Tuff/Lapilli Tuff

Fragments up to 2 cm in size of a variety of basalt flows and hypabyssal basalt/andesite are set in a sparse cryptocrystalline to extremely fine-grained groundmass of basaltic composition. The rock is moderately to strongly magnetic, indicating that much of the opaque is magnetite. Based on the composition of the rock, opaque is probably a mixture of magnetite and ilmenite.

basalt/andesite flows	50-55%
hypabyssal andesite/basalt	15-20
groundmass	
plagioclase laths	3- 4
plagioclase	12-15
chlorite	5- 7
clinopyroxene	2- 3

Some basalt flows contain abundant lathy plagioclase grains in a groundmass containing abundant opaque. In some fragments opaque (magnetite/ilmenite) forms lenses patches interstitial to plagioclase, and in others it forms disseminated grains from 2-5 microns in size. A few fragments contain several patches from 0.07-0.2 mm in size of cryptocrystalline chlorite. In some fragments a flow foliation is defined by orientation of coarser plagioclase laths.

A few basalt flow fragments up to 0.8 mm long contain minor acicular plagioclase grains in a groundmass obscured by abundant dusty opaque.

In some fragments, plagioclase laths are set in a groundmass dominated by chlorite with much less clinopyroxene and plagioclase.

One basalt flow fragment contains abundant amygdules mainly form 0.05-0.1 mm in size of very fine-grained quartz and lesser chlorite. It is cut by two veinlets 0.1 mm wide of extremely fine-grained chlorite and minor epidote. It also contains a subhedral plagioclase phenocryst 0.8 mm long.

One flow fragment contains an amygdule 1.1 mm across of very fine-grained chlorite.

Some hypabyssal basalt/andesite flows contain one or two phenocrysts of pyroxene or plagioclase from 0.3-0.5 mm across. Clinopyroxene is altered completely to extremely fine-grained tremolite or chlorite-(epidote), and plagioclase is altered slightly to moderately to irregular patches of cryptocrystalline chlorite. .

A hypabyssal andesite/basalt fragment 5 mm across consists of prismatic clinopyroxene grains from 0.1-0.15 mm long and lesser interstitial plagioclase, 2-3% disseminated opaque (magnetite?) and minor patches of chlorite up to 0.05 mm long. A replacement patch 1 mm long is of very fine-grained ankerite/dolomite and minor quartz. A few others fragments up to 2 mm in size are similar but somewhat finer-grained. In some of these, plagioclase is more abundant than clinopyroxene, and clinopyroxene is altered moderately to chlorite.

One hypabyssal andesite fragment contains several prismatic phenocrysts from 0.5-0.7 mm in size in a groundmass of finer-grained lathy plagioclase and minor disseminated, extremely fine-grained clinopyroxene, chlorite, and opaque.

One porphyritic andesite contains abundant plagioclase phenocrysts in a groundmass of plagioclase, chlorite, and epidote with abundant lathy opaque (hematite?). Plagioclase phenocrysts are replaced moderately by cryptocrystalline epidote.

A few fragments up to 0.7 mm across are dominated by magnetite/ilmenite.

The groundmass is dominated by cryptocrystalline to extremely fine-grained plagioclase, clinopyroxene, and chlorite.

Sample TR-51 Basalt Lapilli Tuff; Ankerite Replacement; Dolomite-(Quartz?) Veinlets

Fragments up to several mm long of a variety of types of basalt and andesite are set in a basaltic groundmass. In parts of the sample it is difficult to distinguish fragments from groundmass. Ankerite forms a few replacement patches. Veinlets are of dolomite, and some contain patches of quartz(?).

fragments	
basalt , hypabyssal basalt, andesite	30-35%
plagioclase	1
groundmass	
plagioclase	30-35
chlorite	12-15
ankerite	10-12
leucoxene	0.3
replacement	
ankerite	4- 5
veinlets	
dolomite-(quartz?)	1- 2

Plagioclase forms a few phenocrysts mainly from 1-1.5 mm in size. Alteration is moderate to carbonate.

Fragments of a variety of andesite to basalt flows are from 1.5-2.5 mm in size. Some fragments of hypabyssal basalt are dominated by prismatic plagioclase grains in a groundmass of finer-grained plagioclase, ankerite, and minor to moderately abundant opaque. One fragment is of interlocking plagioclase grains mainly from 0.03-0.05 mm in size. It also contains moderately abundant disseminated patches of cryptocrystalline ankerite and disseminated spots of leucoxene.

Several fragments contain prismatic plagioclase phenocrysts from 0.2-0.4 mm in length in a groundmass of finer-grained plagioclase with abundant replacement patches of ankerite mainly from 0.03-0.07 mm in size.

One fragment 0.5 mm across contains lathy plagioclase grains mainly from 0.05-0.08 mm in length in a groundmass containing abundant opaque.

One fragment 4 mm long is of extremely fine-grained andesite consisting of lathy plagioclase altered moderately to ankerite in a groundmass of ankerite, plagioclase, and moderately abundant opaque. It contains a patch (amygdule?) 0.4 mm across of a single quartz grain. It was cut by an ankerite veinlet 0.07 mm across, which is truncated at the border of the fragment, suggesting strongly that it was formed prior to the explosive event which formed the tuff.

The groundmass contains lathy plagioclase grains from 0.05-0.08 mm in length in a matrix of cryptocrystalline to extremely fine-grained plagioclase and cryptocrystalline chlorite(?) with moderately abundant patches of ankerite mainly from 0.03-0.05 mm in size.

A few larger, irregular replacement patches and lenses are of extremely fine-grained ankerite. .

A vein 0.5-0.7 mm wide is of extremely fine-grained ankerite and less abundant cryptocrystalline quartz(?). A discontinuous vein of very fine-grained dolomite contains abundant dusty opaque inclusions. A few late, curved veinlets from 0.1-0.4 mm wide are of very fine-grained dolomite with minor patches of cryptocrystalline quartz(?).

Sample TR-101 **Chalcopyrite-Magnetite-Pyrrhotite-Clinopyroxene-Garnet-Carbonate-Biotite Skarn; Patches of Sericite/Muscovite-(Biotite) ; Veinlet of Dolomite-Pyrrhotite-(Chalcopyrite-Chlorite)**

The sample is a patchy skarn composed of chalcopyrite, magnetite, pyrrhotite, clinopyroxene, garnet, carbonate, and biotite. Much of the clinopyroxene is too fine-grained to distinguish it from epidote. A few relic(?) patches of altered rock are dominated by sericite/muscovite and lesser ankerite and biotite. A veinlet is of carbonate and pyrrhotite with much less abundant chalcopyrite and chlorite. Carbonate appears in section to be dolomite, but it is not reactive with cold, dilute HCl, suggesting that it is ankerite.

chalcopyrite	30-35%	
magnetite	17-20	
pyrrhotite	10-12	
clinopyroxene	25-30	(possibly includes some epidote)
garnet	2- 3	
carbonate	2- 3	
biotite	1	
galena(?)	trace	
patches		
sericite/muscovite-ankerite-(biotite)	2- 3	
veinlets		
dolomite-pyrrhotite-(chalcopyrite-chlorite)	0.5	
limonite-dolomite	0.2	

Chalcopyrite, magnetite, and pyrrhotite occur as granular grains mainly from 0.02-0.05 mm in size, intergrown with each other and with calcite and silicates. A few massive patches up to 1.5 mm in size are of each of chalcopyrite and pyrrhotite. Along a few later fractures, pyrrhotite is altered to dusty pyrite in botryoidal patches mainly from 0.1-0.15 mm in size, and locally up to 0.8 mm across. One patch 0.04 mm across is of an intergrowth of galena(?), chalcopyrite, and minor pyrite

Clinopyroxene forms equant grains mainly from 0.02-0.03 mm in size. These occur in patches, which range from nearly pure silicate to intimate intergrowths with sulfides. The grain size is too fine to distinguish clinopyroxene from epidote.

Carbonate forms very fine- to extremely fine-grained patches intergrown with clinopyroxene and lesser biotite in an irregular patch near one end of the section.

Biotite is concentrated in a few patches as clusters of equant flakes mainly from 0.02-0.05 mm in size; in these biotite is pleochroic from light to medium brown. Disseminated, equant biotite flakes mainly from 0.02-0.05 mm in size are pleochroic from pale to medium slightly brownish green. A few lenses up to 1 mm long interstitial to pyrrhotite are of cryptocrystalline, brownish green biotite.

Garnet occurs in bands up to 1.5 mm wide and several mm long. Grains are anhedral and isotropic, and contain moderately abundant extremely fine-grained inclusions of chalcopyrite, much of it in trains parallel to the length of the garnet band.

A few patches up to 2 mm long are of extremely fine-grained sericite/muscovite, with lesser chlorite and minor disseminated grains of magnetite and/or chalcopyrite and pyrrhotite. One of these contains moderately abundant ankerite intergrown with sericite/muscovite. These may represent altered plagioclase from the original host rock.

A veinlet up to 0.2 mm across is of very fine-grained calcite and pyrrhotite with minor chalcopyrite and chlorite. A few late veinlets from 0.02-0.05 mm wide are of medium orange-brown limonite with cores of carbonate.

Sample X-1 Skarn: Clinopyroxene-Ankerite-Chalcopyrite-Pyrrhotite-Biotite-(Magnetite-Garnet-Quartz-Pyrite; Vein of Limonite/Hematite; Tremolite Alteration; Minor Andesite/Basalt Breccia

The rock is a patchy, partly banded skarn dominated by clinopyroxene with lesser chalcopyrite and ankerite, and much less pyrrhotite/pyrite, magnetite, and garnet. A zone 5 mm wide contains several veins and veinlets dominated by limonite/hematite. Bordering the vein on the skarn side is a tremolite-rich zone, and on the other side is a breccia with fragments of andesite and basalt flows and hypabyssal rocks and plagioclase phenocrysts.

clinopyroxene	40-45%
chalcopyrite	10-12
ankerite	10-12
pyrrhotite/pyrite	5- 7
biotite	4- 5
magnetite	2- 3
garnet	2- 3
quartz	0.5
border of vein	
a) tremolite-rich	4- 5%
b) andesite/basalt breccia	4- 5
late veins	
limonite/hematite	7- 8

Clinopyroxene forms equant to slightly elongate grains mainly from 0.03-0.07 mm in size, and a few up to 0.15 mm long.

Chalcopyrite is widespread as anhedral grains mainly from 0.03-0.1 mm in size, with a few patches up to 1.5 mm across. It is intergrown finely with clinopyroxene, and commonly is interstitial to subhedral clinopyroxene.

Ankerite forms anhedral grains mainly from 0.05-1 mm in size interstitial to clinopyroxene and intergrown with sulfides and biotite. Many coarser grains from 0.7-1.5 mm in size are poikilitic, containing abundant inclusions of clinopyroxene and lesser ones of other minerals.

Pyrrhotite occurs in similar textures as chalcopyrite. Many grains are replaced moderately to strongly to dusty pyrite, and some is replaced further to pyrite grains without dusty inclusions.

Garnet commonly is concentrated in bands up to 0.5 mm wide of grains from 0.02-0.03 mm in size intergrown with sulfides. Less abundant garnet grains are from 0.05-0.15 mm in size.

