Property File
104K 079

BCDM copy

019969

GOLDEN BEAR PROJECT

NORTH AMERICAN METALS CORP.

1992 TOTEM AREA EXPLORATION REPORT

FEBRUARY, 1993

BY

K.M. Jaworski, M.Sc.(A), P.Geo.
D.G. Reddy, M.Sc.

LIST OF FIGURES

deposit. Three major north trending faults divide the Totem area, from west to east they are: (1) West Wall Fault; (2) Central Fault; and (3) Black Fault (Figs. 3 and 4). These faults have offset portions of the carbonate-chert sequence and the mafic volcanics, often along stratigraphy or fold limbs (Fig. 4). A sequence of nonsilicified carbonate rocks outcrops to the west of the West Wall Fault. Between the West Wall and Central Faults is a wedge of mafic volcanic rock. The central part of the Totem area is underlain by the Totem Silica Zone between the Central and Black Faults. A series of mafic tuffs and flows occur on the east side of the Black Fault.

Previous work had concentrated on the major faults, particularly the Black and Central Faults, and on the Totem Silica Zone. Geological mapping by Chevron and NAMBC noted the widespread ankerite alteration associated with the major faults. An extensive area of silicification or chert, the Totem Silica Zone, was recognized. Extensive trenching by Chevron, attempted to expose the Black, Central and West Wall Faults. Although gold values from rock sampling and trenching were less than 1 g/t, some trenches had highly anomalous silver values. Chevron drilled 15 diamond drill holes, totalling 2,171.40 m in the Totem area, to test VLF-EM conductors coincident with major faults. Some of the holes also tested the Totem Silica Zone, in addition to the Black Fault. There were no significant gold intersections. The best drill core intersection was 1.68 g/t Au, <0.3 g/t Ag over 7.55 m (composite assay; core length) which included 3.9 g/t Au, <0.3 g/t Ag over 1.3 m (core length) from silicified argillaceous limestone, associated with the Black Fault, in hole T85DH96.

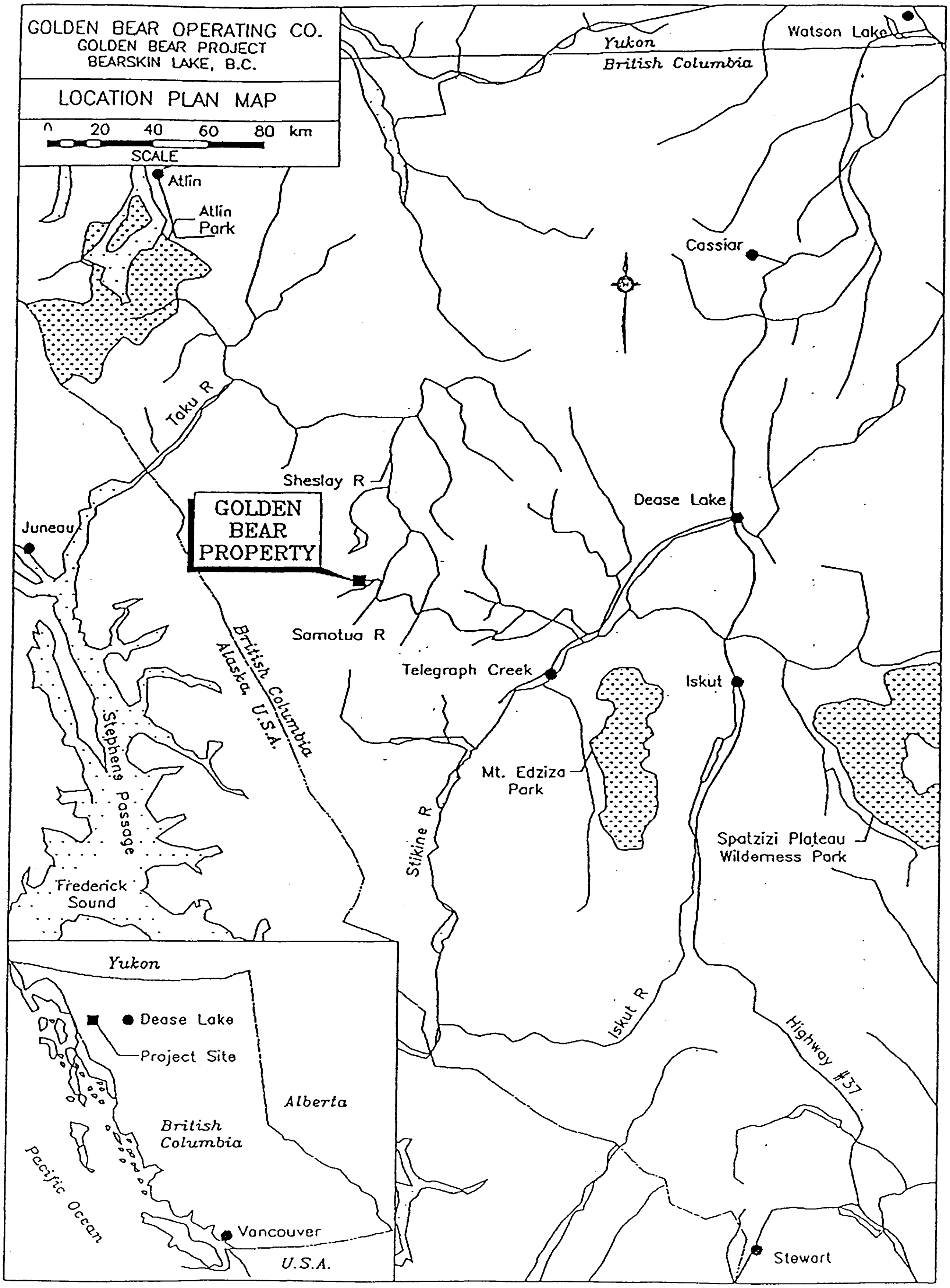


Figure 1. Location Map of Northwestern British Columbia showing the Golden Bear Mine property, the mine access road and proximity to Highway #37.

NORTH AMERICAN METALS CORP.   Golden Bear Mine

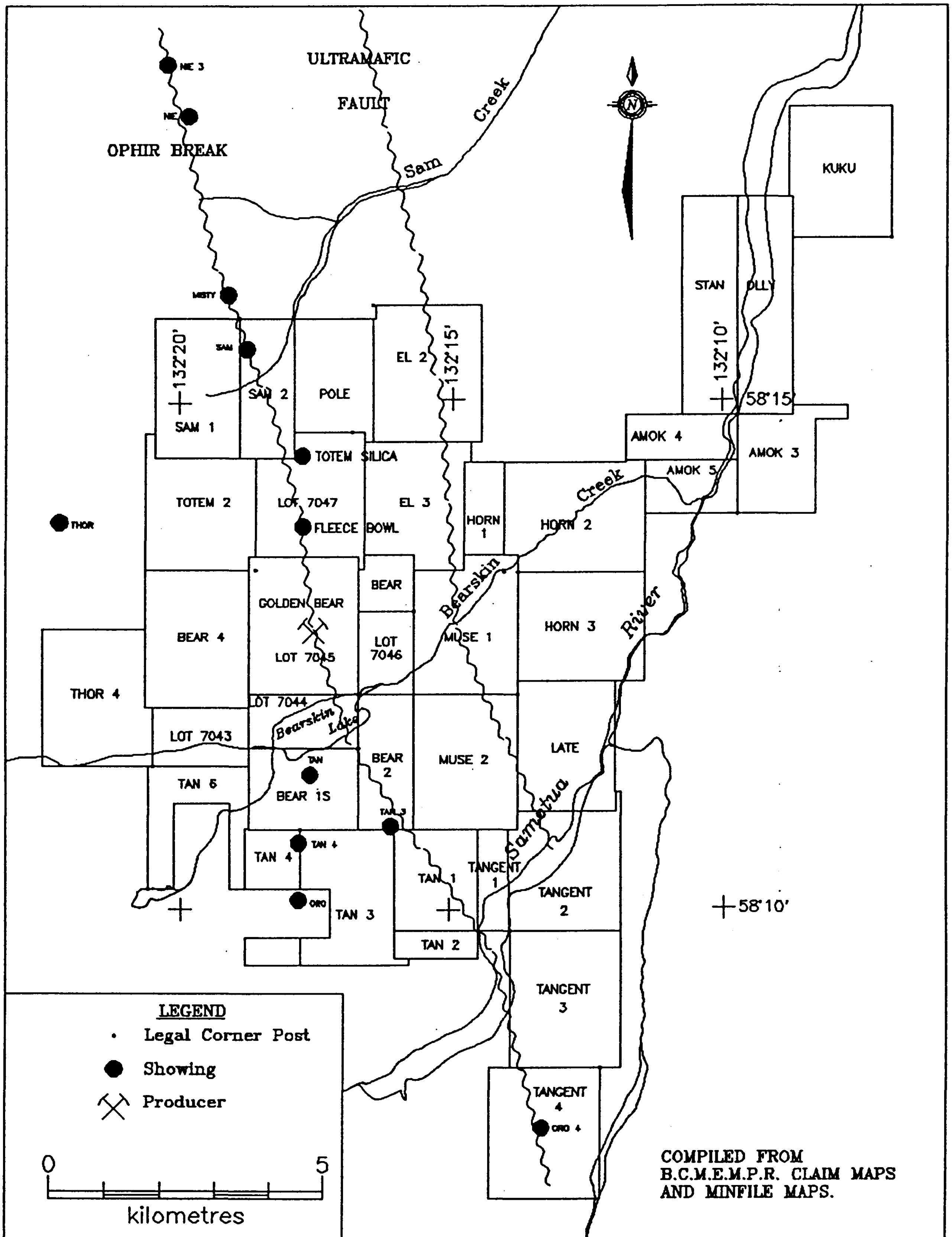


Figure 2. Golden Bear Mine claim map showing location of the Totem Area. Minfile mineral showings and prospects are illustrated.

DATE: Feb. 1993

DRAWN BY: DGR/DAM

FILE NAME: GBPROP93.DWG

NTS: 104K/1

2.0 PREVIOUS EXPLORATION

2.1 Previous Work Done

The TOTEM claim was staked by Chevron in 1981 during original staking of the Golden Bear property. In 1982, the TOTEM2 claim was staked.

In 1982, Chevron conducted 1:10,000 scale geological mapping from 25450 N to 28350 N. Rock sampling was mainly restricted to grid lines with most of the samples collected on or near the baseline. Soil sampling was conducted at 25 m spacing along seven, 100 m spaced lines at the north end of the grid in the Totem Lake area. Rock and soil samples were analyzed for Au, Ag, As and Sb.

