87-334-15894
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ASSESSMENT REPORT

GEOLOGICAL & GEOCHEMICAL ANALYSIS

ON THE

ORO CLAIMS

ATLIN MINING DIVISION

104K/1W

58°11'
132°18'

OWNER

Sage Resources Ltd.
#1108 - 409 Granville Street
Vancouver, B.C.

CONSULTANTS

C.E.C. Engineering Ltd.

AUTHOR

David J. Copeland, P.Eng.

FILMED

GEOLOGICAL BRANCH
ASSESSMENT REPORT

October 4, 1986

15,894

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1. SUMMARY

The size and intensity of alteration and identified mineralization as seen to date would indicate that there are no obvious mineralized zones of any size.

The lithogeochemical values appear low and the anomalous values are not clustered in groups, but rather occur as single point highs.

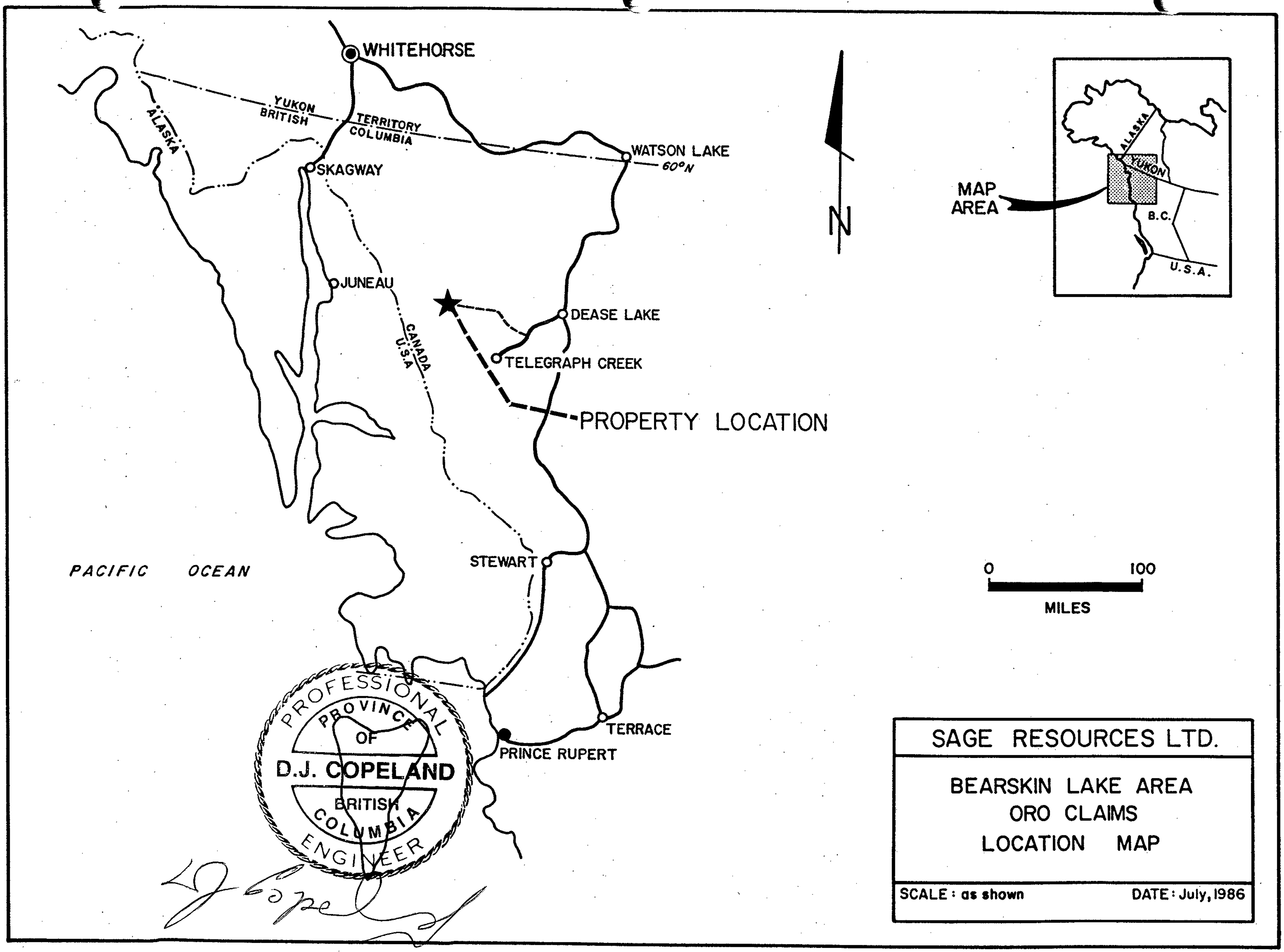
Yet the elements of the ore host model are present. These include large fault structures that interconnect with the Bear-Totem system, altered limestones and pyroclastics (hosts to mineralization at Bear-Totem), small intrusive stocks that are probably coeval and cogenetic and gossanous quartz-iron carbonate mineralized zones that are indicative that hydrothermal fluids were present in the system.

However, given the logistics of operating in this remote area, it is recommended that the company only undertake further work as part of a larger multiple target follow-up or on a joint venture basis where the risk/cost is spread.

2. INTRODUCTION

Location and Access

Mapping and property investigation were conducted for a total of fifteen man days. The Oro property is located 2 km to the south west of Muddy Lake (Bearskin Lake), 137 kilometres west of Dease Lake at latitude 58 degrees 11 minutes north and longitude 132 degrees 18 minutes west. Access is by fixed wing aircraft to the airstrip from Dease Lake, Telegraph Creek, Atlin or Whitehorse. A winter bulldozer road to Muddy Lake exists from Telegraph Creek.