Magnetite is concentrated strongly in a few bands up to 0.3 mm wide in which it forms anhedral, equant grains mainly from 0.02-0.05 mm in size. Intergrown with magnetite is moderately abundant chalcopyrite. Elsewhere, it forms disseminated grain mainly from 0.02-0.05 mm in size intergrown with silicates.

Biotite forms irregular patches up to 1 mm in size, and irregular smaller patches and seams ranging from cryptocrystalline to 0.05 mm in grain size interstitial to clinopyroxene and intergrown with ankerite. Pleochroism is from light to medium greenish brown. Chlorite forms a few lenses up to 1 mm long of cryptocrystalline grains intergrown with minor opaque; it may be secondary after biotite.

Quartz forms interstitial grains mainly from 0.03-0.07 mm in size.

A late, braided, banded vein zone up to 5 mm wide contains veins up to 2 mm wide dominated by opaque to orangish brown hematite/limonite. Veins have banded and colloform textures similar to those in Sample Tr-3.

On one side of the late vein are lensy zones up to 2 mm wide dominated by cryptocrystalline to extremely fine-grained tremolite, with scattered prismatic grains and clusters of grains up to 0.2 mm long.

On the other side of the vein zone is a breccia containing fragments of a variety of andesite/basalt flows and hypabyssal rocks and plagioclase phenocrysts mainly from 0.2-0.7 mm in size in a limonitic groundmass.

Sample X-2 Skarn: Clinopyroxene-Ankerite-Biotite-Chalcopyrite-Magnetite-Pyrrhotite-Garnet-Quartz.; Replacement Patch of Quartz-Ankerite-Biotite

This sample is finer-grained than Sample X1, and has some important differences. Ankerite and biotite are more abundant, and may represent in part an alteration of clinopyroxene. A large replacement patch is dominated by quartz with lesser ankerite and biotite. It is cut by veinlets of quartz, some of which contain patches of chalcopyrite, pyrite, and lesser pyrrhotite.

clinopyroxene	20-25%	**replacement patch**	
ankerite	12-15	quartz	30-35
biotite	5- 7	ankerite	4- 5
chalcopyrite	5- 7	biotite	2
magnetite	4- 5	pyrite	0.2
pyrrhotite/pyrite	3- 4	chalcopyrite	0.2
garnet	1- 2	pyrrhotite	0.1
quartz	1		
late lenses		**veinlets**	
sericite-ankerite(?)	0.5	limonite/hematite	0.5

Clinopyroxene forms equant grains mainly from 0.02-0.05 mm in size. Its optical properties are obscured by magnetite. It probably was replaced moderately to strongly by cryptocrystalline ankerite and biotite.

Ankerite forms anhedral grains ranging widely in size and in abundance of inclusions.

Biotite is concentrated moderately in irregular patches of cryptocrystalline to extremely fine grains. It also is intergrown intimately with disseminated magnetite and sulfide grains.

Magnetite forms abundant, disseminated grains from 0.003-0.02 mm in size intergrown with clinopyroxene and ankerite. It also forms disseminated grains from 0.03-0.05 mm in size.

Chalcopyrite and pyrrhotite forms irregular patches intergrown intimately with silicates. Coarser grained patches commonly are associated with coarser patches of quartz and/or ankerite. Pyrrhotite is altered strongly to pyrite, and cores of some grains are replaced by red-brown hematite.

Garnet is concentrated in a few bands up to 0.4 mm across as grains from 0.1-0.2 mm in size.

A replacement patch up to 2 cm across is dominated by quartz and much less ankerite and biotite. Quartz forms patches of equant, interlocking grains mainly from 0.01-0.03 mm in size. It also forms veinlets up to 0.4 mm wide of grains mainly from 0.05-0.1 mm in size; these zones cut the quartz-rich patch but do not extend into the host rock. Some of these veinlets contain patches of chalcopyrite, pyrrhotite, and pyrite. One contains a cluster of subhedral to euhedral pyrite grains mainly from 0.05-0.15 mm in grain size.

Ankerite is concentrated in a few patches on the border of the quartz-rich patch as slightly interlocking grains from 0.1-0.4 mm in size. Coarser ankerite grains commonly have wavy extinction. Biotite forms irregular patches of cryptocrystalline to extremely fine grains.

Smaller veinlets and replacement zones associated with the main replacement patch are of quartz, ankerite, and sulfides.

A few subparallel lenses up to 3 mm in length and 0.2 mm wide of cryptocrystalline sericite-ankerite(?). cut the quartz-rich patch.

Late veinlets up to 0.03 mm wide are of reddish brown limonite/hematite.

APPENDIX II

11/12/1999

Telkwa Gold Corp.
Summary of 1998 exploration

Expense Category			Total	Geological	Geochemical	Geophysical	Physical Work	Diamond Drilling
Professional fees								
Will Tompson		Rate $350/day						
	July 1 - 15 (16 days)	5,600.00						
	July 16 - 31 (11 days)	3,850.00						
	Aug 1 - 31 (23.5 days)	8,225.00						
	Sept 1 - 30 (9.75 days)	3,412.50						
		21,087.50	**21,087.50**	21,087.50				
Jim Cuttle		Rate $370/day						
	July 13-18, 20-25, 27-31 (17 days)	6,290.00						
	expense recovery	859.90						
	ug 2-7, 9, 11-14, 16-19, 22-28, 31 (21.5 days)	7,955.00						
	expense recovery	774.24						
	Sept 1-9, 19 (7.5 days)	2,775.00						
	expense recovery	577.17						
		19,231.31	**19,231.31**	19,231.31				
Wages		Includes vacation pay and employer's portion of EI and CPP						
Tyler Tompson		Rate $125/day						
	July 1 - 15 (9 days)	1,214.23	**1,214.23**	-	1,214.23			
Dave McCurdy		Rate $0/day						
			242.85			242.85		
Jason LaTrace		Rate $175/day						
	July 1 - 15 (8 days)	1,548.29	**1,548.29**		1,548.29			
Fred Loutitt		Rate $225/day						
	July 1 - 15 (14 days)	3,495.33						
	July 16 - 31 (16 days)	4,000.67						
		7,496.00	**7,496.00**				7,496.00	
Daniel Ethier		Rate $200/day						
	July 1 - 15 (12 days)	2,665.56						
	July 16 - 31 (13 days)	2,888.07						
		5,553.63	**5,553.63**		5,553.63			
Jerry Mencl		Rate $200/day						
	July 1 - 15 (9 days)	1,942.76						
	Aug 16- 31 (4 days)	863.44						
		2,806.20	**2,806.20**		2,806.20			
Thomas Adair		Rate $125/day						
	Aug 1 - 15 (1 day)	134.91	**134.91**					134.91
Gary Thompson		Rate $200/day						
	Aug 16 - 31 (3 days)	658.22	**658.22**		658.22			
Josh Adema		Rate $150/day						
	Aug 16 - 31 (3 days)	491.34	**491.34**				491.34	
WCB		Rate 4.56%	**855.98**	570.78	166.77	3.44	113.07	1.91
Accomodation			**4,186.28**	3,012.19	-	-	1,174.09	-
Storage & transportation			**1,840.00**	1,840.00				
Office and admin supplies			**365.74**	73.15	73.15	73.15	73.15	73.15
Specifically applied to geology			**260.47**	260.47				
Accounting fees			**710.47**	142.09	142.09	142.09	142.09	142.09
Communications			**836.69**	167.34	167.34	167.34	167.34	167.34
Slide imaging			**41.73**	41.73				

11/12/1999

Telkwa Gold Corp.
Summary of 1998 exploration

Expense Category			Total	Geological	Geochemical	Geophysical	Physical Work	Diamond Drilling
Vehicle			**12,898.30**	2,579.66	2,579.66	2,579.66	2,579.66	2,579.66
Supplies			**4,667.19**	933.44	933.44	933.44	933.44	933.44
Specific invoices								
JT Thomas Drilling			**31,000.00**					31,000.00
Mineral Environments Lab			**4,905.10**		2,452.55			2,452.55
Watershed Resources(mapping)			**2,355.00**	2,355.00				
Bruce Hobson			**3,630.00**	3,630.00				
McElhanney Consulting			**5,434.46**	5,434.46				
CDS Inc (Sedar)			**350.00**	350.00				
Frontier Geoscience			**9,300.00**			9,300.00		
Geoff Lillos	4.5 hours @ $65/hour		**292.50**	292.50				
Powerstroke Equip			**495.15**				495.15	
Ron Langdale	1 day @ $250/day		**250.00**				250.00	
Derskins			**14.08**				14.08	
Jim Hutter								
Jun 23 - July 14								
Cat 67 hours @ $60/hour		4,020.00						
Labour 3.5 days @ $350/day		1,225.00						
Other equipment		2,190.94						
July 15 - Aug 6								
Cat 110 hours @ $60/hour		6,600.00						
Labour 3 days @ $350/day		1,050.00						
Other equipment		1,680.59						
Aug 15 - Sept 27								
Cat 21 hours @ $60/hour		1,260.00						
Labour 2 days @ $var/day		550.00						
Other equipment		347.86						
Oct 13 - 21								
Labour 3 days @ $250/day		750.00						
Other equipment		114.20						
		19,788.59	**19,788.69**				19,788.69	
Ethier Exploration			**175.00**		175.00			
Vancouver Petrographics			**2,671.42**	2,671.42				
Chaplin's Woodcraft			**742.05**					742.05
Golden Software			**830.58**	830.58				
Dave Hayward	Rate $200/day Aug 27 - 30 (4 days) Sept 3 - 10 (8 days)		**2,400.00**			2,400.00		
Geodrafting Service			**1,172.36**	1,172.36				
			-					
Totals			**172,933.71**	66,675.98	18,470.57	15,841.96	33,718.10	38,227.10

APPENDIX III

MINERAL
·ENVIRONMENTS
LABORATORIES LTD.

SPECIALISTS IN MINERAL ENVIRONMENTS
CHEMISTS • ASSAYERS • ANALYSTS • GEOCHEMISTS

VANCOUVER OFFICE:
8282 SHERBROOKE STREET
VANCOUVER, BC, CANADA V5X 4E8
TELEPHONE (604) 327-3436
FAX (604) 327-3423

SMITHERS LAB:
3176 TATLOW ROAD
SMITHERS, BC, CANADA V0J 2N0
TELEPHONE (250) 847-3004
FAX (250) 847-3005

Quality Assaying for over 25 Years

Assay Certificate

8S-0081-RA1

Sep-16-98

Company: **TELKWA GOLD CORPORATION**
Project: DEL SANTO
Attn: Will Thompson

We *hereby certify* the following Assay of 2 ROCK samples submitted Sep-08-98 by WILLARD THOMPSON.

Sample Name	Au-fire g/tonne	Ag g/tonne	Cu %	Pb %	Zn %
61608	0.20	45.9	0.630	0.01	0.36
61609	0.03	45.3	0.632	0.01	0.15

Certified by ________

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FAX (250) 847-3005

Quality Assaying for over 25 Years

Geochemical Analysis Certificate

8S-0041-RG1

Jul-15-98

Company: **TELKWA GOLD CORP**
Project: DEL SANTO
Attn: Willard Thompson

We *hereby certify* the following Geochemical Analysis of 7 ROCK samples submitted Jul-06-98 by WILLARD THOMPSON.