In 1983, Chevron established a grid with a 000° azimuth baseline. A VLF-EM (EM-16, Seattle Station) geophysical survey was conducted on the grid. Geological mapping was completed at 1:2500 scale. A road was excavated from the Bearskin Lake camp, northward through the Fleece Bowl area to Totem. In the Totem area, 13 trenches were excavated by bulldozer. All of these trenches, except trench #18, have since been reclaimed. Trench #17 was blasted in bedrock. Detailed trench mapping and sampling was completed in all trenches (Brown and Thicke, 1983). One diamond drill hole, T83DH23 (224.33 m in length), was drilled to test a VLF-EM conductor that is coincident with the West Wall Fault.

In 1984, Chevron repeated the VLF-EM survey (EM-16, Seattle Station) over the 1983 grid and extended coverage further south through the Fleece Bowl area. A total field magnetometer survey was also conducted. Chevron carried out further geological mapping at 1:1000 scale. Rock samples collected were analyzed for Au and Ag.

During 1985, Chevron drilled 14 diamond drill holes, totalling 1947.07 m, on the Totem grid. The holes tested VLF-EM conductors coincident with the Black, Central and West Wall Faults. Of the 15 diamond drill holes in the Totem area; 7 holes, totalling 1116.17 m, were drilled on the Black Fault; 4 holes, totalling 433.43 m, were drilled at 3 sites on the Central Fault; and 4 holes, totalling 621.80 m, were drilled to intersect the West Wall Fault.

No work was done in the Totem area during 1986.

In 1987, North American Metals B.C. Inc. conducted 1:5000 scale geological mapping and rock sampling.

In 1988, Jim Oliver completed 1:5000 scale geological mapping over the Totem area as part of a regional mapping project of the Bearskin Lake to Tatsamenie Lake area for his doctoral thesis (Oliver, 1989; 1990; and Oliver and Hodgson, 1989).

Limited reconnaissance work has been conducted in and around the Totem area between 1989 and 1991.

2.2 Results of Previous Work

2.2.1 Grid Mapping

Chevron and NAMBC, 1:10,000, 1:5000 and 1:2500 scale mapping covering parts or all of the 1992 grid provided a general framework for Totem geology. Structural dynamics and detailed stratigraphy were not fully resolved by previous workers.

2.2.2 Rock Sampling and Trenching

A total of approximately 150 rock grab samples were taken by Chevron and NAMBC in the Totem area. Most samples were from ridges of outcrop within topographic highs of the Totem Silica Zone, and the mafic volcanic rocks between the West Wall and Central Faults. Except for trenched areas, very few rock samples have been taken from the recessively weathered, poorly exposed fault zones. Grab sampling of outcrops from the fault zones returned three samples which were weakly anomalous in either gold or silver. One sample from the Central Fault zone, 250 m south of Totem Lake, returned 0.3 g/t Au, 2.9 g/t Ag. Two samples from the West Wall Fault zone, 100 m north of diamond drill hole T83DH23 returned trace Au, 2.2 g/t Ag, and 1.0 g/t Au, 17.8 g/t Ag respectively.

Only one anomalous rock sample was obtained from the Totem Silica Zone. This sample, taken 50 m southeast of Totem Lake, in an area of gold soil anomalies, returned 0.3 g/t Au, 10.7 g/t Ag.

Several rock grab samples weakly anomalous in silver were from carbonate rocks on the west side of the West Wall Fault. Seven samples returned values of 1.0 to 5.0 g/t Ag, and between trace and 0.2 g/t Au.

Chevron carried out extensive trenching across the major faults of the Totem area.

The Black Fault was trenched in four locations (trench maps for trenches #24, 25, and 26 on the northern part of the fault could not be located). Trench #10, returned 0.1 g/t Au, 6.75 g/t Ag over 11.0 m (composite grade), in ankerite altered mafic volcanic rock with 1-2 % pyrite, carbonate veins, some fault gouge and possible arsenopyrite. The trench also assayed 0.2 g/t Au, 5.15 g/t Ag over 4.0 m (composite grade) from ankerite altered mafic volcanic rock.

The West Wall Fault was trenched in three locations (trench maps for trenches #16 and 18 could not be located). Trench #14 transected both the West Wall and Central Fault zones, but the West Wall Fault was not exposed. Graphitic limestones near the fault assayed 0.18 g/t Au, 4.12 g/t Ag over 10.4 m (composite grade), and graphitic, phyllitic greenstone assayed 0.1 g/t Au, 3.1 g/t Ag over 4.0 m (composite grade). Weakly silicified limestones, exposed in trench #14, from 70 to 120 m west of the West Wall Fault, returned composite grades of: trace Au, 2.55 g/t Ag over 13.9 m; trace Au, 2.87 g/t Ag over 6.0 m; and trace Au, 0.3 g/t Ag over 2.8 m.

Trench #17, situated 100 m west of the West Wall Fault, at 27000 N, returned <0.1 g/t Au, 29.87 g/t Ag over 3.8 m (composite grade) from tetrahedrite-malachite-azurite mineralization in silicified limestone.

The Central Fault was trenched by trenches #14, 15, 19, 20, 21, 22 and 23. Trench maps could not be located for trenches #21 and 22. Trench #14 is the only trench, for which data is available, that exposed the actual Central Fault. The other trenches did not reach bedrock over the fault.

Trenches #14 and 15, near 26700 N, exposed wide zones of carbonatized mafic volcanic rock. Trench #14 yielded a composite assay of 0.9 g/t Au, 2.9 g/t Ag over 32.45 m from sheared and carbonatized mafic volcanic rock. Gouge within carbonatized mafic rocks may represent the Central Fault. The gouge assayed 0.2 g/t Au, 4.8 g/t Ag over 1.0 m. Trench #15, located 50 m to the north of trench #14, returned trace Au, 2.52 g/t Ag over 11.0 m (composite grade) from graphitic limestone at the mafic volcanic/carbonate contact. Carbonatized mafic volcanic rocks at the contact assayed trace Au, 2.43 g/t Ag over 15.0 m (composite grade).

Trench #19, at 27040 N, near diamond drill holes T85DH94 and T85DH95, returned a composite grade of trace Au, 2.3 g/t Ag over 24.46 m from interlayered ankeritic hematitic altered mafic volcanic rock and silicified limestone. A 2.36 m wide zone of chloritic hematitic limonitic gouge, which may be the cause of a VLF-EM conductor noted here, assayed 0.1 g/t Au, 3.85 g/t Ag (composite grade).

Trench #20, at 27500 N, returned highly anomalous silver values. The trench returned a composite grade of trace Au, 14.4 g/t Ag over 26.25 m, from ankeritic hematitic mafic volcanic rock with graphitic interbeds. This interval included trace Au, 25.4 g/t Ag over 3.0 m (composite grade) from carbonatized mafic volcanic rock with quartz stockwork and <2% pyrite, and trace Au, 32.2 g/t Ag over 0.5 m, from an adjacent sample of graphitic schist.

Trench #23, at 27700 N, returned a composite grade of trace Au, 6.46 g/t Ag over 8.6 m from sheared, ankerite altered mafic volcanic rock.

2.2.3 Soil Geochemistry

Most of the Totem area has not been soil sampled due to a cover of felsenmeer and glacial moraine. South of 27750 N only two soil samples have been taken. Grid soil sampling in the Totem Lake area (between 27750 N and 28350 N) has identified soil anomalies over the Totem Silica Zone.

Southeast of Totem Lake several soil samples in the 40 to 80 ppb Au range are centred around individual samples of up to 130 and 160 ppb Au. Although individual gold values are not extraordinarily high, they are anomalous as compared to the background level of 5 ppb Au.

Anomalous soil samples of 80 and 160 ppb Au occur east of the Black Fault at 27850 N.

Several anomalous soil samples containing, 35 to 155 ppb Au occur within the central part of the Totem Silica Zone at 27750 N.

Rare isolated soil anomalies ranging from 35 to 205 ppb Au are associated with the Black and West Wall Faults, and carbonate altered zones within mafic tuffs away from the major faults.

2.2.4 Geophysics

VLF-EM and total field magnetometer were the only geophysical methods used in the Totem area prior to 1992.

The VLF-EM surveys identified a series of strong conductors coincident with the three major fault zones, the Black, Central, and West Wall Faults. The conductors are north trending, up to 500 m long, with north-northwest trending branches that have short strike lengths.

North trending VLF-EM anomalies exhibit breaks and lateral offsets, possibly due to late east-west or northeast striking faults. Offsets occur at 26750 N and 26850 N where conductors related to the Black Fault appear right laterally offset 30 m. At 26525 N, the same conductor appears left laterally offset 30 m.

VLF-EM conductors were the target of Chevron diamond drilling, which successfully intersected the conductors. Most VLF-EM conductive anomalies are due to graphitic argillaceous horizons, most often near the mafic-carbonate contact.

East of the Black Fault, VLF-EM conductors are related to chlorite-clay gouge filled shears within mafic tuffs. The shears contain only minor amounts of graphite. At 24900 E, a conductor of this type, extends from at least 26300 N to 26800 N, and is intersected in diamond drill holes T85DH111, T85DH106, and exposed in trench #10. This chlorite-clay shear may continue northward and be the cause of conductors at, 27050 N to 27100 N, 24900 E, and at, 27250 N to 28500 N, 27875 E to 27925 E.

The total field magnetometer survey was aimed at defining lithological contacts. The magnetometer survey successfully outlined mafic rocks between the West Wall and Central Faults, which appear as a broad area of slightly higher magnetic response than the surrounding carbonate-chert package. Strong highs over the volcanic rocks were coincident with gabbroic textured, plagioclase porphyritic flows. However, the magnetometer survey could not distinguish mafic rocks on the eastern side of the Black Fault from the Totem Silica Zone, perhaps due to extreme carbonate alteration of the mafic rocks and/or the presence of mafic rocks at a shallow depth beneath the Totem Silica Zone.

The magnetic survey weakly defined the major fault zones. In areas of stronger magnetic response, underlain by mafic rocks, the Central Fault is a series of linear magnetic lows. The West Wall Fault is weakly recognizable, as a series of slight deflections in magnetic contours. The Black Fault could not be traced by the magnetic survey.

The magnetic survey identified a linear magnetic low anomaly, within the Totem Silica Zone, at 24750 E, from 27150 N to 27600 N. The south end of the magnetic low is at the limit of 1992 geological mapping, where a fault zone has been mapped. The fault zone which occurs within silicified white limestone, is expressed as brecciation, shearing, and, strongly fractured rock with ankerite fracture filling.

2.2.5 Diamond Drilling

Drilling in the Totem area, included 15 diamond drill holes (totalling 2171.40 m) and did not intersect any gold values of economic significance.

Drilling on the Black Fault zone, intersected weakly anomalous gold values in each of the five holes which penetrated the fault. The anomalous values occurred on or near the Black Fault, associated with either graphitic argillite or graphitic limestone, and were typically 1 to 2 g/t Au over 0.5 to 3.0 m. The best gold grade intersected on the Black Fault, and within the Totem area, was 1.68 g/t Au, <0.3 g/t Ag over 7.55 m (core length) which included 3.9 g/t Au, <0.3 g/t Ag over 1.3 m (core length), in hole T85DH96. Most drill holes on the Black Fault intersected anomalous silver values in the 1 to 2 g/t range.