WHITEHORSE
YUKON
BRITISH
TERRITORY
COLUMBIA
ALASKA
WATSON LAKE
60°N
SKAGWAY
JUNEAU
CANADA
U.S.A
DEASE LAKE
TELEGRAPH CREEK
PROPERTY LOCATION
N
MAP
AREA
ALASKA
YUKON
B.C.
U.S.A.
PACIFIC OCEAN
STEWART
0
100
MILES
TERRACE
PRINCE RUPERT
PROFESSIONAL
PROVINCE
OF
D.J. COPELAND
BRITISH
COLUMBIA
ENGINEER
SAGE RESOURCES LTD.
BEARSKIN LAKE AREA
ORO CLAIMS
LOCATION MAP
SCALE : as shown
DATE : July, 1986

3. LOCAL PHYSIOGRAPHY

The Muddy Lake area is in rugged alpine terrain on the lee side of the Coast Range. Elevations range from 800 metres to over 2,500 metres, while the claim area ranges in elevation from 1,250 metres to 1,800 metres and occupies the drainage divide between Muddy Lake and the Samotua River. Glacial ice is often found in the north facing cirques at the higher elevations. There is heavy snow accumulation from October to April resulting in a relatively short field season.

In the area of the claims, minor grass and shrubs can be found in areas of good soil development, while most of the area is underlain by talus, moraine or felsemeer.

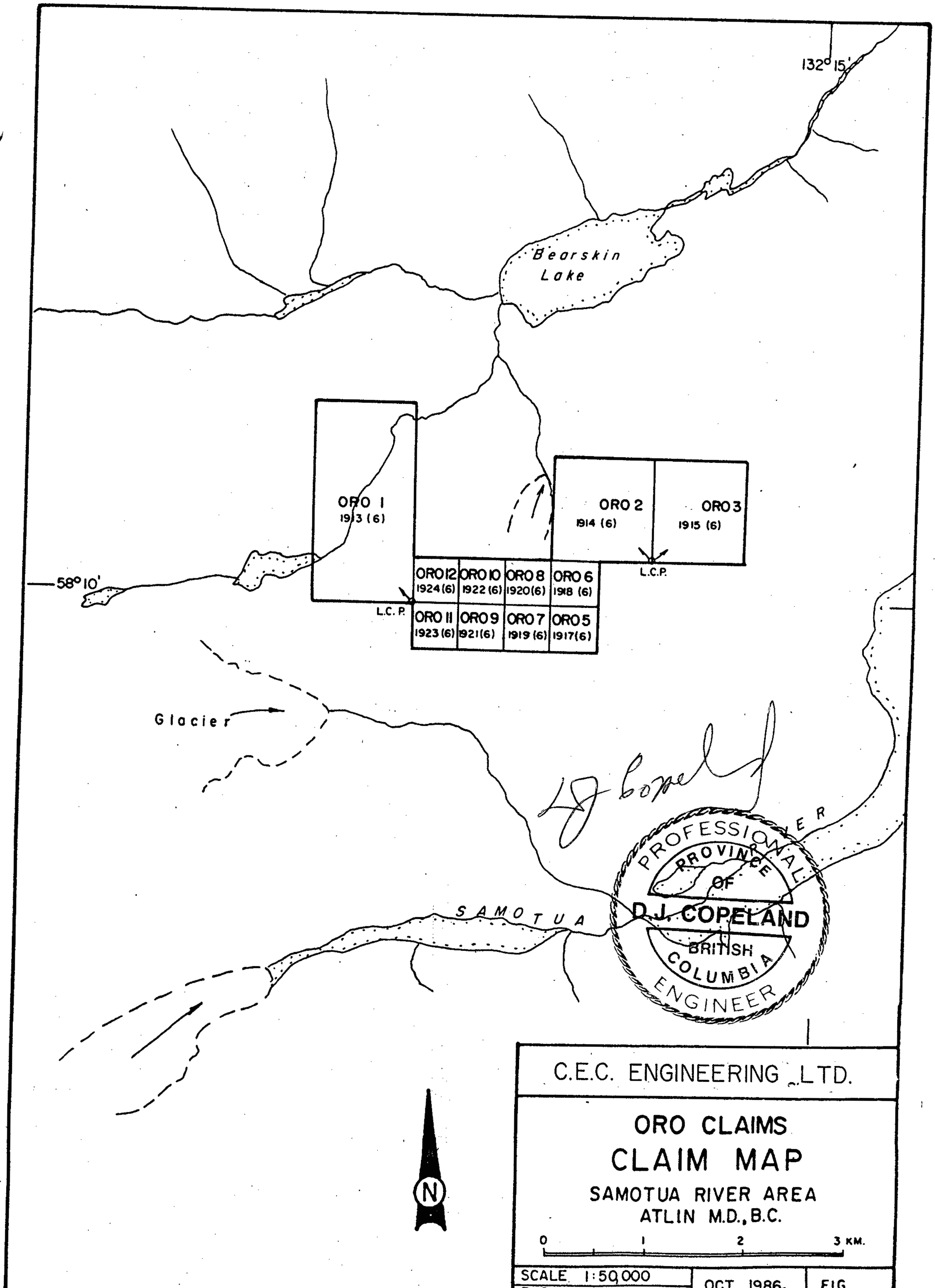
4. HISTORY

Chevron Canada Resources Ltd. commenced an epithermal gold reconnaissance program in 1981 in the area of Tatsamenie Lake and proceeded southward to Muddy Lake. This has culminated in the discovery of the Bear-Totem gold deposit at Muddy Lake. This deposit to date has some 1.3 million tons of drill proven reserves grading 0.34 opt.