Sample Name	Au-fire PPB	Ag PPM	Cu PPM	Pb PPM	Zn PPM
61674	5	0.2	36	18	85
61675	3	0.3	32	18	91
61676	18	0.2	27	16	58
61677	5	3.4	240	49	219
61678	3	0.3	31	24	133
61679	6	0.4	45	25	154
L15 1+50E	<20	0.2	10	18	67

Certified by [signature]

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Quality Assaying for over 25 Years

Assay Certificate

8S-0042-RA1

Jul-16-98

Company: **TELKWA GOLD CORPORATION**
Project: DEL SANTO
Attn: Willard Thompson / Ken Thompson

We *hereby certify* the following Assay of 10 ROCK samples submitted Jul-09-98 by WILL THOMPSON.

Sample Name	Au-fire g/tonne	Ag g/tonne	Cu %	Pb %	Zn %
61680	0.02	0.5	0.050	0.01	0.01
61681	0.01	0.8	0.017	0.01	0.01
61682	0.01	0.2	0.005	0.01	0.01
61683	0.01	0.3	0.009	0.01	0.09
61684	0.01	0.6	0.004	0.01	0.02
61685	0.01	2.7	0.017	0.01	0.16
61686	0.01	86.3	0.732	0.03	0.91
61687	0.04	454.0	3.840	0.10	1.02
61688	0.05	281.0	2.260	0.12	1.51
61689	0.04	221.0	1.710	0.12	1.34

Certified by

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SMITHERS LAB:
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TELEPHONE (250) 847-3004
FAX (250) 847-3005

Quality Assaying for over 25 Years

Assay Certificate

8S-0052-RA1

Jul-31-98

Company: **TELKWA GOLD CORP.**
Project: DEL SANTO
Attn: WILL THOMPSON/KEN THOMPSON

We *hereby certify* the following Assay of 5 ROCK samples
submitted Jul-27-98 by TELKWA GOLD CORP..

Sample Name	Au-fire g/tonne	Ag g/tonne	Cu %	Pb %	Zn %
61720	0.01	0.2	0.016	0.01	0.02
61721	0.01	10.9	0.107	0.01	0.25
61722	0.02	20.5	0.229	0.01	0.16
61723	0.04	14.1	0.104	0.01	0.74
61724	0.02	9.0	0.062	0.01	0.33

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TELEPHONE (250) 847-3004
FAX (250) 847-3005

Quality Assaying for over 25 Years

Assay Certificate

8S-0054-RA1

Company: **TELKWA GOLD CORP.**
Project: DEL SANTO
Attn: Willard Thompson

Aug-07-98
Copy 1:Telkwa Gold Corp., Smithers, BC
Copy 2:Telkwa Gold Corp., Calgary, Alta.
Copy 3:

We *hereby certify* the following Assay of 12 ROCK samples submitted Jul-30-98 by WILL THOMPSON.

Sample Name	Au-fire g/tonne	Ag g/tonne	Cu %	Pb %	Zn %
61725	0.01	4.2	0.039	0.01	0.21
61726	0.02	7.1	0.044	0.01	1.11
61727	0.03	45.7	0.289	0.06	0.48
61728	0.05	71.8	0.745	0.03	1.00
61729	0.02	0.6	0.010	0.01	0.46
61730	0.03	14.9	0.152	0.01	0.07
61731	0.04	98.0	1.160	0.01	0.22
61732	0.03	10.1	0.298	0.01	0.39
61733	0.02	10.6	0.114	0.01	2.85
61734	0.02	22.0	0.232	0.01	0.74
61735	0.03	21.2	0.461	0.01	0.17
61736	0.09	40.3	0.788	0.01	0.19

Certified by

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SMITHERS, BC, CANADA V0J 2N0
TELEPHONE (250) 847-3004
FAX (250) 847-3005

Quality Assaying for over 25 Years

Assay Certificate

8S-0057-RA1

Company: **TELKWA GOLD CORP.**
Project: DEL SANTO
Attn: Will Thompson

Aug-10-98
Copy 1:Telkwa Gold Corp., Smithers, BC
Copy 2:Telkwa Gold Corp., Calgary, Alta.
Copy 3:

We *hereby certify* the following Assay of 7 ROCK samples submitted Aug-04-98 by WILLARD THOMPSON.

Sample Name	Au-fire g/tonne	Ag g/tonne	Cu %	Pb %	Zn %
61737	0.04	21.6	0.394	0.01	0.69
61738	0.06	77.5	1.100	0.01	0.46
61739	0.09	30.4	0.465	0.01	0.60
61740	0.02	0.8	0.013	0.01	0.03
61741	0.01	10.2	0.129	0.01	0.10
61742	0.03	37.6	0.618	0.01	0.31
61743	0.03	20.3	0.405	0.01	0.32

Certified by

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SMITHERS LAB:
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SMITHERS, BC, CANADA V0J 2N0
TELEPHONE (250) 847-3004
FAX (250) 847-3005

Quality Assaying for over 25 Years

Geochemical Analysis Certificate

8S-0065-RG1

Aug-14-98

Company: **TELKWA GOLD CORP.**
Project: DEL SANTO
Attn: Will Thompson / Ken Thompson

We *hereby certify* the following Geochemical Analysis of 3 ROCK samples submitted Aug-06-98 by WILL THOMPSON.

Sample Name	Au-fire PPB	Ag PPM	Cu PPM	Pb PPM	Zn PPM
61744	21	9.4	687	89	3450
61745	45	8.2	781	70	4280
61746	42	25.3	1470	1740	3240

Certified by

Min-En Laboratories

ELKWA GOLD CORP

tention: Willard Thompson

oject: DEL SANTO

mple: ROCK

Mineral Environments Laboratories

8282 Sherbrooke St., Vancouver, B.C., V5X 4E8

Tel (604) 327-3436 Fax (604) 327-3423

Report No : 8S0041

Date : Jul-15-98

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

ımple ımber	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
674	<0.2	1.64	20	140	<0.5	<5	1.30	<1	13	38	34	4.96	0.05	1.45	870	<2	0.08	8	540	10	<5	14	<10	23	0.06	226	<10	12	90	4
675	<0.2	1.37	20	70	<0.5	<5	4.32	<1	8	21	20	4.06	0.08	1.09	1060	2	0.05	4	470	6	5	10	<10	53	0.02	213	<10	16	90	4
676	<0.2	2.30	90	140	<0.5	<5	1.92	<1	28	201	20	3.06	0.01	3.36	610	<2	0.02	79	440	<2	5	8	<10	81	0.10	61	<10	4	58	5
677	2.8	2.88	15	120	<0.5	<5	3.30	<1	17	24	242	6.96	0.85	1.88	>10000	<2	0.06	14	1150	32	<5	14	<10	35	0.14	204	<10	9	203	5
678	<0.2	2.86	<5	110	<0.5	<5	2.91	<1	22	33	24	6.13	0.39	2.67	1530	<2	0.07	16	1000	2	<5	16	<10	42	0.12	197	<10	11	127	5
679	<0.2	2.65	<5	130	<0.5	<5	3.81	<1	22	37	44	5.97	0.24	2.49	1830	<2	0.07	17	1040	6	<5	14	<10	44	0.11	179	<10	11	150	5
5 1+50E	<0.2	2.00	5	80	<0.5	<5	0.52	<1	15	120	6	4.67	0.13	1.42	930	<2	0.06	21	580	10	<5	10	<10	50	0.19	113	<10	7	73	5

A .5 gm sample is digested with 10 ml 3:1 HCl/HNO3
at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Mineral Environments Laboratories

8282 Sherbrooke St., Vancouver, B.C., V5X 4E8

Tel (604) 327-3436 Fax (604) 327-3423

ELKWA GOLD CORP

tention: WILL TOMPSON

ject:

mple: CORE

Report No : **8S0101 RJ**

Date : Oct-22-98

MULTI-ELEMENT ICP ANALYSIS

Aqua Regia Digestion

mple mber	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
326	5.0	0.94	20	30	<0.5	<5	3.87	51	14	61	535	6.01	0.26	1.21	>10000	<2	0.02	18	300	86	5	4	<10	54	0.08	283	10	4	7561	7
327	2.2	2.02	20	50	<0.5	<5	3.80	21	19	83	368	5.32	0.42	1.48	>10000	<2	0.07	27	420	50	<5	8	<10	81	0.14	269	10	4	2853	6
328	<0.2	2.85	15	80	<0.5	<5	5.46	<1	18	96	62	3.00	0.50	2.12	3270	4	0.13	82	700	24	<5	6	<10	159	0.12	146	<10	6	125	6
329	<0.2	2.92	30	110	<0.5	<5	4.38	9	26	145	87	5.28	1.06	2.33	9895	14	0.10	66	720	90	5	16	<10	61	0.21	243	<10	6	1558	8
330	0.8	2.62	10	60	<0.5	<5	3.55	19	18	90	243	5.61	0.65	1.70	>10000	8	0.06	25	540	92	<5	16	<10	39	0.18	272	10	7	2818	5
331	<0.2	2.65	10	30	<0.5	<5	5.71	15	15	73	75	5.82	0.54	1.54	>10000	4	0.05	19	460	48	5	14	<10	53	0.20	383	<10	7	2430	4
332	<0.2	2.44	20	20	<0.5	<5	4.69	<1	9	45	14	4.33	0.31	1.68	4930	<2	0.04	8	580	22	<5	9	<10	35	0.12	70	<10	12	148	4
333	<0.2	2.42	<5	40	<0.5	<5	3.26	1	15	35	13	5.91	0.64	2.07	5520	<2	0.03	15	1170	22	<5	12	<10	16	0.14	141	<10	11	87	4
334	<0.2	1.85	<5	30	<0.5	<5	4.04	4	21	45	66	5.04	0.50	1.61	9110	2	0.02	15	980	34	<5	12	<10	21	0.13	158	<10	12	587	4
335	3.4	0.40	15	10	<0.5	10	1.84	28	12	65	509	10.26	0.16	0.84	>10000	4	0.01	18	220	42	5	4	<10	14	0.05	861	10	3	4475	5
336	3.6	0.46	5	10	<0.5	10	1.18	21	14	74	848	10.76	0.13	0.83	>10000	12	0.01	17	220	48	<5	4	<10	10	0.07	1245	10	2	3016	5
337	1.2	0.39	<5	10	<0.5	10	1.14	12	15	70	783	10.68	0.16	0.78	>10000	4	0.01	18	230	38	5	3	<10	10	0.06	968	<10	2	1536	5
338	23.2	0.44	<5	10	<0.5	10	1.34	3	14	68	5074	10.91	0.15	0.39	>10000	<2	0.01	20	200	40	5	2	<10	14	0.06	449	<10	1	352	7
339	5.6	3.39	5	60	<0.5	<5	3.41	>100	27	275	746	5.42	0.80	1.80	7055	8	0.25	162	640	50	5	8	<10	74	0.20	265	20	5	>10000	7
340	3.0	2.18	10	30	<0.5	<5	2.57	37	20	202	584	4.80	0.35	1.53	7850	16	0.14	105	500	66	5	5	<10	53	0.15	324	10	4	4542	6
341	6.6	1.37	5	50	<0.5	<5	3.02	23	13	63	1056	5.82	0.26	0.73	>10000	16	0.03	19	410	134	<5	4	<10	50	0.12	535	10	4	3237	7
342	0.4	2.20	<5	50	<0.5	<5	4.62	26	16	83	122	4.11	0.15	1.61	5670	2	0.13	24	660	62	<5	9	<10	110	0.11	175	<10	9	2128	8
343	4.8	0.99	590	40	<0.5	10	3.98	<1	17	33	661	9.22	0.17	1.01	>10000	6	0.02	19	310	64	5	3	<10	64	0.09	494	<10	5	1977	8
344	9.0	1.05	15	20	<0.5	10	1.56	33	21	33	2237	10.95	0.19	0.80	>10000	<2	0.04	18	530	60	5	2	<10	40	0.14	566	10	2	4555	9
345	3.4	2.72	505	40	<0.5	<5	3.34	<1	23	94	1312	8.30	0.13	1.65	>10000	<2	0.16	26	940	48	5	9	<10	132	0.18	506	<10	8	1296	8

A .5 gm sample is digested with 10 ml 3:1 HCl/HNO3 at 95c for 2 hours and diluted to 25ml with D.I.H20.