Drilling on the West Wall Fault intersected one anomalous gold value. Hole T83DH23, intersected 1.2 g/t Au, 3.4 g/t Ag over 1.9 m (core length) in a limestone breccia. Holes T83DH23 and T85DH100, tested the southern part of the West Wall Fault. These

3.0 1992 ACTIVITIES AND RESULTS

The 1992 work was conducted between May 21 and September 7 and included the area between 26550 N to 28500 N, and 24000 E to 25100 E on the mine grid. Activities included: (1) geological mapping and rock sampling; (2) diamond drill core relogging; (3) soil sampling; and (4) geophysical surveys.

3.1 Geological Mapping and Rock Sampling

3.1.1 Work Done

During July and August of 1992, a surveyed grid was established over the Fleece-Totem area. The 1992 grid, continued north from the 1991 Troy Ridge grid at line 25300 N, and extended to line 28700 N, north of Totem Lake. Pickets were spaced at 25 m apart along lines that were at 50 m spacing, (except from line 28300 N to line 28700 N in the Totem Lake area where lines were 200 m apart). The north-south baseline was established as 24600 E.

Totem area geological mapping was completed from line 26550 N, the Fleece-Totem boundary at Surprise Ridge, to line 27750 N on the west side of the baseline, and line 27300 N on the east side of the baseline. Detailed geological mapping was done at 1:1000 scale over a one square kilometre area by K.M. Jaworski and J. Bozek (Fig. 4).

Rock sampling was done in conjunction with geological mapping. A total of 347 rock grab samples were collected and analyzed for Au and Ag at the Golden Bear Mine assay lab.

All trenches in the Totem area, except for trench #18 and blasted trench #17, had already been reclaimed. Trench #14, which had partial exposure remaining, was the only trench mapped and sampled in detail during 1992.

3.1.2 Results

(i) Stratigraphy

The regional geology of the Golden Bear property consists of two main lithologic packages: (1) Permian carbonate, chert, and lesser argillaceous rocks overlain by; (2) Permo-Triassic mafic volcanic rocks. In most locales, on and off the property, the contact between these two packages is a major fault, usually with the carbonate and mafic lithologies in stark contrast (J. Oliver, 1992 pers. comm.; D. Brown, 1992 pers. comm.). The Totem area represents the closest to a continuous conformable section. However, faults have propagated along the lithologic contacts, probably during fold development. Whether portions of the apparent section have been thickened or faulted-off in the Totem area is unknown.

The base of the Totem stratigraphic section is a series of Permian carbonate rocks which can be divided into the mappable rock units: dolomite with chert interbeds, tan limestone, thin bedded limestone, massive white limestone, banded grey limestone, and argillaceous grey limestone.

The oldest unit, **dolomite with chert interbeds** (DOCH) is at least 50 m thick (Fig. 5). It is a grey crinoidal limestone or dolomite (variable silicification and calcite veining prevent a distinction between primary limestone and dolomite), with 5 to 15%, 1 to 5 mm diameter crinoids; and contains 20%, 5 to 30 cm thick beds of amorphous brown chert, which are often stylolite bounded. Occasional, thick, (0.5 m to 2 m) massive black chert beds are present. In the southwestern Totem area, unsilicified dolomite, is extensively exposed. Rubble of unsilicified dolomite with chert interbeds, also occurs east of the Black Fault, on line 27300 N at 24850 E; no outcrop was found, but the rubble may be local and not glacial debris. Intensely silicified dolomite with chert interbeds, outcrops at 27200 N to 27300 N, adjacent to the Black Fault.

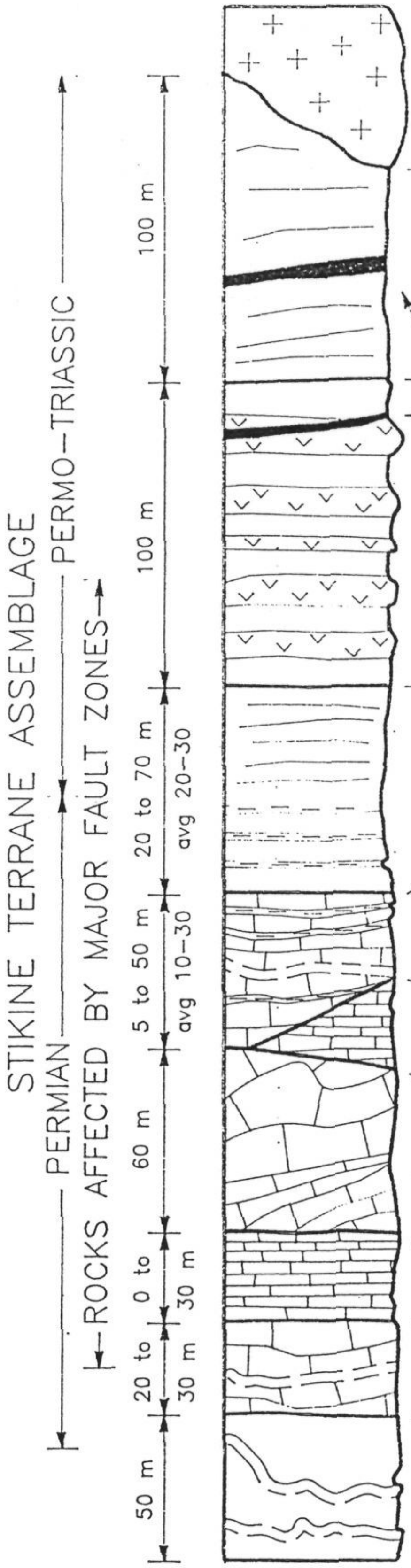
The dolomite with chert interbeds (DOCH) is overlain by a massive grey limestone (LMST) which weathers to tan colour, with a rough surface (**tan limestone**; Fig. 5). The lithology is similar to the dolomite with chert interbeds, but lacks crinoids and brown chert beds. The unit is 20 to 30 m thick.

The dolomite with chert interbeds, and tan limestone are the only map units within the Totem area containing definite primary chert.

The tan weathering limestone is overlain by a relatively thin, up to 30 m, discontinuous unit of **thinly bedded limestone** (LMST). This unit has alternating 1 to 5 cm thick layers of massive white limestone and white-grey silty textured, more porous, limestone. Weathering contrasts create a "vuggy" appearance. Thinly bedded limestone outcrops in the southwestern part of the map area, on lines 26950 N and 27000 N. A highly silicified equivalent outcrops near the Central Fault, at line 26700 N. This unit locally grades into the overlying massive white limestone, such as in the Totem Silica Zone on line 26600 N, and lines 26850 N to 27000 N, where it is silicified and limonitic.

A 60 m thick unit of **massive white limestone** (LMST) overlies thinly bedded limestone. Thin discontinuous layers of massive white limestone also occur stratigraphically above and below the tan weathering limestone (Fig. 5).

NORTH AMERICAN METALS CORP.   Golden Bear Mine



ROCK TYPE	DESCRIPTION
GRANODIORITE (GRDI)	
MAFIC LAPILLI TUFF (MFLP)	Mafic tuffs or highly sheared flows. 5–20% 1–5mm diameter augite crystals. May contain 25% 1–3mm long plagioclase phenocrysts.
ANDESITE DYKE (ANDY)	Plagioclase–hornblende porphyritic intermediate to mafic dyke. 2–5% 1–5mm long plagioclase phenocrysts. May contain acicular hornblende phenocrysts. Aphanitic grey matrix.
MAFIC FLOWS and MAFIC LAPILLI TUFF (MFFL/MFLP)	Plagioclase porphyritic 'Gabbroic textured' mafic flows. 20–50% 2–7mm diameter plagioclase phenocrysts. Mafic lapilli tuff similar to above unit.
LAMINATED MAFIC ASH TUFF and ARGILLITE (MFAS/ARGI)	Highly sheared and sericite altered mafic rocks of undetermined origin (probably MFLP). Thin sericite laminae. Interbeds of argillite.
ARGILLACEOUS GREY LIMESTONE and ARGILLITE (LMST/ARGI)	Grey limestone with stylolites, graphite, and black carbonaceous material. Graphitic argillite interbeds. Black chert beds 1–2m thick.
BANDED GREY LIMESTONE (LMST)	Dark and light grey strongly banded or laminated limestone or chert. Always siliceous or silicified.
MASSIVE WHITE LIMESTONE (LMST)	White poorly bedded massive limestone with stylolites. Usually silicified, resembling quartz or chert.
THIN BEDDED LIMESTONE (LMST)	Light grey to white thin (1–5cm) layers of massive white limestone and porous silty limestone. Vuggy appearance.
TAN LIMESTONE (LMST)	Grey weathers to tan with a rough weathered surface. Massive. Rare 0.5–2m thick black chert beds.
DOLOMITE with CHERT INTERBEDS (DOCH)	Grey crinoidal limestone or dolomite with brown chert beds 5–30cm thick. Occasional black chert beds.

FIGURE 5:
Generalized Stratigraphic Section of Major Lithologies within the Totem Area.

DATE: January 17, 1993
DRAWN BY: KJ/PSM
FILE NAME: FIG5KJ92.DWG
NTS: 104K/1

Silicified massive white limestone comprises most rock exposures in the Totem Silica Zone. The limestone is light grey to cream coloured, poorly bedded, with 10 to 50 cm thick beds, and abundant stylolites. In the Totem Silica Zone this unit is a white jasperoid; the limestone has been almost entirely replaced by fine grained silica. Limestone has been intersected in drill core where it grades into silicified white limestone as major faults are approached. An outcrop at 26800 N, 24300 E, west of the West Wall Fault, is the only outcrop of this unit that is not silicified.

In some areas a 5 to 30 m thickness of silicified **banded grey limestone** (LMST) overlies the massive white limestone (Fig. 5). This limestone has 0.5 to 10 cm thick dark and light grey bands. It outcrops only within the Central Fault zone and Totem Silica Zone where it is highly siliceous or silicified, and could be primary chert. This unit may have a slight argillaceous component, causing the dark grey bands, and may be a transitional unit between underlying 'clean' carbonate rocks and overlying argillaceous carbonate rocks.

A 5 to 50 m, averaging 10 to 30 m, thick **argillaceous grey limestone** (LMST/ARGI) overlies the massive white limestone. This argillaceous limestone is massive with abundant stylolites. The stylolites contain black, powdery carbonaceous material and thin (mm to cm thick) seams of graphite. The unit is similar to the tan weathering limestone and dolomite with chert interbeds, except for the argillite component. The unit is argillaceous throughout, often resembling a siltstone and contains 10%, up to 3 m thick beds of graphitic argillite.