Kerr Addison Mines Ltd. are also actively exploring the Heart Peaks property, some 48 km north, northeast of Muddy Lake.

5. PROPERTY

The Oro property consists of 24 units (8 two post claims and 16 modified grid units) all staked in June of 1983, and transferred to Sage Resources Ltd. in December, 1983. A title opinion was not part of the contracted work and consequently the author did not undertake a field check of all post and boundary locations. Those posts that were examined


132° 15'
Bearskin Lake
ORO 1
1913 (6)
ORO 2
1914 (6)
ORO 3
1915 (6)
L.C.P.
ORO 12
1924 (6)
ORO 10
1922 (6)
ORO 8
1920 (6)
ORO 6
1918 (6)
ORO 11
1923 (6)
ORO 9
1921 (6)
ORO 7
1919 (6)
ORO 5
1917 (6)
L.C.P.
58° 10'
Glacier
SAMOTUA
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D.J. COPELAND
N
C.E.C. ENGINEERING LTD.
ORO CLAIMS
CLAIM MAP
SAMOTUA RIVER AREA
ATLIN M.D., B.C.
0 1 2 3 KM.
SCALE 1:50,000
R. S.
OCT. 1986
FIG.

while mapping was in progress appear correctly placed.

The claims located in the Atlin Mining Division of British Columbia and the claim names, record numbers, record date and expiry date are as follows:

CLAIM NAME	NO. OF UNITS	RECORD NO.	EXPIRY
Oro #1	8	1913	June 17, 1989
Oro #2	4	1914	
Oro #3	4	1915	
Oro #5	2 post claim	1917	June 17, 1989
Oro #6	2 post claim	1918	June 17, 1989
Oro #7	2 post claim	1919	June 17, 1989
Oro #8	2 post claim	1920	June 17, 1989
Oro #9	2 post claim	1921	June 17, 1989
Oro #10	2 post claim	1922	June 17, 1989
Oro #11	2 post claim	1923	June 17, 1986
Oro #12	2 post claim	1924	June 17, 1986

No record of transfer of Oro #2 and #3 was found. It would appear that Oro #2 and Oro #3 are in dispute. The author was not requested to render a title opinion.

6. REGIONAL GEOLOGY

6.1 Stratigraphic and Tectonic Setting

The Tulsequah map area incorporates the eastern margin of the Coast Plutonic Complex and the flanks consisting of variably deformed and altered, volcanic and sedimentary strata. The strata range in age from Permian to Recent and comprise the western margin of the Intermontane Belt, a belt of eugeosynclinal arc-type sedimentary and volcanic rocks. This belt hosts most of the known lode and placer gold deposits in the Cordillera.

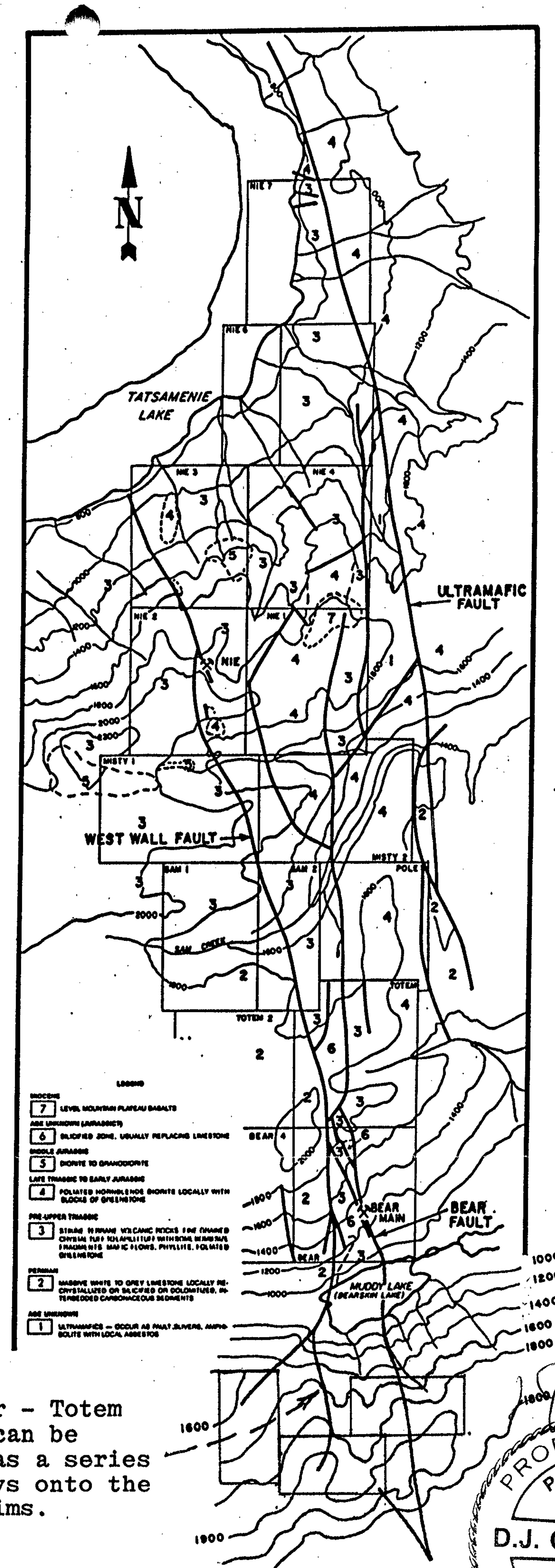
6.2 Area Geology

In the general area of the property, Permian to Upper Triassic layered rocks can be found, while late Triassic to Middle Jurassic stocks intrude the assemblages.