Signed:

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0042SG001	-100	50	L1 0+50E A	5	0.3	21	19	133
8S0042SG001	-100	50	L1 0+50E B	5	0.3	17	16	65
8S0042SG001	-100	100	L1 1+00E	5	0.2	21	17	87
8S0042SG001	-100	150	L1 1+50E	5	0.2	19	18	126
8S0042SG001	-100	200	L1 2+00E	5	0.2	22	15	90
8S0042SG001	-100	250	L1 2+50E	5	0.3	17	14	117
8S0042SG001	-100	300	L1 3+00E	5	0.2	21	16	99
8S0042SG001	-100	350	L1 3+50E	10	0.8	44	19	141
8S0042SG001	-100	400	L1 4+00E	5	0.5	31	22	185
8S0042SG001	-100	500	L1 5+00E	5	0.5	57	18	134
8S0042SG001	-100	0	L1 0+00W	5	0.2	15	12	81
8S0042SG001	-100	-50	L1 0+50W	5	0.3	16	15	87
8S0042SG001	-100	-100	L1 1+00W	5	0.2	10	14	52
8S0042SG001	-100	-150	L1 1+50W	5	0.2	22	15	108
8S0042SG001	-100	-350	L1 3+50W	5	0.2	14	12	94
8S0042SG001	-100	-400	L1 4+00W	5	0.2	14	14	83
8S0042SG001	-100	-450	L1 4+50W	5	0.5	46	20	162
8S0042SG001	-100	-500	L1 5+00W	5	0.2	23	20	185
8S0042SG001	-200	50	L2 0+50E	5	0.2	25	20	199
8S0042SG001	-200	100	L2 1+00E	5	0.2	11	11	70
8S0042SG001	-200	150	L2 1+50E	5	0.2	14	15	102
8S0042SG001	-200	200	L2 2+00E	5	0.2	20	12	123
8S0042SG001	-200	250	L2 2+50E	5	0.3	32	12	151
8S0042SG001	-200	300	L2 3+00E	5	0.2	10	13	54
8S0042SG002	-200	350	L2 3+50E	5	0.4	22	19	134
8S0042SG002	-200	400	L2 4+00E	5	0.4	54	23	155
8S0042SG002	-200	450	L2 4+50E	5	0.9	35	20	162
8S0042SG002	-200	0	L2 0+00W	5	0.2	25	22	182
8S0042SG002	-200	-50	L2 0+50W	5	0.2	19	18	130
8S0042SG002	-200	-100	L2 1+00W	5	0.2	8	9	44
8S0042SG002	-200	-150	L2 1+50W	5	0.3	7	9	33
8S0042SG002	-200	-200	L2 2+00W	5	0.2	16	12	65
8S0042SG002	-200	-250	L2 2+50W	5	0.2	9	9	55
8S0042SG002	-200	-300	L2 3+00W	5	0.2	9	8	47
8S0042SG002	-200	-350	L2 3+50W	5	0.3	13	10	68
8S0042SG002	-200	-400	L2 4+00W	5	0.3	22	13	97
8S0042SG002	-200	-450	L2 4+50W	5	0.6	21	15	101
8S0042SG002	-200	-500	L2 5+00W	5	0.3	15	10	49
8S0042SG002	-300	50	L3 0+50E	5	0.2	21	15	112
8S0042SG002	-300	100	L3 1+00E	5	0.2	18	14	137
8S0042SG002	-300	150	L3 1+50E	10	0.2	15	9	103
8S0042SG002	-300	200	L3 2+00E	5	0.2	14	10	75
8S0042SG002	-300	250	L3 2+50E	5	0.3	38	13	164
8S0042SG002	-300	300	L3 3+00E	5	0.3	23	14	100
8S0042SG002	-300	350	L3 3+50E	5	0.6	37	15	158
8S0042SG002	-300	400	L3 4+00E	5	0.8	45	18	184
8S0042SG002	-300	450	L3 4+50E	5	1.8	69	13	97
8S0042SG002	-300	500	L3 5+00E	5	0.3	11	10	37

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0042SG003	-300	0	L3 0+00W	5	0.3	15	14	77
8S0042SG003	-300	-50	L3 0+50W	5	0.2	14	13	56
8S0042SG003	-300	-100	L3 1+00W	5	0.2	23	17	88
8S0042SG003	-300	-150	L3 1+50W	5	0.2	18	16	78
8S0042SG003	-300	-200	L3 2+00W	5	0.6	96	19	56
8S0042SG003	-300	-300	L3 3+00W	5	0.2	17	13	69
8S0042SG003	-300	-350	L3 3+50W	5	0.2	15	19	72
8S0042SG003	-300	-400	L3 4+00W	5	0.4	19	16	80
8S0042SG003	-300	-450	L3 4+50W	10	0.2	16	15	80
8S0042SG003	-300	-500	L3 5+00W	5	0.2	24	18	87
8S0042SG003	-400	50	L4 0+50E	5	0.4	15	12	57
8S0042SG003	-400	100	L4 1+00E	5	0.2	16	15	84
8S0042SG003	-400	150	L4 1+50E	5	0.2	28	18	135
8S0042SG003	-400	200	L4 2+00E	30	0.3	14	14	63
8S0042SG003	-400	250	L4 2+50E	5	0.3	14	11	51
8S0042SG003	-400	300	L4 3+00E	15	0.2	18	12	86
8S0042SG003	-400	350	L4 3+50E	5	0.2	19	14	95
8S0042SG003	-400	400	L4 4+00E	5	0.5	34	18	137
8S0042SG003	-400	450	L4 4+50E	5	0.3	10	13	60
8S0042SG003	-400	500	L4 5+00E	5	0.2	12	10	37
8S0042SG003	-400	0	L4 0+00W	5	0.2	14	12	45
8S0042SG003	-400	-50	L4 0+50W	5	0.3	21	14	110
8S0042SG003	-400	-100	L4 1+00W	5	0.2	12	11	48
8S0042SG003	-400	-150	L4 1+50W	5	0.2	26	13	68
8S0042SG004	-400	-200	L4 2+00W	5	0.3	52	21	187
8S0042SG004	-400	-250	L4 2+50W	5	1.8	82	20	96
8S0042SG004	-400	-300	L4 3+00W	5	0.2	22	21	117
8S0042SG004	-400	-350	L4 3+50W	5	0.2	11	15	59
8S0042SG004	-400	-400	L4 4+00W	5	0.2	9	13	45
8S0042SG004	-400	-450	L4 4+50W	5	0.2	11	14	85
8S0042SG004	-400	-500	L4 5+00W	10	0.2	10	11	46
8S0046SG001	-500	50	L5 0+50E	5	0.4	14	18	84
8S0046SG001	-500	100	L5 1+00E	5	0.4	26	25	161
8S0046SG001	-500	150	L5 1+50E	5	0.4	23	24	172
8S0046SG001	-500	200	L5 2+00E	5	0.5	34	20	98
8S0046SG001	-500	250	L5 2+50E	10	1.8	93	181	1720
8S0046SG001	-500	300	L5 3+00E	5	0.2	10	14	58
8S0046SG001	-500	350	L5 3+50E	5	0.3	11	16	68
8S0046SG001	-500	400	L5 4+00E	5	0.2	16	24	133
8S0046SG001	-500	450	L5 4+50E	5	0.2	16	23	157
8S0046SG001	-500	500	L5 5+00E	10	1.3	120	12	13
8S0046SG001	-500	0	L5 0+00W	5	0.2	30	21	124
8S0046SG001	-500	-50	L5 0+50W	5	0.7	61	27	112
8S0046SG001	-500	-100	L5 1+00W	5	0.2	19	22	153
8S0046SG001	-500	-150	L5 1+50W	5	0.2	42	21	104
8S0046SG001	-500	-200	L5 2+00W	5	0.2	18	31	187
8S0046SG001	-500	-250	L5 2+50W	5	0.3	64	24	131
8S0046SG001	-500	-300	L5 3+00W	5	0.2	13	15	96

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0046SG001	-500	-350	L5 3+50W	5	0.2	8	10	44
8S0046SG001	-500	-400	L5 4+00W	5	0.3	21	20	88
8S0046SG001	-500	-450	L5 4+50W	5	0.2	5	10	33
8S0041SG001	-600	50						
8S0041SG001	-600	100						
8S0041SG001	-600	150						
8S0041SG001	-600	200						
8S0041SG001	-600	250						
8S0041SG001	-600	300						
8S0041SG001	-600	350						
8S0041SG001	-600	400						
8S0041SG001	-600	450						
8S0041SG001	-600	500						
8S0041SG001	-600	0						
8S0041SG001	-600	-50						
8S0041SG001	-600	-100						
8S0041SG001	-600	-150						
8S0041SG001	-600	-200						
8S0041SG001	-600	-250						
8S0041SG001	-600	-300						
8S0041SG001	-600	-350						
8S0041SG001	-600	-400						
8S0041SG001	-600	-450						
8S0041SG001	-600	-500						
8S0042SG004	-700	50	L7 0+50E	5	0.5	63	25	209
8S0042SG004	-700	100	L7 1+00E	5	0.2	18	16	135
8S0042SG004	-700	150	L7 1+50E	5	0.2	22	16	107
8S0042SG004	-700	200	L7 2+00E	5	0.2	16	14	134
8S0042SG004	-700	250	L7 2+50E	5	0.6	14	17	155
8S0042SG004	-700	300	L7 3+00E	5	0.4	13	11	71
8S0042SG004	-700	350	L7 3+50E	5	0.2	6	8	25
8S0042SG004	-700	400	L7 4+00E	5	0.2	15	13	92
8S0042SG004	-700	450	L7 4+50E	5	0.2	5	8	29
8S0042SG004	-700	500	L7 5+00E	5	0.4	26	15	108
	-700	0						
	-700	-50						
	-700	-100						
	-700	-150						
	-700	-200						
	-700	-250						
	-700	-300						
	-700	-350						
	-700	-400						
	-700	-450						
	-700	-500						
8S0043SG001	-800	50	L8 0+50E	5	0.2	17	13	107
8S0043SG001	-800	100	L8 1+00E	5	0.2	13	10	56
8S0043SG001	-800	150	L8 1+50E	5	0.5	30	19	186