Argillites, argillaceous grey limestone and argillaceous mafic rock can be highly graphitic, with locally up to 80% graphite in 10 to 20 cm thick beds, and commonly, 3 to 10% graphite over several metres thicknesses. The argillaceous component and interbeds in the upper part of the carbonate sequence and the lowermost mafic volcanic rocks supports this as a continuous stratigraphic succession.

A 20 to 70 m thick, averaging 20 to 30 m, unit of **laminated mafic ash tuff and argillite** (MFAS/ARGI), overlies the argillaceous grey limestone. These laminated, possibly tuffaceous, mafic rocks, are highly sheared and ankerite-sericite altered, with thin (2 to 50 mm wide) sericitic bands and trace pyrite. The rock is almost a chlorite-sericite-ankerite schist. The laminated mafic rock contains, both thin (1 to 10 cm thick), and thick (1 m) interbeds of graphitic argillite (Fig. 5).

The protolith of the laminated MFAS could be either tuffs or flows; deformation is too extreme to determine the exact origin of the volcanic rocks. The rocks appear to be the highly sheared and altered equivalent of the overlying mafic lapilli tuffs. The laminated MFAS occurs only adjacent to major faults.

A 100 m thick mafic volcanic unit consisting of interlayered 'gabbroic textured' **mafic flows, and augite bearing mafic lapilli tuffs** (MFFL/MFLP) (Fig. 5) overlies the argillaceous mafic rocks. This unit outcrops on the east side of the West Wall Fault. Mafic flows are 1 to 45 m thick, averaging 5 to 15 m thick. The flows contain 20 to 50%, 2 to 7 mm diameter, plagioclase phenocrysts in a plagioclase-amphibole matrix. The texture varies from porphyritic to medium grained (1 to 5 mm grain size) phaneritic. Field mapping observations and lithologic relationships suggest that these rocks are flows, rather than sills. Augite bearing mafic lapilli tuffs (MFLP) are interlayered with the 'gabbroic textured' flows.

A 100 m thick sequence of **augite bearing mafic lapilli tuff** (MFLP) forms the top of the Totem stratigraphic section (Fig. 5) and overlies the interbedded 'gabbroic textured' mafic flows, and augite bearing mafic lapilli tuff. These mafic lapilli tuffs are similar to the underlying unit except they lack the gabbroic textured flows. This unit comprises most of the mafic rocks of the Totem area and is typically dark green and chloritic, with 5 to 20%, 1 to 5 mm diameter, augite porphyroblasts, phenocrysts or crystal fragments. The augite could be crystal fragments ejected into a tuff, hence the naming of the rock as lapilli tuff. However, this unit may instead be a flow that was highly deformed during regional D1 deformation, creating a strong, flat lying foliation which resembles bedding and contains porphyroblasts. The flat lying foliation has been subsequently folded by D2. The subhorizontal foliation decreases to the south, in the mafic rocks between the West Wall and Central Faults. Here the augite-bearing mafic rocks grade into massive outcrops which are probably flows. An outcrop at 26550 N, 24900 E, beside the road on Surprise Ridge, resembles a massive flow but contains augite, suggesting that augite bearing rocks may be flows.

Rare, plagioclase-hornblende porphyritic, **andesite dykes** (ANDY) intrude the 'gabbroic textured' mafic flows, laminated MFAS and augite bearing mafic lapilli tuffs. The dykes have an aphanitic grey matrix which weathers to brown, and contain 2 to 15%, 1 to 5 mm long, lath-shaped plagioclase phenocrysts. They sometimes contain 5%, less than 2 mm long, acicular hornblende phenocrysts. Dykes are approximately 5 m in thickness, and strike 140 to 150°, subparallel to local stratigraphy. Dykes are at a low angle to stratigraphy and are sill-like. Dykes, along with their host rocks, are ankeritic and hematitic near the Black Fault, suggesting that these dykes predate the period of ankerite alteration on the Ophir Break.

Mafic rocks east of the Black Fault have been intruded by a Triassic **granodiorite** (GRDI) stock. Abundant granodiorite talus was encountered on the eastern edge of the Totem grid, but no outcrop occurs within the map area.

Along major faults, rocks are strongly ankerite-sericite altered and/or silicified. Each primary rock type has an ankeritic and/or silicified equivalent. All carbonate rocks have been either silica flooded, or fractured with ankerite, limonite-calcite, or calcite fracture filling, making the distinction between primary limestone and dolomite difficult in most cases. Carbonate rocks mapped during 1992 are referred to as limestone, even though they may have been dolomitized prior to further alteration or veining.

(ii) Structural Geology

The Bear, Fleece and Totem areas have been subjected to three superimposed deformational events. The first event, D1, which occurred during the mid Triassic, produced a series of north-south trending isoclinal folds with steep east dipping axial planes (Lehrman and Caddey, 1989). Precursor faults to the Ophir Break developed along F1 axial planes and stratigraphic contacts. During early to mid Jurassic, a second deformational event, D2, resulted in broad, open, northwest trending folds (Lehrman and Caddey, 1989). The superposition of the two fold events produced a fold interference pattern, of a series of domes and saddles. The D2 event produced structural dilations along the Ophir Break which host known mineralization (Lehrman and Caddey, 1989). A third, later, post mineralization deformation, D3, has generated zones of clay gouge and chlorite schist.

The outcrop pattern of the Totem area is dominated by large scale **D1** folds (Figs. 4 and 6). The mafic rocks between the West Wall and Central Faults form the core of a shallow south plunging synform that has been truncated by the two faults (Fig. 4). The Totem Silica Zone forms the top of an antiform which plunges approximately 10° south.

Folds and fold interference patterns support the first two periods of deformation. Ellipsoidal fold interference patterns, occur at 27150 N, 24650 E to 24675 E, and at 24825 E. **D2** deformation has resulted in open minor folds on the scale of 10 cm to 10 m. Minor fold orientations trend most commonly at 175 to 206°, plunging 09 to 45° south, and, trend at 005 to 031°, plunging 14 to 26° north. Less common northwest and southeast plunging minor folds trend at 280 to 287°, plunging 41 to 62° west, and trend at 110 to 131°, plunging 01 to 27° east. The superposition of D2 deformation on D1 features has generated dome shaped folds near the Central Fault, at 27375 N, baseline 24600 E.

Away from major faults, stratigraphy strikes at 155 to 160°, demonstrating deflection of these rocks into a north-south orientation by the faults.

The Central, Black and West Wall Faults follow lithologic contacts. Typically the faults develop along argillaceous horizons

NORTH AMERICAN METALS CORP. Golden Bear Mine

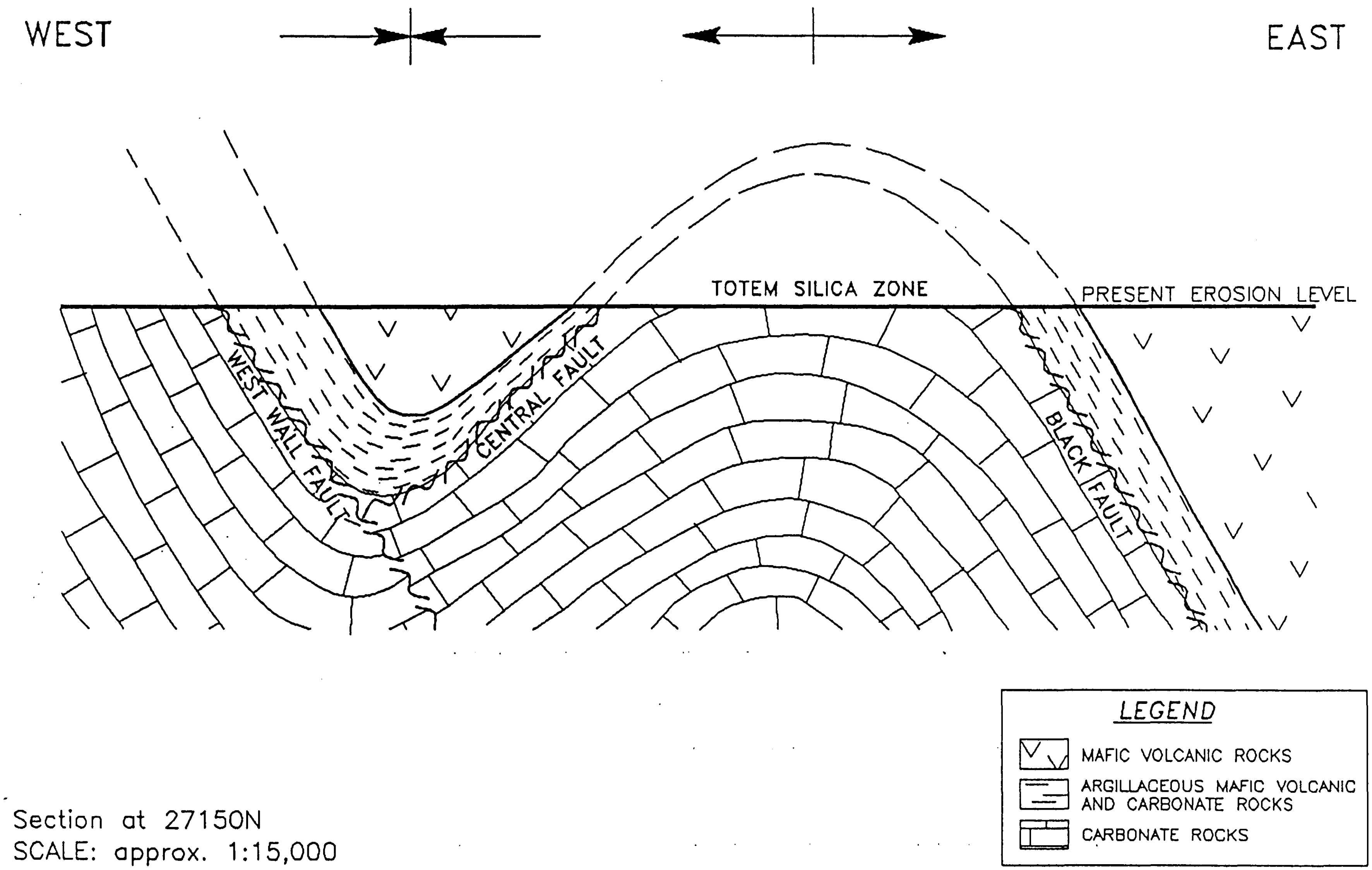


FIGURE 6: Schematic Cross-Section of the Totem Area facing North	DATE: January 15, 1993	NTS: 104K/1
	DRAWN BY: KJ/RSM	FILE NAME: FIG6KJ92.DWG

The **West Wall Fault** forms the western contact, of the wedge of mafic rocks situated between the West Wall and Central Faults. On the west side of the West Wall Fault is a largely unsilicified sequence of carbonate rocks. In the north, the fault strikes at 170°, but the strike changes to 160° in the southern part of the map area. The fault curves, following stratigraphic contacts as the closure of a major synform is approached (Fig. 4). Limited drill hole cross-sections correlated with surface mapping indicate a dip of 60° east. Tension gash-type quartz veins at 27450 N, 24375 E and 26875 N, 24400 E indicate left lateral movement. At 26825 N, a fault plane at 166°/66° E has slickensides plunging at 60° toward 129°. Slickensides on 145° fault planes, plunge approximately 20° south. These fault planes, located within mafic volcanic rocks on the east side of the West Wall Fault, may represent Riedel shears to the West Wall Fault. At 27500 N, 24350 E, 170° trending quartz veins are left laterally offset by joint sets (also possible Riedel shears) at 134°/72° NE. Left lateral strike-slip movement with lesser normal dip-slip movement is probable for the West Wall Fault.