The Permian rocks consist of massive limestone and carbonaceous siltstones. The limestones have both local brecciation and sedimentary breccias that occur as conformable layers. Adjacent to fault contacts the limestone is dolomitized and silicified.

Pre-upper Triassic rocks overlie the limestones with apparent conformity. The sequence consists of pyro-clastic sedimentary rocks, intercalcated volcanic rocks (altered to phyllite and greenstones), minor chert and jasperoid greywacke. Regional metamorphism has converted tuffs and mafic flows to greenstones. In the Muddy Lake area the limestones are overlain by ash, lapilli and crystal andesitic tuff.

A number of hornblende diorite to granodiorite stocks out crop in the region. Contacts with the county rock are sharp and regular and in places these bodies occur in fault planes and may have a genetic relationship with mineralization. These stocks have age dates ranging from late Triassic to middle Jurassic.



The Bear - Totem faults can be traced as a series of splays onto the Oro claims.

PROFESSIONAL PROVINCE OF D.J. COPELAND BRITISH COLUMBIA ENGINEER

0 1000 2000 3000 4000
METRES

SAGE RESOURCES LTD.

BEAR - TOTEM
GEOLOGY & STRUCTURE

Date: Oct. 1986

FIG. 3

7. STRUCTURE

Three main episodes of tectonic activity have occurred in the region:

(a) Mid-Triassic Tahltanian Orogeny

(b) Upper Jurassic

(c) Early Tertiary

Major folds are common in all the rocks of Jurassic age or older with the early generation of folds being isoclinal with well developed axial planar fabric. The second generation of folds tend to be open to closed in shape, occasionally recumbent and do not have a well developed axial planar fabric.

Major faults strike northwest, southeast and north-south while the major lineaments have a pronounced north-east direction.

Muddy Lake and Bearskin Creek, which drains the lake, occupy one of these strong northeast lineaments.

In the vicinity of Muddy Lake a prominent north to northwest trending fault system exists that has been traced northward some 10 kilometres and has an average width of 3,500 metres. It is along this major structure that a swarm of fault splays and secondary splinter faults are found that contain mineralized zones making up the Bear-Totem gold deposit.

8. ECONOMIC GEOLOGY

The Bear-Totem mineralization would appear to be a hydrothermal system similar to a gold-silver mesothermal deposit (Lindgren 1933). (A comparable model would be the Comstock Lode.)

A detailed description of the adjacent Bear-Totem deposit follows as it is important in determining the merits of the economic geology of the Oro claims.

The data is taken from B.C. Ministry of Mines Reports and personal communication with North American Metals personnel.

Bear-Totem Property Geology (Fig.3)

Unknown Age (Unit 1)

A gabbro or metagabbro of unknown age crops out on the eastern portion of the property, particularly on Troy Ridge. It is extensively chloritized and hematized. Its relationship with other rocks is unclear, but it may correlate with the pre-Upper Traissic mafic volcanic rocks. The gabbro appears to be cut by foliated hornblende diorite of the Late Triassic to Early Jurassic age.

Permian (Unit 2)

The unaltered limestone is massive to well bedded with cherty grey "boudins" up to 15 centimetres in length. Fossils are not abundant. Local brecciation and sedimentary breccias that occur as conformable layers within the limestone section consist of angular to subangular clasts of limestone in a fine-grained carbonate matrix. Late-stage calcite veins and cavity fillings both crosscut and parallel bedding planes within the limestone. On the bluff above Helen Lake, veins are up to 1 metre in width.

Adjacent to fault contacts, particularly the West Wall fault, the limestone is pink, variably dolomitized, and contorted to isoclinally folded. In altered areas, the limestone is silicified and locally vuggy with the late-stage veinlets of calcite and siderite.

A sedimentary package of siltstone and carbonaceous siltstone lies conformably on the limestone and dips 75 degrees to the east. This unit is invariably strongly faulted and not well exposed. The name 'Black fault' was chosen because it forms a black, carbonaceous zone adjacent to silicified limestone in the hanging wall.

Pre-Upper Triassic (Unit 4)

Overlying the limestones with apparent conformity is a thick section of ash, lapilli and crystal andesitic tuffs, and possibly mafic flows. Locally graded beds, flame structures, and rip-up clasts in ash layers give tops. In detail the mafic volcanic rocks grade into tuffs across distances as little as 2 metres. Local coarsening gives the volcanics a dioritic appearance. The sequence has few markers - one being a chalcopyrite-bearing horizon in lapilli tuff. Where altered, mainly in the hanging wall, tuffs are silicified, carbonatized, and contain fuchsite (listwanites). Locally the tuffs are interbedded with black siliceous siltstone and may contain up to 3 volume per cent pyrite. At the Fleece Bowl showing and elsewhere, altered fuchsite-bearing tuffs occur as fault pods or slices.

Late Triassic to Early Jurassic (Unit 5)

Hornblende diorite is strongly foliated and exhibits strong alteration to chlorite, hematite, and epidote, and contacts with pre-Upper Triassic rocks are brecciated. Locally the diorite contains up to 5 per cent pyrite, and traces of chalcopyrite both as disseminations and on fractures. It intrudes the pre-Upper Triassic rocks and is locally agmatitic. Angular blocks of greenstone-metagrabbro 0.3 metre to 2 metres in diameter, have been incorporated into the diorite. Dykelets of felsite cut both the foliated diorite and the intruded greenstones; later facturing offsets these dykelets.