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0043SG001	-800	200	L8 2+00E	5	0.2	22	16	107
8S0043SG001	-800	250	L8 2+50E	5	0.8	36	19	141
8S0043SG001	-800	300	L8 3+00E	5	0.2	9	7	39
8S0043SG001	-800	350	L8 3+50E	5	0.2	12	9	84
8S0043SG001	-800	400	L8 4+00E	5	0.2	18	11	79
8S0043SG001	-800	450	L8 4+50E	5	0.3	12	8	38
8S0043SG001	-800	500	L8 5+00E	5	0.2	8	9	44
8S0043SG001	-800	0	L8 0+00W	5	0.2	7	6	34
8S0043SG001	-800	-50	L8 0+50W	5	0.2	43	17	156
8S0043SG001	-800	-150	L8 1+50W	5	0.6	28	14	293
8S0043SG001	-800	-200	L8 2+00W	30	1.4	18	15	257
8S0043SG001	-800	-250	L8 2+50W	5	0.4	22	15	178
8S0043SG001	-800	-300	L8 3+00W	5	0.3	24	18	156
8S0043SG001	-800	-350	L8 3+50W	5	0.2	21	13	118
8S0043SG001	-800	-400	L8 4+00W	5	1.5	23	9	25
8S0043SG001	-800	-450	L8 4+50W	5	0.3	20	23	150
8S0043SG001	-800	-500	L8 5+00W	5	0.9	53	18	116
8S0043SG001	-900	50	L9 0+50E	5	0.2	13	12	30
8S0043SG001	-900	100	L9 1+00E	5	0.2	14	14	61
8S0043SG001	-900	150	L9 1+50E	5	0.2	8	10	29
8S0043SG001	-900	200	L9 2+00E	5	0.4	32	17	204
8S0043SG002	-900	250	L9 2+50E	5	0.6	21	15	96
8S0043SG002	-900	300	L9 3+00E	5	0.2	21	18	108
8S0043SG002	-900	350	L9 3+50E	5	0.3	12	10	39
8S0043SG002	-900	400	L9 4+00E	5	0.2	42	23	117
8S0043SG002	-900	450	L9 4+50E	5	1.1	48	13	98
8S0043SG002	-900	500	L9 5+00E	10	1.2	40	14	81
8S0043SG002	-900	0	L9 0+00W	15	0.3	15	12	63
8S0043SG002	-900	-50	L9 0+50W	25	0.2	8	11	54
8S0043SG002	-900	-100	L9 1+00W	5	0.2	20	16	101
8S0043SG002	-900	-150	L9 1+50W	5	0.3	12	10	56
8S0043SG002	-900	-200	L9 2+00W	5	0.4	16	10	60
8S0043SG002	-900	-250	L9 2+50W	5	0.2	18	11	78
8S0043SG002	-900	-300	L9 3+00W	5	0.2	12	11	75
8S0043SG002	-900	-350	L9 3+50W	10	0.4	45	14	103
8S0043SG002	-900	-400	L9 4+00W	5	0.4	21	14	112
8S0043SG002	-900	-450	L9 4+50W	5	0.2	22	12	134
8S0043SG002	-900	-500	L9 5+00W	5	0.4	21	12	111
8S0043SG002	-1000	50	L10 0+50E	5	0.8	72	20	203
8S0043SG002	-1000	100	L10 1+00E	5	0.2	25	16	102
8S0043SG002	-1000	150	L10 1+50E	5	0.2	7	10	28
8S0043SG002	-1000	200	L10 2+00E	5	0.2	23	14	99
8S0043SG002	-1000	250	L10 2+50E	5	0.2	7	8	22
8S0043SG002	-1000	300	L10 3+00E	5	0.2	18	15	75
8S0043SG002	-1000	350	L10 3+50E	5	0.3	13	13	62
8S0043SG003	-1000	400	L10 4+00E	5	0.2	7	12	64
8S0043SG003	-1000	450	L10 4+50E	5	0.2	13	12	76
8S0043SG003	-1000	500	L10 5+00E	5	0.3	14	11	91

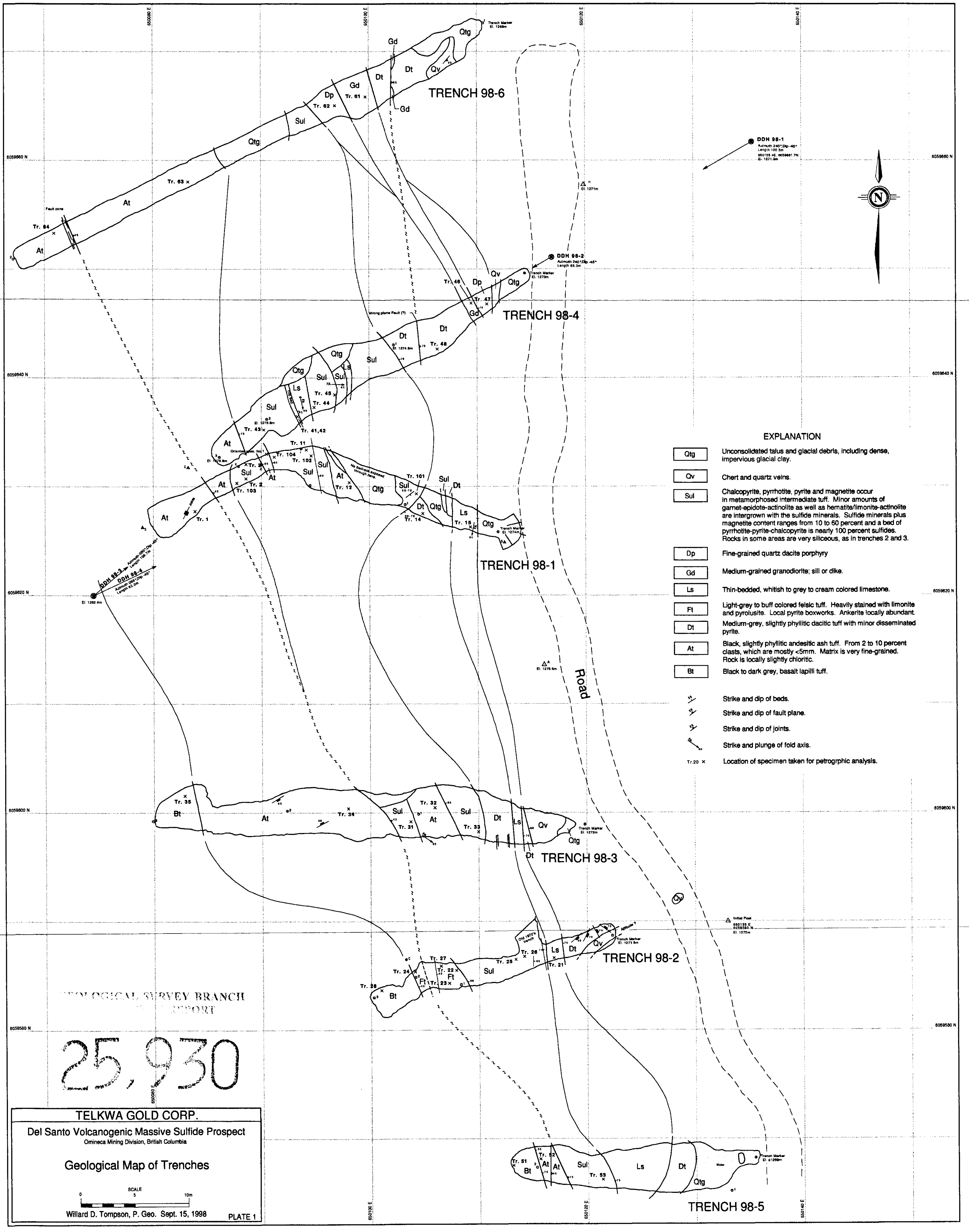
Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0043SG003	-1000	-50	L10 0+50W	5	0.2	12	10	41
8S0043SG003	-1000	-150	L10 1+50W	5	0.3	12	12	48
8S0043SG003	-1000	-200	L10 2+00W	5	0.2	46	14	151
8S0043SG003	-1000	-250	L10 2+50W	5	0.3	56	22	348
8S0043SG003	-1000	-300	L10 3+00W	5	0.2	9	10	50
8S0043SG003	-1000	-350	L10 3+50W	5	0.2	15	13	91
8S0043SG003	-1000	-400	L10 4+00W	5	0.2	22	12	99
8S0043SG003	-1000	-450	L10 4+50W	5	0.4	12	9	75
8S0043SG003	-1000	-500	L10 5+00W	5	0.2	15	9	80
8S0043SG003	-1100	50	L11 0+50E	5	0.3	26	15	98
8S0043SG003	-1100	100	L11 1+00E	5	0.2	25	20	151
8S0043SG003	-1100	200	L11 2+00E	5	0.2	11	12	96
8S0043SG003	-1100	250	L11 2+50E	5	0.2	14	14	73
8S0043SG003	-1100	300	L11 3+00E	5	0.4	10	11	56
8S0043SG003	-1100	350	L11 3+50E	5	0.2	29	19	112
8S0043SG003	-1100	400	L11 4+00E	5	0.2	21	14	90
8S0043SG003	-1100	500	L11 5+00E	5	1.6	56	27	176
8S0043SG003	-1100	0	L11 0+00W	5	0.2	12	14	105
8S0043SG003	-1100	-50	L11 0+50W	5	2	57	22	163
8S0043SG003	-1100	-100	L11 1+00W	5	0.3	19	13	68
8S0043SG003	-1100	-150	L11 1+50W	5	0.2	20	16	73
8S0043SG004	-1100	-200	L11 2+00W	5	0.8	80	21	176
8S0043SG004	-1100	-250	L11 2+50W	5	0.2	19	16	117
8S0043SG004	-1100	-300	L11 3+00W	5	0.2	19	18	162
8S0043SG004	-1100	-350	L11 3+50W	5	0.4	18	16	122
8S0043SG004	-1100	-400	L11 4+00W	5	0.2	20	21	137
8S0043SG004	-1100	-500	L11 5+00W	5	0.5	51	20	133
8S0043SG004	-1200	50	L12 0+50E	5	0.6	32	18	131
8S0043SG004	-1200	100	L12 1+00E	5	0.2	32	18	106
8S0043SG004	-1200	150	L12 1+50E	5	0.2	20	14	101
8S0043SG004	-1200	200	L12 2+00E	5	0.2	26	19	117
8S0043SG004	-1200	250	L12 2+50E	5	0.2	39	14	89
8S0043SG004	-1200	300	L12 3+00E	5	0.2	13	12	102
8S0043SG004	-1200	350	L12 3+50E	5	0.5	20	13	94
8S0043SG004	-1200	450	L12 4+50E	5	0.2	15	11	95
8S0043SG004	-1200	500	L12 5+00E	5	0.4	22	12	91
8S0043SG004	-1200	0	L12 0+00W	5	0.2	16	11	96
8S0043SG004	-1200	-50	L12 0+50W	5	1.1	58	18	137
8S0043SG004	-1200	-100	L12 1+00W	5	0.2	17	11	86
8S0043SG004	-1200	-150	L12 1+50W	20	0.2	28	12	89
8S0043SG004	-1200	-200	L12 2+00W	5	1.4	85	16	176
8S0043SG004	-1200	-250	L12 2+50W	5	0.5	28	15	182
8S0043SG004	-1200	-300	L12 3+00W	5	0.5	34	18	220
8S0043SG004	-1200	-350	L12 3+50W	5	0.2	16	13	97
8S0043SG004	-1200	-400	L12 4+00W	5	0.3	13	11	65
8S0043SG005	-1200	-450	L12 4+50W	5	0.2	15	17	115
8S0043SG005	-1200	-500	L12 5+00W	5	0.2	13	14	76
8S0043SG005	-1300	0	L13 0+00W	5	0.3	19	13	103