The latest movements on the Black and West Wall Faults are primarily strike-slip.

Late east-west (070 to 090°) and northeast-southwest (045 to 065°) striking joints, faults, and fractures are common within the Totem area.

Structures with an **east-west** strike are: (1) east-west striking zones of shearing; (2) minor offsets in VLF-EM conductors; and (3) joint and fault planes. Zones of shearing outcrop in the mafic rocks between the West Wall and Central Faults, at 26800 N to 26900 N, 24400 E to 24575 E. Ten metre wide zones of strong shearing strike at 060 to 080° and postdate fabrics related to the West Wall Fault. The shearing appears to right laterally offset a VLF-EM conductor located east of the Central Fault. Joints and fault planes striking 080 to 090° are common throughout the Totem area. At 27225 N, 24600 E, near the Central Fault, a 5 m wide zone of strong jointing occurs at 085°/79° S.

Northeast-southwest striking structures are reflected by: (1) minor offsets in VLF-EM conductors; (2) joint sets and fractures, often silica coated (especially in the Totem Silica Zone); and (3) narrow, hematitic fault breccias and ankeritic limestone breccias.

Near diamond drill hole T85DH103, a VLF-EM conductor which probably represents the Black Fault, is right laterally offset 30 m, by 045 to 050° striking, steeply (70 to 80°) north dipping faults observed in outcrop.

Within the Totem Silica Zone, at 27200 N to 27300 N, 24600 E to 24850 E, zones of silica coated fractures, trend at 045 to 050°. These fracture zones, contain shallowly north (20°) dipping, along with calcite in the mafic rocks. Closer to the centre of the shear zone pervasive ankerite flooding (10 to 50% ankerite) with minor (<5%), 1 to 5 mm wide ankerite veins occurs. The zone of ankerite flooding, with increasing alteration, is characterized by: chlorite-calcite-ankerite-sericite schist, chlorite-sericite-ankerite-calcite schist, and ankerite-sericite-chlorite schist. Carbonatized mafic volcanic rock **(MFCA)** locally occurs at the centre of the shear zone. MFCA, which is ankerite-sericite-pyrite-fuchsite schist or massive listwanitization, contains trace to 10% fine disseminated pyrite, trace to 5% fuchsite, and 5 to 25%, ankerite veins that are up to 1 cm wide, occurring as a stockwork.

Carbonatization is not widespread in the Totem area and is mainly associated with the Central Fault, especially near its confluence with the West Wall Fault. Here trenches #14 and 15 exposed wide zones of carbonatization, and extensive rubblecrop of carbonatized mafic volcanic rock, with commonly up to 10% pyrite is present. Local areas of carbonatization occur along the Central Fault (i.e. 27500 N, and 27700 N). On the West Wall Fault, carbonatized mafic volcanic rock was intersected in diamond drill holes T85DH100, 102, and 105. Hole T85DH100 near the confluence of the West Wall and Central Faults, had the widest intersection of MFCA (10 m core length). The Black Fault, has only one known occurrence of MFCA, intersected over 1.43 m (core length) in diamond drill hole T85DH106.

Pervasive ankerite flooding (10 to 50% ankerite), expressed as ankerite-sericite-chlorite schist and chlorite-sericite-ankerite-calcite schist is the dominant form of carbonate alteration within Totem area mafic rocks, and is the cause of most rusty coloured weathering along major faults (Fig. 3). Ankerite flooding is widest on the Central Fault where altered and sheared areas are up to 100 m wide. On the West Wall Fault the zone of ankerite flooding is less than 50 m wide in the south portion of the map area, and as narrow as 10 m in the north. On the Black Fault the zone of ankerite flooding is up to 170 m wide (trench #10 area). Pervasive ankerite flooding and carbonatization of mafic rocks occur only adjacent to major faults, generally following the north-south trend of the faults.

Limestones and dolomites have also been highly affected by carbonate minerals. Carbonate alteration within carbonate host rocks has two styles, depending on the type of limestone. In tan weathering limestone, carbonate alteration is expressed as pervasive ankerite flooding, with increasing stockwork ankerite veining (1 to 10 mm wide veins) as alteration intensity increases. In some areas on the Central Fault, the tan weathering limestone contains up to 25% pervasive ankerite and 25% ankerite veins. In other, carbonate rocks, especially silicified rocks, ankerite occurs as <1 to 1 mm thick, coatings on fractures or joints, and as breccia filling of crackle breccias.

(1) an earlier event of widespread pervasive silica flooding or silicification which has produced the Totem Silica Zone; and (2) a later event of 'water clear' crustiform silica filled fractures or veins. Silicification and silica veins were only noted in carbonate host rocks. No evidence for silica alteration has been observed in mafic volcanic rocks.

The pervasive, jasperoid type of silicification has locally affected each of the carbonate rock units. The presence of silicification within each carbonate rocktype is well exhibited in drill core. Drill core also reveals that pervasive silicification is peripheral to major faults, decreasing in intensity away from the faults. On surface, the most visible expression of the silicification is the Totem Silica Zone, where flat-lying silicified white limestone covers a large (2 km x 0.5 km) area. Within the Totem Silica Zone, thin bedded limestone, dolomite with chert interbeds, and argillaceous grey limestone are also silicified.

Crustiform silica-filled fractures or veins, are 1 to 10 mm wide, averaging 1 to 5 mm wide, and occur in amounts of up to 15%. These often vuggy veins fill fractures in jasperoidal carbonate rocks. They occur on surface within silicified white limestone, and in drill core within silicified white limestone, silicified tan weathering limestone, and silicified dolomite with chert interbeds. In the Totem Silica Zone, at 27300 N, 24600 E to 24850 E, 10 to 20 m wide zones, of 5 to 15% silica filled fractures, trend northeast. In diamond drill hole T85DH104 silica filled fractures form a halo to a heterolithic fault breccia.

Hematite is present throughout the Totem area, although only in small amounts away from the major fault zones.

There are two modes of occurrence of hematite: (1) pervasive hematite associated with ankerite flooding, usually within a host rock of 'gabbroic textured' mafic flows; and (2) hematite coated fault planes and joints, or matrix fillings of narrow cataclastic fault breccias.

The most abundant occurrence of hematite is as pervasive hematite associated with ankerite flooded 'gabbroic textured' mafic flows. Up to 20% hematite may be present, giving rocks a brick red colour. This type of hematite occurs over broad (2 to 20 m wide) areas, along major faults, especially the Central and Black Faults.

A much less abundant style of hematite, is as a coating on fault planes, joints, and as a matrix of cataclastic fault breccias. In the Totem Silica Zone, and the south part of the West Wall Fault zone, narrow (5 to 20 cm wide) cataclastic breccias of 0.2 to 1 cm diameter limestone fragments in a hematite or hematite-crustiform silica matrix are present. The breccias may contain up to 10% hematite. These breccias and hematite coated fault planes

3.2 Diamond Drill Core Relogging

During May and June, 1992, all Totem area diamond drill holes were relogged. Seventeen diamond drill holes, totalling 2456.09 m were relogged by K.M. Jaworski and C. Pothorin. The holes are located in the Totem and northern Fleece area between 26277 N and 28043 N. Relogging allowed standardization and correlation of rock types between holes and with geologic mapping. The latter facilitated the development of a more complete stratigraphic section.

Four holes (T85DH94, 95, 97, and 98) were relogged from the Central Fault zone. Four holes (T83DH23, T85DH100, 102, and 105) were relogged from the West Wall Fault zone. On the Black Fault zone, nine holes (T85DH92, 93, 96, 99, 101, 103, 104, 106, and 111) were relogged. Holes, T85DH93 and 111 are in the Fleece area, near the Fleece-Totem boundary.

Selected sampling of previously unsampled core was undertaken. A total of 87 split core samples were analyzed for Au and Ag at the Golden Bear Mine assay lab. No significant gold results were returned, with the best assay being 0.48 g/t Au, 1.4 g/t Ag over 1.44 m (core length), from hole T85DH111.

The similarity of lithologies at each of the three major fault zones suggests stratigraphy is repeated across the Totem area, due to folding, with the younging direction alternating across major faults.

The abundance of argillaceous rocks and the presence of transitional interbedded argillaceous material within basal carbonate rocks and overlying mafic rocks supports the existence of a conformable or "near-conformable" succession in the Totem area.

The high proportion (20% in drill core versus 1% on surface) of 'gabbroic textured' plagioclase porphyritic mafic flows intersected within drill core suggests that the porphyritic flows occur near the base of the mafic succession, and represent a significant portion of the stratigraphy even though there are few outcrops of this rock type.

Substantial sericite is present, with up to 50% sericite within the most intensely deformed mafic rocks, sericite-ankerite-fuchsite schist. Significant (up to 20%) amounts of more widespread sericite is associated with deformation and trace to 1%, fine pyrite within strongly sheared mafic flows or tuffs ("Laminated MFAS"), resulting in thin sericitic bands.

Major deformation zones are localized along graphitic horizons, particularly at the argillaceous grey limestone-massive white limestone contact. Deformation to a lesser extent occurs on the margins of plagioclase porphyritic mafic flows. Most flow margins are sheared and ankerite-hematite altered, sometimes with intense ankerite replacement and near total destruction of mafic minerals. The margins of mafic flows have been the sites of D3 deformation, resulting in the generation of soft, incompetent, chlorite schist or chlorite gouge, i.e. hole T85DH111.

Bedding and foliation angles to core axes change rapidly and radically, suggesting strong folding. Ovoid and circular fold interference patterns provide evidence for two stages of deformation.

Diamond drilling reveals that the Totem Silica Zone does not extend to depth. Holes T85DH101 and T85DH103 have drilled through an almost flat-lying, extremely silicified white limestone (previously logged as 'chert' or 'quartz') and grade into massive, calcareous, white, stylolitic limestone, the probable protolith to the Totem Silica Zone.

Diamond drilling intersected heterolithic breccias with fragments of wallrock limestones and carbonatized mafic volcanic rocks, along with white 'chert'(or silicified limestone) fragments. The heterolithic nature of the breccias and presence of white chert is similar to breccias of the Bear and Fleece deposits. Heterolithic breccias have been identified in holes, T85DH94, 95 and 98 which penetrated the Central Fault, and holes, T85DH100 and 101 which penetrated the West Wall Fault. On the Black Fault, holes T85DH101, 103, 104 and 106 also intersected this type of breccia. The breccias may be related to northeast-southwest striking faults.