Unknown Age (Middle Jurassic?) (Unit 6)

Four occurrences of narrow dykes of hornblende diorite composition were noted - three in the area of the Totem silica zone and one in drill core from the Fleece Bowl zone. The dykes cut all older rocks. A sample for possible age dating was collected from a dyke cutting foliated hornblende diorite on the east side of the Totem silica area. In Fleece Bowl, a 'felsic dyke', which was mineralized in several sections, was intersected by drilling.

Miocene (Unit 8)

A 1-metre thick dyke of black basalt, probably a feeder to Level Mountain Group flows, crops out in Bear Main zone.

Bear Main Zone

The silicified 'pod' on Bear Main zone has been traced by drilling along a length of 1 kilometre, across a width of 10 metres and to a depth of at least 200 metres. The 'pod' is composed of silicified dolomite and is bounded on the west side by altered tuffs. Rare bedding at 085/23 south was preserved as were remnants of isoclinal folds. The dolomite locally displays a quartz stockwork with resistant veinlets of quartz. The southern portion of the 'pod' is strongly brecciated; the breccia zones commonly have relatively sharp contacts and occur between the silicified dolomite and altered tuff. Two varieties of breccia exist:

(1) Heterolithic breccia: contains fragments of fuchsite-bearing tuff, white-grey limestone, black carbonaceous siltstone, white to grey quartz, and black limestone in a dolomitic matrix.

(2) Monolithic breccia: consists of silicified white limestone fragments in a grey, silicified limestone matrix.

Both varieties of breccia contain vuggy quartz and purite up to 10 per cent by volume.

The hangingwall fault (Bear fault) cuts the tuffaceous rocks and is marked by a zone of black gouge. A thick section of ash, lapilli and crystal tuffs, and what appear to be local mafic flows, occur above the hangingwall. The only marker observed is a chalcopyrite 'zone' within the lapilli tuff. Slickensided fractures have attitudes of 045/48 northwest. A 1-metre dyke of black basalt (Tertiary ?) intrudes silicified dolomite and altered tuff on Bear Main zone.

Near the north end of the main outcrop (elevation 1520 metres) soil and talus drape over the silicified and/or dolomitized limestone.

Fleece Bowl Zone

The West Wall and Black faults bound the Fleece Bow zone on the west and east respectively. The Black fault occurs in a graphitic, siliceous siltstone and drips to the east; the fault zone ranges from 6 to 20 metres in width. Late-stage calcite veinlets cut the rock which is locally vuggy. The hangingwall zone consists of fuchsite-bearing tuff with trace arsenopyrite in quartz veinlets. The West Wall fault cuts silicified limestone and silicified dolomite and dips steeply to the east. A slice up to 12 metres wide with strong, north-striking foliation consists of fuchsite-bearing tuff with quartz-carbonate veining, and breccia containing angular fragments of fuchsite-bearing tuff, and silicified limestone up to 15 centimetres in diameter is exposed in a north-south trench. The rocks contain 1 to 2 per cent pyrite as disseminations and fracture fillings. The hangingwall fault in this 'slice' is marked by black gouge which contains anomalous gold values. The hangingwall sequence consists of well-banded silicified limestone and dolomite.

Diamond drilling encountered a 'felsic' dyke which consists of fine-grained white quartz eyes in a pervasively sericitized groundmass and contains up to 10 per cent pyrite as fine disseminations and fracture fillings. The dyke is anomalous in gold (Chevron personnel, personal communication).

Totem Silica Zone

A large (1 100-metre by 200-metre) zone of intense silicification with or without dolomitization occurs on the northern portion of the property (Fig. 3). The host rocks are well-bedded, locally intensely folded limestones with some dolomites; they occupy the core of a north-trending anticline. The limestone beds have local, strata-bound breccia zones.

Two phases of folding are prominent: phase 1 consists of tight, isoclinal, commonly recumbent folds that are consistently S-shaped, when viewed southerly down the plunge; phase 2 consists of broader, open anticlinal folds that trend northerly, as do regional, broad anticlinal folds at the northwest end of Tatsamenie Lake. Local minor folds occur on the limbs of phase 2 folds.

Strong, late-stage northeasterly trending crossfracturing is prominent. 'Boudinaging' of quartz in banded silicified limestone is locally well developed, as are breccias with large, quartz-lined vugs around silicified limestone fragments. In vuggy quartz-calcite breccias in 'sandy' limestones, rhombs of calcite grow on quartz crystals. Pyrite occurs in trace amounts within the silicified limestone and locally occurs as 'wispy' rims around white silicified limestone fragments in breccias.

The southwest side of the zone is characterized by silicified dolomite with quartz stockworks that are weakly mineralized with tetrahedrite occurring as disseminations and on fractures.

On the west side of the Totem Silica zone, which is on the west limb of the anticline, bedding is steep near the fault contact between silicified limestone and interbedded fuchsite-bearing tuff and carbonaceous siltstone. This fault zone strikes north and dips east; it is brecciated with hematite-rich slickensides plunging 45 degrees to the south, indicating that the west side moved down.

The hangingwall section both east and west of the Totem Silica zone consists of foliated hornblende tuff, chloritic tuff, and fine-grained greenstone with hematitic fractures. A foliated hornblende diorite intrudes the rocks on the east. Hornblende-feldspar porphyry dykes of intermediate composition that trend southwest and dip steeply, cut silicified diorite. These dykes have been altered to epidote, chlorite, and clay minerals.