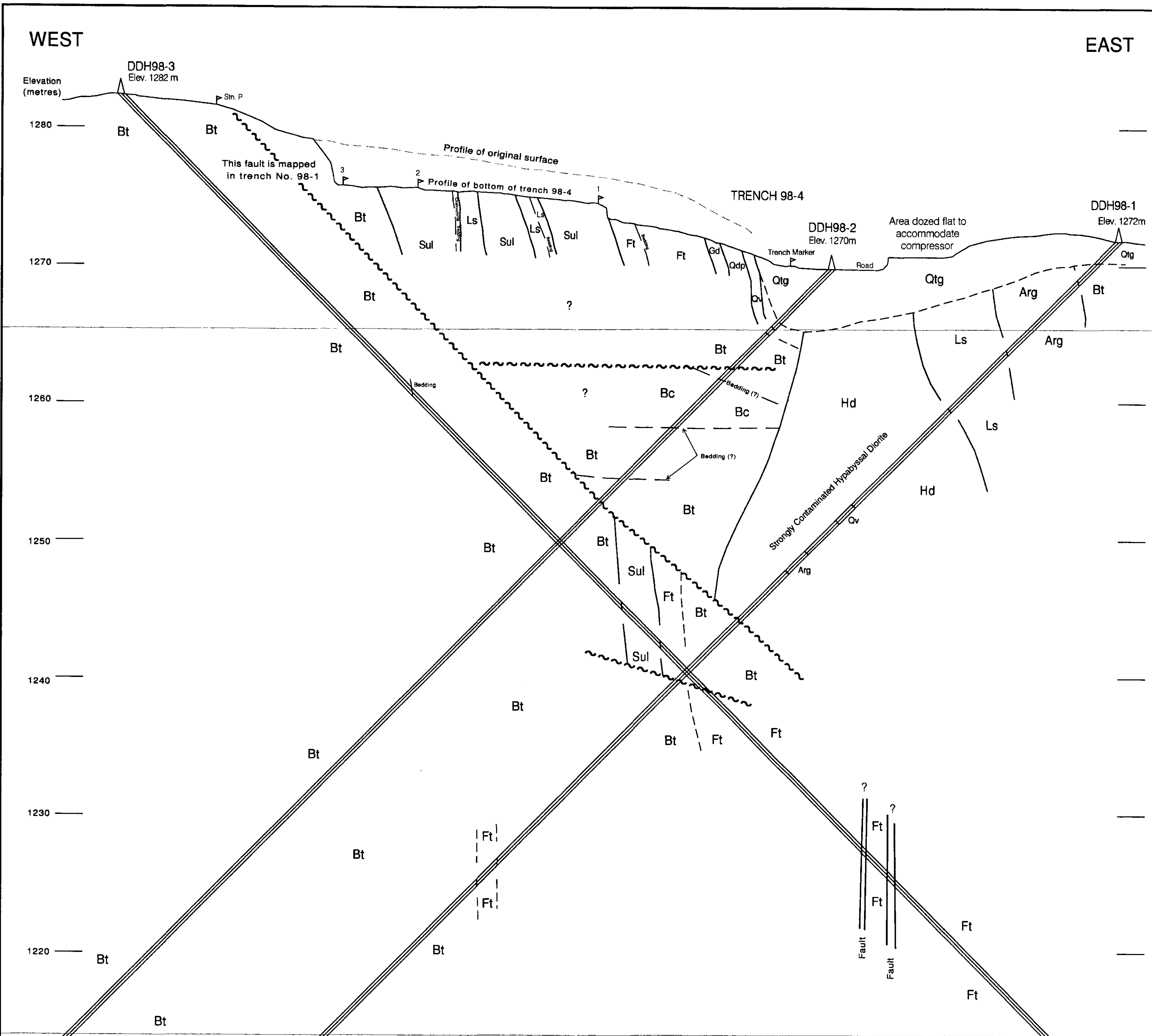
Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0043SG005	-1300	-50	L13 0+50W	5	0.2	20	13	92
8S0043SG005	-1300	-100	L13 1+00W	5	0.2	37	18	107
8S0043SG005	-1300	-150	L13 1+50W	5	0.2	21	14	86
8S0043SG005	-1300	-200	L13 2+00W	5	0.9	32	16	49
8S0043SG005	-1300	-250	L13 2+50W	5	0.4	19	13	90
8S0043SG005	-1300	-300	L13 3+00W	5	0.2	39	18	93
8S0043SG005	-1300	-350	L13 3+50W	5	0.2	20	15	94
8S0043SG005	-1300	-400	L13 4+00W	10	1.1	102	13	75
8S0043SG005	-1300	-450	L13 4+50W	5	0.2	25	17	90
8S0043SG005	-1300	-500	L13 5+00W	5	0.3	14	12	93
8S0046SG001	-1300	50	L13 0+50E	5	1.8	56	13	34
8S0046SG001	-1300	100	L13 1+00E	5	0.6	127	10	10
8S0046SG001	-1300	150	L13 1+50E	5	0.2	12	18	53
8S0046SG001	-1300	200	L13 2+00E	5	0.2	9	12	45
8S0046SG002	-1300	250	L13 2+50E	5	0.2	27	20	90
8S0046SG002	-1300	300	L13 3+00E	5	0.4	17	19	68
8S0046SG002	-1300	350	L13 3+50E	5	0.3	4	10	14
8S0046SG002	-1300	400	L13 4+00E	25	0.2	10	14	46
8S0046SG002	-1300	450	L13 4+50E	5	0.2	12	13	58
8S0046SG002	-1300	500	L13 5+00E	5	0.2	14	16	60
8S0046SG002	-1400	350	L14 3+50E	5	1.2	35	26	200
8S0046SG002	-1400	450	L14 4+50E	5	0.6	23	9	27
8S0046SG002	-1400	500	L14 5+00E	5	0.5	22	12	42
8S0046SG002	-1400	-50	L14 0+50W	5	0.2	14	15	85
8S0046SG002	-1400	-100	L14 1+00W	5	2.4	64	20	69
8S0046SG002	-1400	-150	L14 1+50W	5	0.2	31	21	102
8S0046SG002	-1400	-250	L14 2+50W	5	0.2	22	7	17
8S0046SG002	-1400	-300	L14 3+00W	5	0.8	77	13	13
8S0046SG002	-1400	-350	L14 3+50W	5	1.9	92	21	83
8S0046SG002	-1400	-400	L14 4+00W	5	0.2	28	15	74
8S0046SG002	-1400	-450	L14 4+50W	5	0.2	12	15	62
8S0046SG002	-1400	-500	L14 5+00W	5	0.2	9	10	43
	-1500	50						
	-1500	100						
	-1500	200						
	-1500	250						
	-1500	300						
	-1500	350						
	-1500	400						
	-1500	450						
	-1500	500						
8S0046SG002	-1500	0	L15 0+00W	5	1.1	58	18	57
8S0046SG002	-1500	-50	L15 0+50W	5	0.4	18	19	86
8S0046SG002	-1500	-100	L15 1+00W	5	0.3	45	27	156
8S0046SG002	-1500	-150	L15 1+50W	5	0.8	47	29	182
8S0046SG002	-1500	-200	L15 2+00W	5	0.4	50	32	161
8S0046SG002	-1500	-250	L15 2+50W	5	1.1	54	25	146
8S0046SG003	-1500	-300	L15 3+00W	5	0.2	15	17	98

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0046SG003	-1500	-350	L15 3+50W	5	0.2	15	17	91
8S0046SG003	-1500	-400	L15 4+00W	5	0.2	19	18	77
8S0046SG003	-1500	-450	L15 4+50W	5	0.2	26	17	74
8S0046SG003	-1500	-500	L15 5+00W	5	0.7	29	18	85
8S0041SG001	-1600	50						
8S0041SG001	-1600	100						
8S0041SG001	-1600	150						
8S0041SG001	-1600	200						
8S0041SG001	-1600	250						
8S0041SG001	-1600	300						
8S0041SG001	-1600	350						
8S0041SG001	-1600	400						
8S0041SG001	-1600	450						
8S0041SG001	-1600	500						
8S0041SG001	-1600	-50						
8S0041SG001	-1600	-100						
8S0041SG001	-1600	-150						
8S0041SG001	-1600	-200						
8S0041SG001	-1600	-250						
8S0041SG001	-1600	-300						
8S0041SG001	-1600	-350						
8S0041SG001	-1600	-400						
8S0041SG001	-1600	-450						
8S0041SG001	-1600	-500						
8S0041SG001	-1600	0						
8S0046SG003	-2100	100	L21 1+00E	5	0.4	16	16	67
8S0046SG003	-2100	200	L21 2+00E	5	0.2	11	13	55
8S0046SG003	-2100	250	L21 2+50E	5	0.2	9	14	39
8S0046SG003	-2100	300	L21 3+00E	5	0.4	7	10	33
8S0046SG003	-2100	350	L21 3+50E	5	0.3	14	14	51
8S0046SG003	-2100	400	L21 4+00E	5	0.5	36	29	133
8S0046SG003	-2100	500	L21 5+00E	5	0.2	20	21	82
8S0046SG003	-2100	550	L21 5+50E	5	0.2	19	16	83
8S0046SG003	-2100	600	L21 6+00E	5	0.5	18	17	42
8S0046SG003	-2200	100	L22 1+00E	5	0.3	19	14	79
8S0046SG003	-2200	150	L22 1+50E	5	0.2	18	16	64
8S0046SG003	-2200	200	L22 2+00E	5	0.3	16	12	55
8S0046SG003	-2200	250	L22 2+50E	5	0.2	15	14	65
8S0046SG003	-2200	300	L22 3+00E	5	0.2	4	6	12
8S0046SG003	-2200	350	L22 3+50E	5	0.2	11	12	39
8S0046SG003	-2200	400	L22 4+00E	5	0.3	12	14	47
8S0046SG003	-2200	450	L22 4+50E	5	1	31	21	148
8S0046SG003	-2200	500	L22 5+00E	5	1.8	65	32	200
8S0046SG003	-2200	550	L22 5+50E	5	1.4	46	24	169
8S0046SG004	-2200	600	L22 6+00E	5	0.5	32	18	86
8S0046SG004	-2300	50	L23 0+50E	5	0.2	13	13	58
8S0046SG004	-2300	150	L23 1+50E	5	0.5	17	15	79
8S0046SG004	-2300	200	L23 2+00E	5	0.2	8	10	37