A zonation in silica alteration surrounds the heterolithic breccias. 'Water-clear' silica filled fractures, less than 1 mm to 2 mm wide, are a halo to a heterolithic breccia in hole T85DH104.

Drill hole data from hole T85DH103, when combined with surface information suggests a possible truncation of shallow east dipping beds of the Totem Silica Zone by the steeply dipping Black Fault. Such a relationship between structures, with bedding subperpendicular to the fault, could have allowed reactive silica bearing fluids, which may have been moving along the fault to penetrate limestones of the Totem Silica Zone and move along bedding planes.

3.3 Soil Sampling

3.3.1 Work Done

Soil sampling was done in the northern part of the Totem grid, near Totem Lake. The survey was aimed at: (1) evaluating the area north of Totem Lake where a large area of ankeritic soil is present; (2) aid in the evaluation of the Central Fault; and (3) following-up Chevron gold soil anomalies southeast of Totem Lake. A total of 170, soil samples were collected on 50 m spaced grid lines, from line 27800 N to line 28300 N. Samples were collected at 12.5 m spacing along lines across the Central Fault zone, and 25 m spacing over the Totem Silica Zone and north of Totem Lake.

Samples were analyzed for 31 elements by inductively coupled plasma (I.C.P.) spectrometry at International Plasma Laboratory Ltd. in Vancouver.

3.3.2 Results

In the Totem Silica Zone, background values are 10 to 30 ppb Au. Noticeably lower background values of less than 10 ppb Au occur over areas underlain by mafic volcanic rocks.

Three samples were moderately anomalous in gold. The highest sample, which returned 351 ppb gold, was on line 27850 N at 24975 E, 300 m southeast of Totem Lake. The sample is east of the Black Fault, in an area underlain by mafic rocks with no nearby outcrops. The anomaly is probably associated with the Black Fault. A second anomalous sample, which yielded 213 ppb Au, is at 28050 N, 24825 E, 100 m east of the south end of Totem Lake. The sample is adjacent to an outcrop of fuchsite-quartz-carbonate altered rock noted by J. Oliver, which returned trace Au, 0.1 oz./t Ag when sampled by Chevron. A soil sample which returned 176 ppb Au is located 50 m to the northwest. The soil anomaly trends at 150°, an orientation similar to joints, foliations and fault planes, in the Totem area.

Other very weak soil anomalies, in the 30 to 50 ppb Au range, trend at 025, 045 and 160°. The orientation of these anomalies are also similar to joints, foliations and fault planes in the Totem area.

Copper background values in soil are less than 100 ppm. Copper increases toward the Central Fault, with a 100 to 200 m wide, zone of weakly anomalous (greater than 100 ppm Cu) soil surrounding the Central Fault zone. Narrower, 25 to 30 m wide, more highly anomalous areas in the 200 to 325 ppm range occur directly over the fault.

Background arsenic values are less than 50 ppb in mafic rocks and 50 to 100 ppb in the Totem Silica Zone. The highest arsenic value was 378 ppm on line 27950 N at 26750 E, 50 m southeast of Totem Lake. This sample is part of a 50 m wide north-south trending weakly anomalous (greater than 100 ppm As) zone which extends south to the southern limit of sampling at 27800 N. A second weakly anomalous (100 to 177 ppm As) zone trends at 150° near the Central Fault (24600 E) on line 27800 N, and is coincident with a very weak (60 ppb) gold anomaly.

No silver anomalies were present. Silver values ranged from <0.1 to 0.7 ppm with most in the <0.1 to 0.2 ppm range. The data range was too small to make contouring the data useful.

3.4 Geophysical Surveys

3.4.1 Work Done

During the period, August 22 to 31, Pacific Geophysical Limited (PGL) was contracted by North American Metals Corp. (NAMC) to conduct time domain induced polarization (I.P.)/resistivity surveys over the Totem and northern Fleece areas. The surveys were carried out by two PGL personnel and two NAMC assistants, using an EDA IP-6 unit.

The surveys were initiated to search: (1) at depth beneath the Totem Silica Zone, for any large body of disseminated sulphides, which could host a large tonnage, low grade gold deposit; or (2) for discrete bodies of high sulphide gold bearing fault gouge similar to the Bear Fault. The surveys also tested for a potential northward extension of Fleece "B", fault related gold-pyrite mineralization.

Gradient (Schlumberger) array and pole-dipole array surveys were conducted on 200 m spaced grid lines, beginning at line 25900 N and extending to 27500 N for the pole-dipole survey, and 28100 N, for the gradient survey. Line 25900 N, is at the north end of the Fleece "B" zone and was intended to act as an I.P. test line over known gold mineralization of the Fleece "B" mineralized resource. Surveys were conducted across the entire width of the Fleece-Totem area. The gradient survey covered a total of 8.6 line km and the pole-dipole survey a total of 6.45 line km.

The gradient survey used a current electrode spacing of 2000 m and potential electrode spacing of 25 m, thus achieving a probable depth penetration of 300 m. The pole-dipole survey used a=50 m with readings taken at n=1 to n=5, thus achieving a depth penetration of 100 m, at n=5. Two grid lines, line 26450 N and 26700 N, were resurveyed at a=100 m (200 m depth penetration) to test for an anomaly at depth noted on line 26450 N.

The gradient array was used as a deep search for any large I.P. anomaly that may be related to a disseminated sulphide body, especially below the Totem Silica Zone. Follow-up with pole-dipole was intended to discriminate near-surface anomalies and narrow structures from deeper targets.

3.4.2 Results

The gradient survey, worked well in outlining the main lithologies and defined major fault structures (Fig. 7).

The gradient resistivity survey effectively outlined mafic and limestone rocks. The survey showed mafic rocks between the West Wall and Central Faults, extending in the subsurface as far south as 26100 N, where on surface they pinch out at 26,650 N. A southward plunge of the mafic volcanic rocks is suggested.

The gradient chargeability survey also outlined overall lithologic contacts, although not as well as the resistivity. The chargeability survey was especially effective at identifying graphitic rocks of the Black and West Wall Faults which are extreme chargeability highs (Fig. 8).

Pole-dipole resistivity maps also define mafic volcanic and limestone rocks. Mafic volcanic rocks are strong resistivity lows while limestones have moderate and high resistivity. The Black and West Wall Faults are strong linear resistivity lows. Resistivity surveys show that silicified limestones of the Totem Silica Zone do not extend to depth (are probably at least 75 m thick) (P. Cartwright, 1992, pers. comm.).

Pole-dipole chargeability at n=1 closely reflects lithologic contacts as mapped at surface. Limestones have very low chargeability, while mafic volcanic rocks have intermediate or low chargeability. Fault zones have high chargeability with the Black and West Wall Faults having very high chargeability in graphitic areas. Chargeability data, like resistivity results, suggests that the Totem Silica Zone, is less prominent at depth.

Limestones in the Fleece "B" area on line 25900 N, west of the Fleece Fault have very high gradient resistivity and moderate pole-dipole resistivity which may be related to silicification associated with Fleece "B" type gold mineralization.

A circular, 200 to 300 m wide area of very low pole-dipole chargeability between 26100 N and 26450 N, west of the Fleece Fault, could represent silicification within limestones. The chargeability low is coincident with a smaller (150 m by 200 m) circular pole-dipole resistivity low between 26100 N and 26300 N which could represent faulting or brecciation. A linear pole-dipole chargeability low (at n=1) extending northwest from the circular low, corresponds with a fault zone mapped on surface with ankerite and limonite-calcite limestone breccias.

Gradient resistivity has effectively traced the Black, Central and West Wall Faults as pronounced linear lows (Fig. 7). The Central Fault is a pronounced linear resistivity low north of line 26450 N; south of 26450 N it is less well developed. At line 26100

N the Central Fault joins with a northwest trending series of resistivity lows, which probably define another fault, possibly the extension of the Fleece Fault.

The gradient resistivity also identified several less distinct linear resistivity lows, which probably represent faults (Fig. 7). On the west side of the Central Fault, a linear resistivity low extends from 26200 N, 24575 E to 27100 N, 24650 E. This low is coincident over much of its length with a VLF-EM conductor. The resistivity low may represent a fault which follows an argillaceous horizon. The south end of the resistivity low is coincident with a limestone breccia zone mapped on surface in the Fleece Bowl area.

A northwest trending series of resistivity lows extends from 25900 N, baseline 24600 E, to 26300 N, 24475 E. This is coincident with a limestone breccia mapped on surface and probably represents a fault zone, possibly the extension of the Fleece Fault.

A northeast trending (030°) series of resistivity lows which extend from 26100 N, 24325 E to 27000 N, 24800 E may represent a late fault. Near the Black Fault, at 26750 N, 24775 E the resistivity low is coincident with northeast-southwest striking faults mapped in outcrop.

The gradient survey identified moderate chargeability anomalies due to broad (greater than 50 m wide) areas of 2 to 10% disseminated pyrite within carbonatized mafic volcanic rocks (Fig. 8). One of these anomalies is on line 26700 N, at 24500 E to 24600 E. The anomaly exposed by Chevron trenches #14 and 15, and sampled during 1992 in rubblecrop, is barren of gold. The other anomaly is at 27300 N to 27700 N, on the Central Fault, was sampled in trench #20, and is also barren of gold.

There appears to be excellent correlation between resistivity events seen in the gradient array data and those interpreted in the pole-dipole data (Cartwright, 1992).

There are two significant zones of anomalous I.P. response (Cartwright, 1992) (Fig. 8). A weakly anomalous I.P. response (Cartwright, 1992) correlates with known gold mineralization in the Fleece "B" zone on line 25900 N, near baseline 24600 E. This "zone continues to the northwest until it strikes off the grid in the area of line 26700 N, at which point there is only pole-dipole data. The anomalous I.P. effects which constitute this trend increase moderately in magnitude as one moves northwesterly, such that the best responses are evident in the pole-dipole data recorded at the extreme western ends of lines 25700 N and 26450 N. Relatively narrow, steeply dipping, tabular sources are thought to be present at less than 50 m depth" (Cartwright, 1992). On surface the area is covered by limestone rubble.

Another significant "zone of above normal I.P. readings is indicated to be present in the vicinity of the western ends of lines 27700 N, 27500 N and 27300 N. While coverage of this feature is incomplete towards the west and north, one can say that the source appears to be quite wide and is very resistive. It is bounded on the east by a well defined structure (West Wall Fault?), and is buried less than 50 m beneath the surface" (Cartwright, 1992). The area of anomalous I.P. response was not totally covered by the 1992 mapping grid, but is covered with limestone felsenmeer. A grab sample from possible outcrop at the south end of the area of anomalous I.P. response returned 7.17 g/t Au.

4.0 CONCLUSIONS

Synthesis of the previous exploration data together with the 1992 work has yielded many significant contributions to the understanding of stratigraphy, structure and alteration in the Totem area. The following points summarize the main conclusions.