Structure

Three main episodes of tectonic activity have occurred in the region: (1) Mid-Triassic Tahltanian Orogeny, (2) Upper Jurassic; and (3) Early Tertiary. Monger (1977) stated that "the Stikine assemblage was emplaced by poorly understood, complex motions that involve transcurrent movement, subduction on both sides of a narrowing basin floored by 'trapped' oceanic crust and, in the final stages of closure, eastward obduction of the basin floor". A prominent northerly to northwesterly trending fault zone, locally referred to as the Ophir Break zone, extends through the property and has been traced on the surface and by drilling from Muddy Lake northward to Tatsamenie Lake - a distance of more than 10 kilometres (Fig. 3). The zone is about 3 500 metres wide and defined by areas of intense fracturing, abundant slickensiding, areas of carbonaceous and siliceous black siltstone and gouge, and linear Fe-carbonate, quartz ± fuchsite-bearing tuff (listwanites) and quartz-dolomite alteration zones. The zone is bounded on the west by the West Wall fault and on the east by the Ultramafic fault so named because it contains elongated serpentine pods. Several minor fault structures occur within the Ophir Break zone. Locally slices of fuchsite-bearing tuff belonging to the pre-Upper Triassic greenstone package occur within Permian limestone, such as in the bluffs immediately northwest of Bear Main zone.

Two directions of younger crossfaulting have been observed. One strikes northwesterly and shows left-lateral movement of up to 100 metres between limestone and greenstone west-northwest of Bear Main zone; the other strikes northeasterly and shows right-lateral offset within silicified dolomite in Bear Main zone.

As described for Totem Silica zone, two phases of folding exist: Mid-Triassic age, isoclinal, commonly recumbent, S-type folds; and Late Jurassic broad, open folds, similar to those at Tatsamenie Lake. The cores of anticlines occasionally contain crackle breccias (for example, Ram/Tut property). Phase 1 and phase 2 folding are prominent in Totem Silica zone, and phase 1 is a minor feature in Bear Main zone.

Alteration

Two dominant alteration types occur:

(1) Quartz-dolomite, which occurs primarily in the limestone unit.

(2) Quartz-iron carbonate-pyrite fuchsite (listwanites), which occur in the tuff unit.

Both types are most intensely developed adjacent to or in fault zones and both appear to increase in intensity toward the hangingwall.

The quartz-dolomite alteration consists of massive fine-grained quartz, quartz breccia, and lesser dolomite. Outward from a zone of intense silicification, with or without brecciation, silica decreases gradually from massive quartz to vein quartz to stringer quartz in a dolomite matrix. Further out, alteration grades into dolomitic limestone and finally to unaltered limestone. This sequence of alteration is well developed in the footwall of The Bear Main zone and less so in the Fleece Bowl and Totem Silica zones. Heterolithic and monolithic breccias are locally well developed in the quartz-dolomite alteration zone. Abundant replacement dolomite and carbonate veining may result from release of magnesium and zome calcium from the greenstone unit or from a deep-seated ultramafic source.

The listwanitic quartz-iron carbonate-pyrite fuchsite alteration assemblage is restricted mainly to tuffaceus rocks of the greenstone unit. The zones range in width from 1 metre to 20 metres and are strongly foliated. Carbonate minerals noted include ferroan dolomite, ankerite, calcite, and aragonite. X-ray determination of the clay-sized fraction shows mainly illite and sericite and traces of sodium-rich alunite. The rocks also have kaolinite veinlets and gypsum coating fractures. Other accessory minerals identified in the listwanitic zones include talc, chlorite, hematite, and pyrite, which occur as veinlets, breccia fillings, rimming clasts, and as fine laminations. Jaroside is conspicuous on silicified dolomite bluffs at the southern end of Bear Main zone.

The process of listwanitization corresponds to a CO_2-Ca metasomatism of ultramafic rocks, with addition of potassium in fuchsite-rich listwanites. Gold values are randomly distributed within listwanite lenses at Muddy Lake, as is the case in similarly mineralized areas around the world. A strong positive correlation exists between gold, arsenic, and sulphur. Fuchsite formation involves transfer of Si and Fe^{3+}? from the zone altered to listwanite to the 'ore' zone; Mn, Ca, K, and C are introduced and other elements, including Cr, are redistributed.

Mineralization

Mineralization is of the 'no-seeum' gold type with minor silver values. Metallic mineralogy consists of 0.1 to 5 per cent pyrite, trace amounts of arsenopyrite and scorodite, native gold with values up to 27.8 grams per tonne gold and silver up to 67 grams per tonne (Schroeter, 1984), pyrrhotite, chalcopyrite in amygdules in lapilli and altered fuchsite-bearing tuff, Sb-bearing tetrahedrite, and hessite. The latter two minerals are listed in a private report by Chevron.

Tetrahedrite occurs in fractures in silicified dolomite on the west portion of the Totem Silica zone. Native gold is micron to submicron size and very erratic in distribution, a characteristic of listwanitic deposits. Locally within the Bear Main zone, gypsum is associated with mineralization. Pyrite occurs in at least two distinct stages: as late-stage veinlets; and as earlier breccia matrix filling, fragments within breccias, 'wispy' rims on silicified limestone fragments in breccia, and local laminations in fine bleached tuff. The younger, fine-grained pyrite veinlets rarely offset older breccia or lamination pyrite.

Two main 'zones' of mineralization have been identified: Bear Main and Fleece Bowl (Fig. 3). The Bear Main zone crops out in a fault bounded silicified and listwanitized block which has been traced by drilling along a strike length of nearly 1 kilometre, across an average width of 10 metres, and to a depth of at least 200 metres. The host rocks in the Bear Main zone include silicified dolomitized limestone and breccia and carbonatized tuffs (listwanites). The gold:silver ratios are high, greater than 2 to 1, and silver is rarely more abundant than gold in individual assays. Mineralization in the Fleece Bowl zone does not crop out; it has been intersected only in drill holes. Several short mineralized sections associated with quartz veining exist, as well as mineralization associated with a 'felsic' dyke which locally contains up to 10 per cent pyrite as disseminations and fracture fillings. The dyke contains white quartz eyes and has been extensively sericitized.