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0046SG004	-2300	250	L23 2+50E	5	0.2	6	12	30
8S0046SG004	-2300	300	L23 3+00E	5	0.3	5	8	31
8S0046SG004	-2300	350	L23 3+50E	5	0.4	21	15	98
8S0046SG004	-2300	400	L23 4+00E	5	0.2	11	12	53
8S0046SG004	-2300	450	L23 4+50E	5	0.2	8	13	42
8S0046SG004	-2300	500	L23 5+00E	5	0.2	15	13	56
8S0046SG004	-2300	550	L23 5+50E	5	0.8	114	39	223
8S0046SG004	-2300	600	L23 6+00E	5	0.4	20	16	88
8S0046SG004	-2400	0	L24 0+00E	5	0.2	15	14	43
8S0046SG004	-2400	50	L24 0+50E	5	0.2	21	17	89
8S0046SG004	-2400	100	L24 1+00E	10	0.3	8	13	47
8S0046SG004	-2400	150	L24 1+50E	5	0.2	13	12	49
8S0046SG004	-2400	200	L24 2+00E	5	0.2	10	12	53
8S0046SG004	-2400	250	L24 2+50E	5	0.4	12	13	57
8S0046SG004	-2400	350	L24 3+50E	5	0.2	37	19	113
8S0046SG004	-2400	400	L24 4+00E	5	0.2	7	10	29
8S0046SG004	-2400	450	L24 4+50E	5	0.6	29	16	103
8S0046SG004	-2400	500	L24 5+00E	45	0.2	12	14	38
8S0046SG004	-2400	550	L24 5+50E	5	1.6	46	21	98
8S0046SG004	-2500	0	L25 0+00E	5	0.4	15	15	48
8S0046SG005	-2500	50	L25 0+50E	5	0.2	13	14	53
8S0046SG005	-2500	100	L25 1+00E	5	0.4	11	13	46
8S0046SG005	-2500	150	L25 1+50E	5	0.2	8	11	47
8S0046SG005	-2500	300	L25 3+00E	5	0.2	8	14	40
8S0046SG005	-2500	350	L25 3+50E	5	0.4	7	11	33
8S0046SG005	-2500	400	L25 4+00E	5	0.3	16	18	64
8S0046SG005	-2500	450	L25 4+50E	5	0.8	12	10	67
8S0046SG005	-2500	500	L25 5+00E	5	0.2	19	20	71
8S0046SG005	-2500	550	L25 5+50E	5	0.4	26	19	92
8S0046SG005	-2500	600	L25 6+00E	5	0.2	13	13	43
8S0046SG005	-2600	0	L26 0+00E	5	0.5	14	15	55
8S0046SG005	-2600	50	L26 0+50E	5	0.3	13	17	64
8S0046SG005	-2600	100	L26 1+00E	5	0.4	8	15	44
8S0046SG005	-2600	150	L26 1+50E	5	0.4	16	16	52
8S0046SG005	-2600	200	L26 2+00E	5	0.2	17	16	71
8S0046SG005	-2600	250	L26 2+50E	5	0.3	19	19	80
8S0046SG005	-2600	300	L26 3+00E	5	0.3	6	10	33
8S0046SG005	-2600	350	L26 3+50E	5	0.2	16	19	77
8S0046SG005	-2600	400	L26 4+00E	5	0.4	10	16	58
8S0046SG005	-2600	450	L26 4+50E	5	0.9	64	30	159
8S0046SG005	-2600	500	L26 5+00E	5	0.7	36	17	61
8S0046SG005	-2600	550	L26 5+50E	5	0.9	27	24	115
8S0046SG005	-2600	600	L26 6+00E	5	0.2	12	15	51
8S0046SG005	-2700	0	L27 0+00E	5	0.4	22	17	105
8S0046SG006	-2700	50	L27 0+50E	5	0.9	38	28	118
8S0046SG006	-2700	100	L27 1+00E	5	0.2	20	20	76
8S0046SG006	-2700	150	L27 1+50E	5	0.4	9	13	33
8S0046SG006	-2700	200	L27 2+00E	5	0.2	18	17	73

Certificate Number	north	east	Sample sample	Geochem Au-wet PPB	Geochem Ag PPM	Geochem Cu PPM	Geochem Pb PPM	Geochem Zn PPM
8S0046SG006	-2700	250	L27 2+50E	15	0.2	11	15	52
8S0046SG006	-2700	300	L27 3+00E	5	0.3	2	8	13
8S0046SG006	-2700	350	L27 3+50E	5	0.3	30	25	103
8S0046SG006	-2700	400	L27 4+00E	5	0.2	15	19	68
8S0046SG006	-2700	450	L27 4+50E	5	0.2	16	17	77
8S0046SG006	-2700	500	L27 5+00E	5	1.1	31	22	91
8S0046SG006	-2700	550	L27 5+50E	5	0.2	7	15	48
8S0046SG006	-2700	600	L27 6+00E	5	0.3	8	11	25


TRENCH 98-6
TRENCH 98-4
TRENCH 98-1
TRENCH 98-3
TRENCH 98-2
TRENCH 98-5
DDH 98-1
Azimuth 240°,Dip -45°
Length 100.3m
DDH 98-2
Azimuth 240°,Dip -45°
Length 65.3m
DDH 98-3
DDH 98-4
Road
Fault zone
Strong plane Fault (?)
Oriented spec. No. 1
No bedrock exposed through here.
Old 1970's trench
Initial Post
Trench Marker
Water
6059660 N
6059640 N
6059620 N
6059600 N
6059580 N
650080 E
650100 E
650120 E
650140 E
EXPLANATION
Qtg Unconsolidated talus and glacial debris, including dense, impervious glacial clay.
Qv Chert and quartz veins.
Sul Chalcopyrite, pyrrhotite, pyrite and magnetite occur in metamorphosed intermediate tuff. Minor amounts of garnet-epidote-actinolite as well as hematite/limonite-actinolite are intergrown with the sulfide minerals. Sulfide minerals plus magnetite content ranges from 10 to 60 percent and a bed of pyrrhotite-pyrite-chalcopyrite is nearly 100 percent sulfides. Rocks in some areas are very siliceous, as in trenches 2 and 3.
Dp Fine-grained quartz dacite porphyry
Gd Medium-grained granodiorite; sill or dike.
Ls Thin-bedded, whitish to grey to cream colored limestone.
Ft Light-grey to buff colored felsic tuff. Heavily stained with limonite and pyrolusite. Local pyrite boxworks. Ankerite locally abundant.
Dt Medium-grey, slightly phyllitic dacitic tuff with minor disseminated pyrite.
At Black, slightly phyllitic andesitic ash tuff. From 2 to 10 percent clasts, which are mostly <5mm. Matrix is very fine-grained. Rock is locally slightly chloritic.
Bt Black to dark grey, basalt lapilli tuff.
Strike and dip of beds.
Strike and dip of fault plane.
Strike and dip of joints.
Strike and plunge of fold axis.
Tr.20 × Location of specimen taken for petrogrphic analysis.
25,930
TELKWA GOLD CORP.
Del Santo Volcanogenic Massive Sulfide Prospect
Omineca Mining Division, British Columbia
Geological Map of Trenches
SCALE
0 5 10m
Willard D. Tompson, P. Geo. Sept. 15, 1998
PLATE 1



EXPLANATION

Qtg	Unconsolidated talus and glacial debris, including dense, impervious glacial clay.
Qv	Chert and quartz veins.
Sul	Chalcopyrite, pyrrhotite, pyrite and magnetite occur in metamorphosed intermediate tuff. Sulfide minerals plus magnetite content ranges from 10 to 60 percent .
Bc	Grey and black bedded chert. Commonly mineralized with minor amounts of pyrite with lesser chalcopyrite.
Gd	Medium-grained granodiorite; sill or dike.
Qdp	Fine-grained quartz dacite porphyry
Hd	Fine-grained hypabyssal, strongly contaminated diorite.
Ls	Thin-bedded, whitish to grey to cream colored limestone.
Ft	Light-grey to buff colored felsic tuff.
Bt	Black to dark grey, basalt lapilli tuff and andesitic ash tuff. Clasts are from 5 to 50 percent of rocks.
Arg	Black, fine-grained argillite.

TELKWA GOLD CORP.

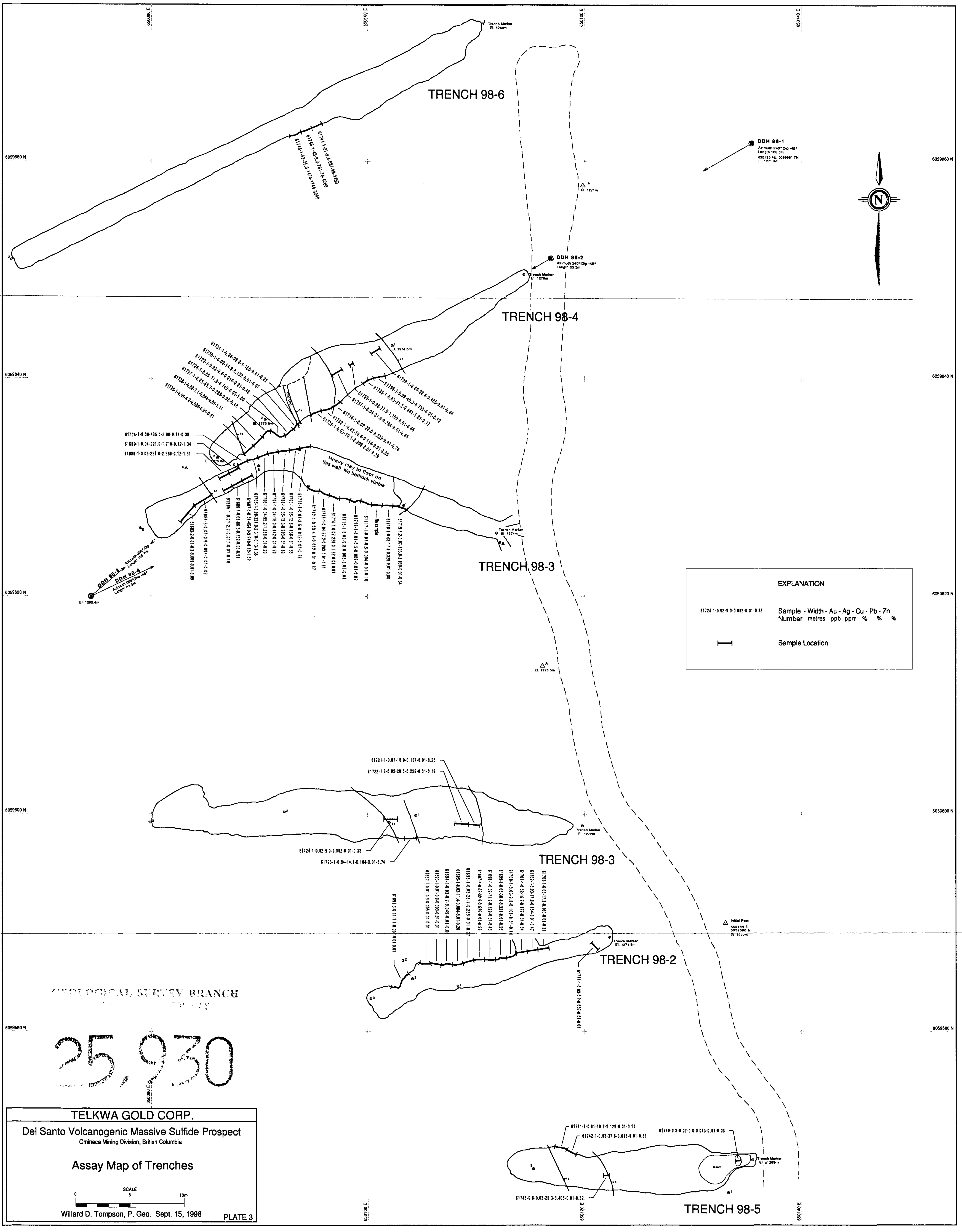
Del Santo Volcanogenic Massive Sulfide Prospect
Omineca Mining Division, British Columbia