1) Stratigraphy of the Totem area is the closest example of a continuous section within the region. The limestones are overlain, and near the upper contact, are interbedded with a transitional argillite unit that is interbedded with the lower portion of overlying mafic tuffs and flows.

2) The Totem stratigraphy is folded into a series of shallowly south plunging antiforms and synforms. Major faults are localized along argillaceous rocks near the mafic-limestone contact. Fault development has propagated along limb failures due to the lithologic contrast of the volcanic rock and limestones.

3) The Black and West Wall Faults, dip steeply east. The latest movements on the Black and West Wall Faults are primarily strike-slip. The Central Fault dips variably west at 30 to 80°. The latest movement on the Central Fault is dip-slip.

4) Of the three major faults in the Totem area, the Central Fault is associated with the widest deformation zone and most intense carbonatization.

5) The Central Fault extends south from the Totem area into the northern Fleece area, where it joins the steeply east dipping Fleece Fault. In an area of rubblecrop between 26550 N and 26000 N the Central Fault is either truncated by the West Wall or Fleece Fault, or changes from west dipping to east dipping.

6) The Central, Black and West Wall Faults contain heterolithic breccias with fragments of wallrock limestones and carbonatized mafic volcanics, along with white chert (or silicified limestone) fragments. The heterolithic nature of the breccias and presence of white chert is similar to breccias of the Bear and Fleece deposits.

7) The Totem Silica Zone is a flat-lying body of intensely silicified white limestone. Silicification in carbonates is related to proximity to the Central and Black Faults.

8) The Totem Silica Zone is a relatively thin (but at least 75 m thick) veneer of silicified limestones underlain by massive white limestone.

9) Extensive brecciation within the Totem Silica Zone is peripheral to the Black and Central Faults, and also related to other less intense north trending and northeast trending faults.

10) A late, northeast-southwest striking fault structure, up to 1.2 km long appears to right laterally offset the Black Fault by as much as 50 m.

11) Copper-silver mineralization, which is present near the West Wall, Central and Black Faults, may be associated with the silica event which has led to the development of the Totem Silica Zone.

12) The Fleece "B" zone has an identifiable I.P. signature. An anomaly extends for 550 m north into the Totem area and may represent a continuation of Fleece "B" mineralization.

13) I.P. surveys indicated that an anomaly related to a large body of disseminated sulphide mineralization does not exist beneath the Totem Silica Zone, however a large chargeability high was noted on the end of several lines in the northwestern Totem area. The latter I.P. anomaly is coincident with a 7.17 g/t Au grab sample of limestone from a probable outcrop. The anomaly and sample require further investigation.

Geological mapping combined with I.P. and soil surveys have investigated most of the Totem area. Further work should concentrate on: (1) the northern extension of the Fleece "B" I.P. anomaly; (2) the 2 km length of the Central Fault zone, particularly in the south as an extension of Fleece "B" mineralization; and (3) on the northwest margin of the map area where a broad I.P. anomaly remains uninvestigated.

5.0 RECOMMENDATIONS

1992 work in the Totem area has identified several areas of interest where additional exploration work is warranted. In particular, I.P. anomalies provide potential for new discoveries of gold deposits of significant size and require further investigation. The following recommendations address the direction of future work.

1) The I.P. anomaly which appears to be the extension of the Fleece "B" zone, requires further fieldwork and trenching, and subsequently may require drill testing.

2) Additional field investigation of the I.P. anomaly on the northwest corner of the map area is required with rock chip sampling to be conducted where possible.

3) A grab sample in the northwest part of the map area, which assayed 7.17 g/t Au, is coincident with an I.P. anomaly and should be followed-up.

4) Geological mapping at 1:1000 scale in the Totem area should be continued to the north of the area mapped in 1992.

5) Detailed soil sampling along grid lines, across the Central Fault zone should be extended to the south of the 1992 sampling area. This would involve a strike-length of 800 m before glacial cover prohibits sampling. The sampling may identify parts of the Central Fault which may have potential to host gold-bearing mineralization. The soil sampling would also aid in evaluating I.P. anomalies related to the Central Fault.

6) The nature of copper-silver mineralization should be better established and its relationship, if any, to gold mineralization should be investigated.

7) Continuation of I.P. southward from the limits of the 1992 survey may be considered to cover the Fleece "B" zone, Fleece "A" zone and the Helen Lake area, pending whether significant mineralization has been identified with the 1992 survey.

6.0 REFERENCES

Brown, D., and Thicke, M. 1983. Assessment Report Trench Geology and Geophysical Survey Totem Group, Atlin Mining Division Tatsamenie Lake Area, B.C. N.T.S. 104K/Tulsequah Sheet. Chevron Canada Resources Limited. Assessment report number 11663.

Cartwright, P.A., 1992. Pacific Geophysical Limited, Report on the Induced Polarization & Resistivity Survey on the Totem Grid, Golden Bear Mine, Atlin Mining Division, British Columbia, for North American Metals Corp., N.T.S. 104K/1.

Lehrman, N.J., and Caddey, S.W. 1989. Golden Bear project, northern British Columbia, geologic appraisal and exploration recommendations. Homestake Mining Company internal company report.

McAllister, S.C. 1984. Bear-Totem Geology 1:5000 Map, Chevron Canada Resources Ltd., map M523-G-119.

McBean, D.A., and Reddy, D.G. 1993. Golden Bear Project 1992 Fleece Bowl Exploration Report, Jan. 5, 1993. North American Metals Corp. internal company report.

Oliver, J.L. 1989. Property Geology 1:5000 Map, Golden Bear Deposit. Map in progress towards doctoral thesis. Queen's University, Kingston, Ontario.

Oliver, J.L. 1990. Structural and stratigraphic relations relevant to gold mineralization; Golden Bear Deposit and surround, June 4, 1990 memo. Homestake Canada Ltd. internal company report.

Oliver, J.L., and Hodgson, C.J. 1989. Geology and mineralization, Bearskin (Muddy) and Tatsamenie Lake district (south half), northwestern British Columbia. In British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1988, Paper 1989-1, pp. 443-453.

Oliver, J.L., and Hodgson, C.J. 1990. Geology and mineralization, Tatsamenie Lake district, northwestern British Columbia. In British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1989, Paper 1990-1, 163-173.

Reddy, D.G., Smith, J.M., and McDonald, B.W.R. 1991. Golden Bear Project 1990 Exploration Report, March, 1991. Homestake Canada Ltd. internal company report.

Schroeter, T.G. 1985. Muddy Lake prospect (104 K/1W). In British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1984, Paper 1985-1, pp. 257-258.

Schroeter, T.G. 1986. Muddy Lake prospect (104 K/1W). In British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1985, Paper 1986-1, pp. 175-183.

Schroeter, T.G. 1987. Golden Bear project (104 K/1W). In British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1986, Paper 1987-1.

Smith, J.M., McBean, D.A., Dixon, K.P., Reddy, D.G., and McDonald, B.W.R. 1991. Golden Bear Project 1991 Exploration Report, December 1991. North American Metals Corp. internal company report.

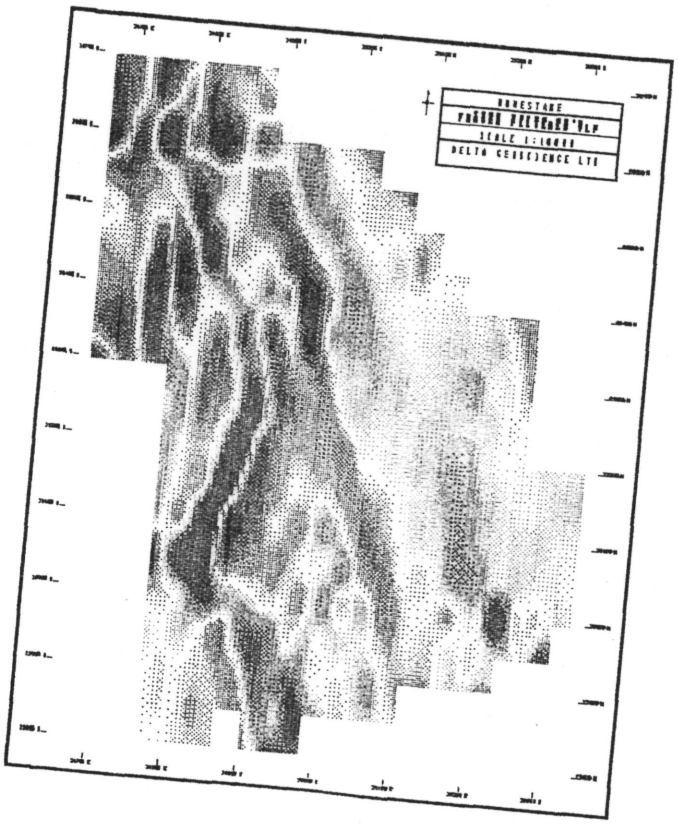
Souther, J.G. 1971. Geology and mineral deposits of Tulsequah map-area, British Columbia. Geological Survey of Canada, Memoir 362.