There is a positive correlation between Hg-As-Sb-Au and Ag in mineralized zones. The only sulphides identified to date on the Totem Silica zone are pyrite in the silicified limestone and tetrahedrite in the silicified dolomites.

Current published reserve figures indicate that the Bear zone has some 1,900,000 tons grading .27 opt, while the Fleece zone has outlined diluted and inferred reserves of 658,000 tons grading .20 opt. The Totem zone has good drill intersections but as yet unestablished reserves.

9. ORO PROPERTY GEOLOGY

The claims are predominantly underlain by volcaniclastics, tuffs, tuffaceous breccias, argillites and minor limestone. These rocks are in turn intruded by a number of small stocks that appear to be structurally controlled.

All the volcaniclastic, sedimentary and intrusive rocks have been regionally metamorphosed to lower greenschist facies.

The western portion of the claims, Oro #1, eight units, is predominantly underlain by well bedded volcaniclastic rocks belonging to the Takla Group of Pre-Upper Triassic age. In the northern and central portion of the claims, well bedded lapilli and lithic tuffs, tuffaceous breccias and agglomerate are found. Bedding attitudes vary from a strike of 098° dipping 17°S to strikes of 003° dipping 34°NW.

At the southern end of the claim a large diorite stock is found. This intrusive body is structurally controlled and probably coeval and cogenetic with the surrounding volcaniclastic rocks.

There is a good dominant structural pattern present throughout this portion of the claims. The dominant shear direction os 018° to 027°, which parallels the predominate drainage directions.

The central portion of the claims, Oro #5 through Oro #12, is underlain by a series of altered sediments and volcaniclastics. The volcaniclastic lithology consists of tuff breccia, lithic tuff and agglomerate. Several small apophysis and stocks of diorite are found on either side of a major north trending fault. This fault can be traced northward 1500 metres to the Bear-Totem fault system and is probably an extension or splay.

The stocks vary in composition from hornblende diorite to augite porphyry. In general there is little contact alteration indicating these intrusions were cogenetic. However, in the vicinity of the inferred contacts, gossans are developed that contain ankerite, hematite and in some cases visible chalcopyrite, pyrite and malachite. The hornblende diorite stock on Oro #8 and #6 being a case in point.

The southeastern area contains interbedded argillite, chert and lithic tuff. These lithologies strike at 280° to 232° and exhibit near vertical dips.

Within the argillite and cherts, several large gossans were located. One on Oro #5, another on Oro #7 and #9, and one on Oro #8. In all cases they are more or less parallel to the bedding, are several metres wide and up to 700 metres long. Ankerite, pyrite and limonite are found as fracture fillings, coatings and disseminations.

The Oro #2 and #3 were seen to contain the geology most reflecting the ore host model.

Strong north-northwesterly trending faults are present that cut a series of limestones and volcaniclastics. These faults can be traced northwards to mesh with the Totem-Bear system. The limestones are slightly silicified, but rarely dolomitized over large areas.

Adjoining the fault trace on Oro #2 and Oro #6 is a linear gossan some 600 metres long of siliceous iron carbonate located in felsemeer of limestones and volcaniclastics. This material is very similar to the gossans observed at the Bear-Totem but does not have near the areal extent.

Another linear gossan, which may be an extension of the gossan described above is located on the south side of a saddle on Oro #6, again it is associated with a major fault structure that trends northwestward and is located partially on Oro #2 and Oro #6. This gossan is located in highly altered volcaniclastic rocks and is surrounded by an erratically developed pyrite zone.

10. MINERALIZATION

As observed in previous work, minor pyrite and limonite occur on fracture faces throughout the Oro claims.

On the Oro #6 and #8 claims, disseminated pyrite, chalcopyrite blebs and fracture fillings, and coatings of malachite are found in the small diorite stock and associated altered zone.

Gossans of quartz iron rich carbonate are located on the south side of Oro #5 and #7 and are seen to contain extensive pyrite and minor chalcopyrite blebs. Limonite and malachite are present as coatings.

The quartz carbonate iron carbonate gossan zone adjacent to the north west trending fault of Oro #2 and #6 has patchy mineralization throughout its length. Pyrite, chalcopyrite, bornite and specular hematite were all identified occurring as blebs, fracture fillings and some cases, as disseminations.

Some forty-eight rock chip samples were collected, each sample containing at least ten kg of material. Each sample was collected over a 3 metre interval and all locations were plotted relative to located claim posts.

All samples were sent to Acme Analytical Labs in Vancouver for gold, copper and arsenic geochemical analysis (the analytical results are in Appendix I; the analytical procedures are described in Appendix II).

In general, the values appear low and are not clustered as highs. However, it must be remembered that the Bear-Totem was found as the result of a single point anomaly of 700 ppb gold in reconnaissance sampling at 300 metre spacing.

From the analytical work, five sample sites can be considered worthy of follow-up. Four are located along the north west trending fault or Oro #2 and #6 and one, 86-20-4, is located on Oro #3 in a saddle in silicified limestones.

11. CONCLUSIONS

The size and intensity of alteration and mineralization as seen to date would indicate that there are no obvious mineralized zones of any size.

Yet the elements of the ore host model are present. These include large fault structures that interconnect with the Bear-Totem system, altered limestones and pyroclastics (hosts to mineralization at Bear-Totem), small intrusive stocks that are probably coeval and cogenetic and gossanous quartz-iron carbonate mineralized zones that are indicative that hydrothermal fluids were present in the system.