Geological Cross Section of Diamond Drill Holes Numbers 98-1, 98-2 AND 98-3

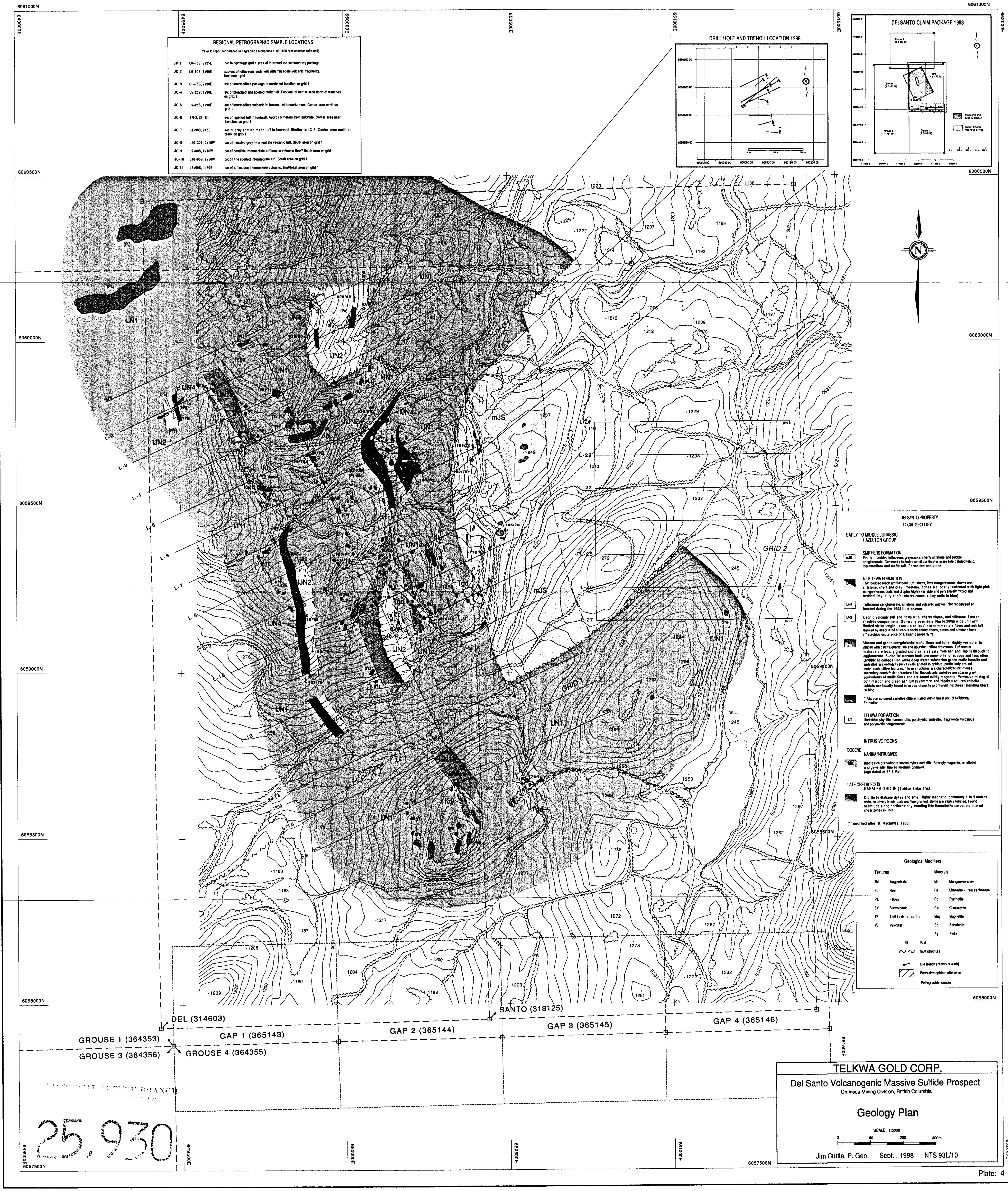
SCALE
0 5 10 15 20m

Willard D. Tompson, P. Geo. Oct. 8, 1998

PLATE 2



TRENCH 98-6
DDH 98-1
DDH 98-2
TRENCH 98-4
Heavy clay to floor on this wall. No bedrock viable
TRENCH 98-3
DDH 98-3
DDH 98-4
EXPLANATION
Sample - Width - Au - Ag - Cu - Pb - Zn
Number metres ppb ppm % % %
Sample Location
TRENCH 98-3
TRENCH 98-2
Initial Post
GEOLOGICAL SURVEY BRANCH
25,930
TRENCH 98-5
TELKWA GOLD CORP.
Del Santo Volcanogenic Massive Sulfide Prospect
Omineca Mining Division, British Columbia
Assay Map of Trenches
SCALE
0
5
10m
Willard D. Tompson, P. Geo. Sept. 15, 1998
PLATE 3


REGIONAL PETROGRAPHIC SAMPLE LOCATIONS
(refer to report for detailed petrographic descriptions of all 1998 rock samples collected)
JC-1 L0+75S, 2+25E o/c in northeast grid 1 area of intermediate-sedimentary package.
JC-2 L0+60S, 1+95E sub o/c of tuffaceous sediment with mm scale volcanic fragments. Northeast grid 1
JC-3 L1+75S, 2+60E o/c of intermediate package in northeast location on grid 1
JC-4 L5+25S, 1+90E o/c of bleached and spotted mafic tuff. Footwall of center area north of trenches on grid 1
JC-5 L5+25S, 1+90E o/c of intermediate volcanic in footwall with quartz eyes. Center area north on grid 1
JC-6 TR-2, @ 18m o/c of spotted tuff in footwall. Approx 5 meters from sulphide. Center area near trenches on grid 1
JC-7 L4+90S, 215E o/c of grey spotted mafic tuff in footwall. Similar to JC-6. Center area north at creek on grid 1
JC-8 L10+30S, 0+10W o/c of massive grey intermediate volcanic tuff. South area on grid 1
JC-9 L9+00S, 2+10W o/c of possible intermediate tuffaceous volcanic flow? South area on grid 1
JC-10 L10+00S, 2+50W o/c of fine spotted intermediate tuff. South area on grid 1
JC-11 L3+50S, 1+50E o/c of tuffaceous intermediate volcanic. Northeast area on grid 1
DRILL HOLE AND TRENCH LOCATION 1998
DELSANTO CLAIM PACKAGE 1998
GRID 1
GRID 2
DELSANTO PROPERTY
LOCAL GEOLOGY
EARLY TO MIDDLE JURASSIC
HAZELTON GROUP
mJS SMITHERS FORMATION
Poorly bedded tuffaceous greywacke, cherty siltstone and pebble conglomerate. Commonly includes small centimeter scale intercalated felsic, intermediate and mafic tuff. Formation undivided.
NILKITKWA FORMATION
Thin bedded black argillaceous tuff, slates, limy manganiferous shales and siltstone, chert and grey limestone. Zones are locally laminated with light pink manganiferous beds and display highly variable and pervasively mixed and bedded limy, silty and/or cherty zones. (Limy units in blue)
lJN3 Tuffaceous conglomerate, siltstone and volcanic wackes. Not recognized or located during the 1998 field season.
lJN2 Dacitic volcanic tuff and flows with cherty slates, and siltstone. Lesser rhyolitic compositions. Generally seen as a 10m to 200m wide unit with limited strike length. It occurs as localized intermediate flows and ash tuff flanked by associated siliceous sedimentary cherts, slates and siltstone beds. (** sulphide occurrence on Delsanto property**)
Maroon and green amygdaloidal mafic flows and tuffs. Highly vesicular in places with calcite/quartz fills and abundant pillow structures. Tuffaceous textures are locally graded and clast size vary from ash and lapilli through to agglomerate. Subaerial maroon beds are commonly tuffaceous and less often phyllitic in composition while deep water submarine green mafic basalts and andesites are ordinarily pervasively altered to epidote, particularly around meter scale pillow features. These structures are characterized by intense secondary quartz/calcite fracture fills. Subvolcanic varieties are coarse grain equivalents of mafic flows and are found mildly magnetic. Pervasive mixing of both maroon and green ash tuff is common and highly fractured chlorite schists are locally found in areas close to prominent northeast trending block faulting.
** Maroon coloured varieties differentiated within basal unit of Nilkitkwa Formation.
lJT TELKWA FORMATION
Undivided phyllitic maroon tuffs, porphyritic andesite, fragmental volcanics and polymictic conglomerate
INTRUSIVE ROCKS
EOCENE
NANIKA INTRUSIVES
Tgd Biotite rich granodiorite stocks,dykes and sills. Strongly magnetic, unfoliated and generally fine to medium grained. (age dated at 47.1 Ma)
LATE CRETACEOUS
KASALKA GROUP (Tahtsa Lake area)
Diorite to diabase dykes and sills. Highly magnetic, commonly 1 to 5 metres wide, relatively fresh, dark and fine grained. Some are slighly foliated. Found to intrude along northwesterly trending thin limonite/Fe carbonate altered shear zones in lJN1
(** modified after D. MacIntyre, 1986)
Geological Modifiers
Textures
AM Amygdaloidal
FL Flow
PL Pillows
SV Subvolcanic
TF Tuff (ash to lapilli)
VS Vesicular
Minerals
Mn Manganese stain
Fe Limonite / Iron carbonate
Po Pyrrhotite
Cp Chalcopyrite
Mag Magnetite
Sp Sphalerite
Py Pyrite
Flt float
fault structure
Old trench (previous work)
Pervasive epidote alteration
Petrographic sample
DEL (314603)
SANTO (318125)
GROUSE 1 (364353)
GROUSE 3 (364356)
GROUSE 4 (364355)
GAP 1 (365143)
GAP 2 (365144)
GAP 3 (365145)
GAP 4 (365146)
6061000N
6060500N
6060000N
6059500N
6059000N
6058500N
6058000N
6057500N
649000E
649500E
650000E
650500E
651000E
651500E
652000E
TELKWA GOLD CORP.
Del Santo Volcanogenic Massive Sulfide Prospect
Omineca Mining Division, British Columbia
Geology Plan
SCALE: 1:5000
0 100 200 300m
Jim Cuttle, P. Geo. Sept., 1998 NTS 93L/10
Plate: 4
25,930