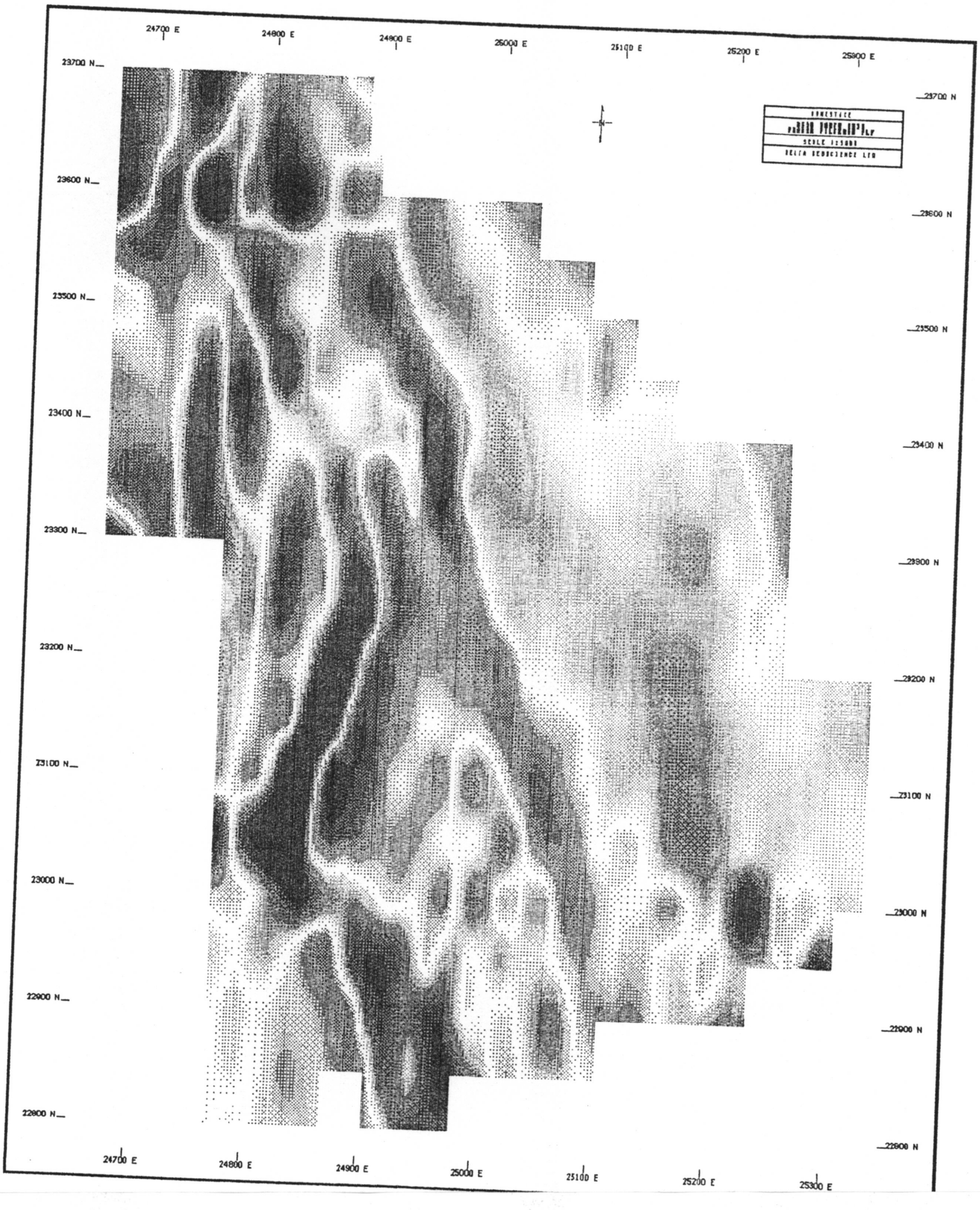
Titley, E.D. 1987. Geological report on the BEAR and BEAR 1 mineral claims. North American Metals B.C. Inc. internal company report.

Titley, E.D. 1988. Golden Bear Mine Exploration Proposal, BEAR, BEAR 1, TOTEM Mineral Claims, Muddy Lake, Tatsamenie Lake Area, B.C., Claims owned by Chevron Canada Minerals Ltd. and North American Metals Corp. internal company report.

Wasylyshyn, R. 1987. Review Report on the Totem Mineral Claim Golden Bear Project for North American Metals B.C. Inc. internal company report.

Wober, H.H., and Shannon, K.R. 1985. Bear-Totem Status Report. Chevron Canada Resources Limited internal company report.





24700 E
24800 E
24900 E
25000 E
25100 E
25200 E
25300 E
23700 N
23600 N
23500 N
23400 N
23300 N
23200 N
23100 N
23000 N
22900 N
22800 N
N
DELTA GEOSCIENCE LTD

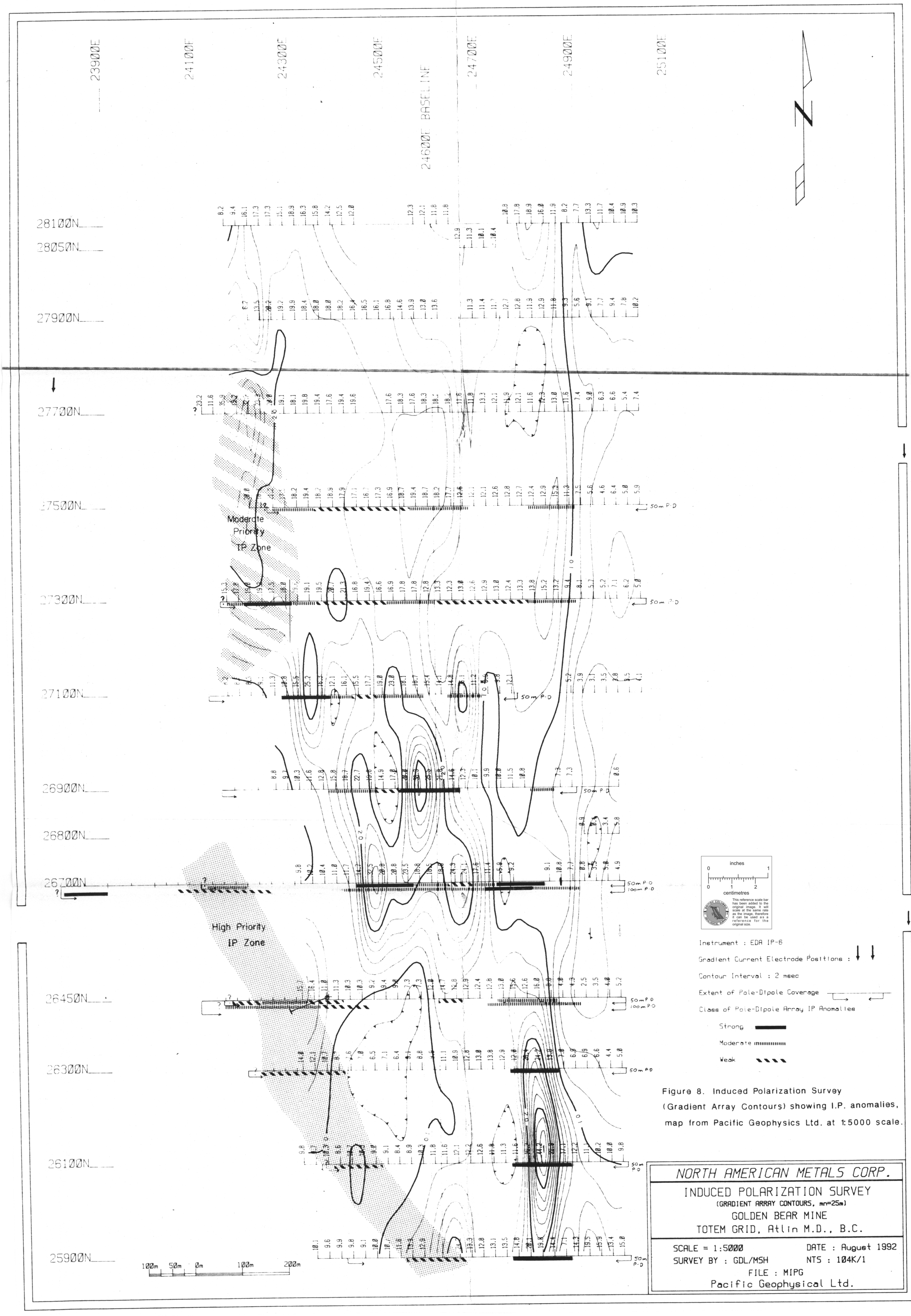


Figure 8. Induced Polarization Survey (Gradient Array Contours) showing I.P. anomalies, map from Pacific Geophysics Ltd. at 1:5000 scale.

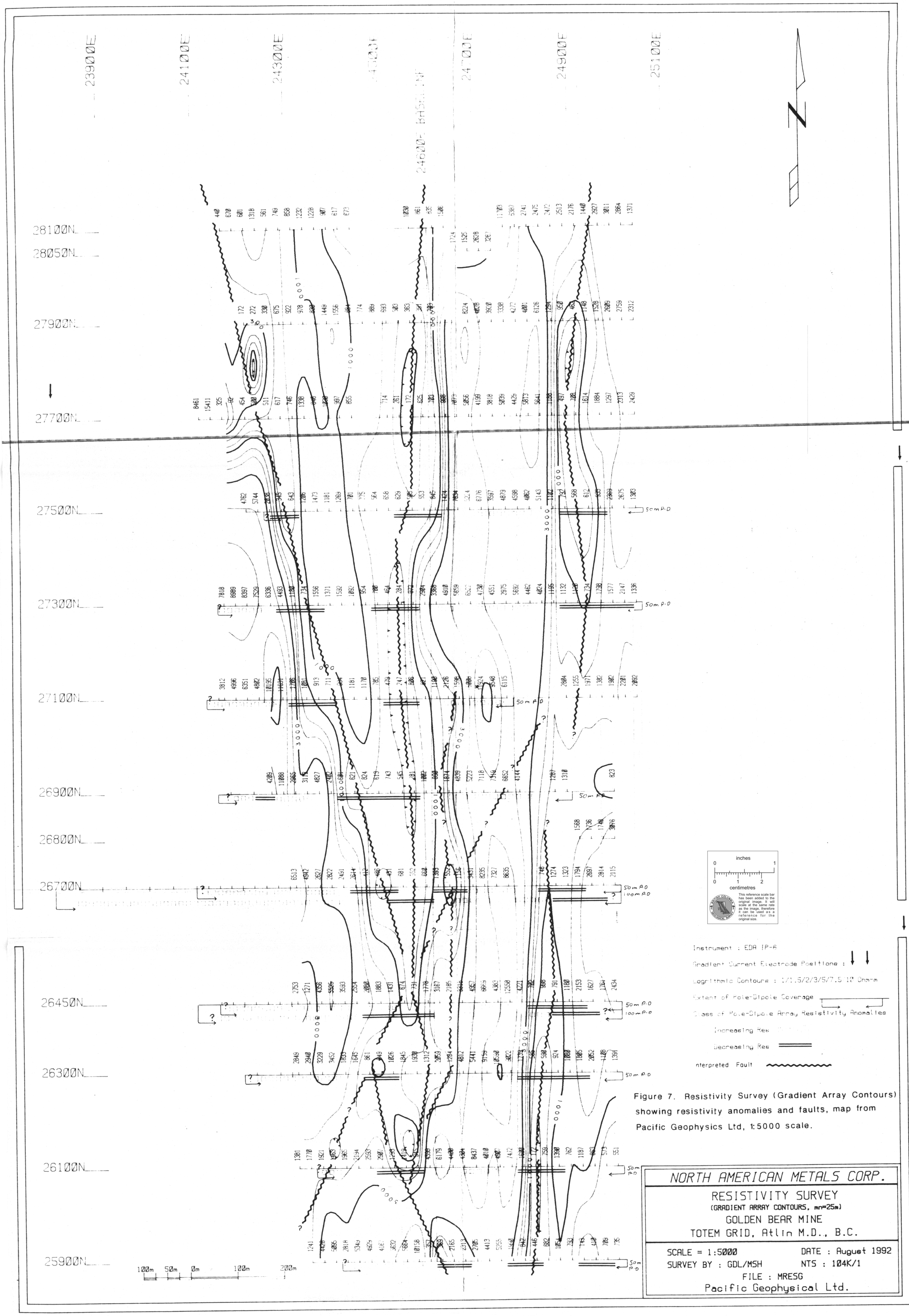


Figure 7. Resistivity Survey (Gradient Array Contours) showing resistivity anomalies and faults, map from Pacific Geophysics Ltd, 1:5000 scale.