Potential zones could easily be masked as there is an abundance of felsemeer present. However, given the logistics of operating in this remote area it is recommended that the company only undertake further work as part of a larger multiple target follow-up or on a syndication basis where the risk/cost is spread.

Future work should include detailed testing of the anomalous targets and detail examination of the fault zones.

12. REFERENCES

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STATEMENT OF COSTS

FIELD EXPENSES

Air Travel	
Air travel to site	$ 293.70
Helicopter charter	617.50
Helicopter fuel	141.98
Fixed wing charter	1,887.00
Air freight	72.60
Food & Accommodation	
Food	272.54
Accommodation	242.89
Field Supplies	9.11
Geochemical Analyses	
Assays and rock sample preparation	567.46

PROFESSIONAL/TECHNICAL EXPENSES
(includes consumables & equipment rental)

C.E.C. Engineering Ltd.	3,500.00
Minorex Consulting Ltd.	5,411.25
Tarnex Geoservices	1,152.92

OFFICE EXPENSES

Maps	
Drafting	276.25
Printing	56.46
Clerical	
Typing	44.00
Photocopying	13.18
Report covers	6.36
Courier	6.00

TOTAL COST OF PROJECT	$14,571.20

CERTIFICATE OF QUALIFICATIONS

I, David J. Copeland, of 3626 West 1st Avenue, Vancouver, British Columbia, do hereby certify that:

(1) I am a graduate of the University of British Columbia with a Bachelor of Science degree in Geology, 1970.

(2) Since graduation I have been engaged in mineral exploration and mine development in Canada, United States of America, Mexico, South America, Australia, New Guinea and South East Asia.

(3) I am a registered member, in good standing, of the Association of Professional Engineers in British Columbia.

(4) I am a Consulting Geological Engineer.

(5) This report and field work were prepared and carried out by myself and associates working under my direction.

(6) This writer has examined the Bear-Totem geology and has reviewed the extensive data base of North American Metals on the geological setting.

(7) I have not received nor do I expect to receive any interest directly or indirectly in the securities or properties of Sage Resources Ltd.

(8) I hereby give permission for inclusion of this report into a statement of material facts or a prospectus.

D.J. Copeland, P.Eng.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D.J. COPELAND

Vancouver, B.C.
October 4, 1986

APPENDIX A

ACME ANALYTICAL LABORATORIES LTD.
852 E.HASTINGS ST.VANCOUVER B.C. V6A 1R6
PHONE 253-3158 DATA LINE 251-1011

DATE RECEIVED: SEPT 13 1986
DATE REPORT MAILED: Sept. 17/86

GEOCHEMICAL ICP ANALYSIS

.500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN.FE.CA.P.CR.MG.BA.TI.B.AL.NA.K.W.SI.ZR.CE.SN.Y.NB AND TA. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: ROCK CHIPS AU* ANALYSIS BY AA FROM 10 GRAM SAMPLE.

ASSAYER: D. Toye DEAN TOYE. CERTIFIED B.C. ASSAYER.

C.E.C ENGINEERING PROJECT-ORO P86-20 FILE# 86-2639 PAGE 1

SAMPLE#	Cu PPM	As PPM	Au* PPB
86-20-1	6	5	1
86-20-2	51	20	1
86-20-3	56	7	2
86-20-5	63	80	1
86-20-6	66	127	1
86-20-7	61	37	1
86-20-8	211	136	2
86-20-9	152	52	1
86-20-10	65	46	1
86-20-11	114	70	4
86-20-12	106	74	3
86-20-13	82	71	2
86-20-14	77	80	1
86-20-15	80	135	1
86-20-16	103	74	2
86-20-17	86	69	1
86-20-18	101	4	1
86-20-19	1586	6	1
86-20-20	2942	7	13
86-20-21	66	4	1
86-20-22	112	18	1
86-20-23	45	83	2
86-20-24	53	6	1
86-20-25	60	20	1
86-20-26	185	13	1
86-20-27	40	56	1
86-20-28	90	10	52
86-20-29	148	9	1
86-20-30	123	9	1
86-20-31	76	2	1
86-20-32	518	2	7
86-20-33	96	4	1
86-20-34	212	12	1
86-20-35	2847	3	26
86-20-36	99999 ✓	14	930
86-20-37	231	3	1
STD C/AU-R	60	43	495

✓ Assay required for correct result

✓

SAMPLE#	Cu PPM	As PPM	Au* PPB
86-20-38	431	3	1
86-20-41	46	37	1
86-20-42	36	34	10
86-20-43	42	12	1
86-20-44	115	71	10
86-20-45	344	141	5
86-20-46	102	62	1
86-20-47	65	54	1
STD C/AU-R	60	42	500

ACME ANALYTICAL LABORATORIES LTD.
852 E.HASTINGS ST.VANCOUVER B.C. V6A 1R6
PHONE 253-3158 DATA LINE 251-1011

DATE RECEIVED: SEPT 13 1986
DATE REPORT MAILED: Sept. 18/86.

GEOCHEMICAL ICP ANALYSIS

.500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN.FE.CA.P.CR.MG.BA.TI.B.AL.NA.K.W.SI.ZR.CE.SN.Y.NB AND TA. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: ROCK CHIPS AU* ANALYSIS BY AA FROM 10 GRAM SAMPLE.

ASSAYER: D. Toye DEAN TOYE. CERTIFIED B.C. ASSAYER.

C.E.C.ENGINEERING PROJECT-ORO P86-20 FILE#86-2635 PAGE 1

SAMPLE#	Cu PPM	As PPM	Au* PPB
86-20-4	99999 ✓	21	26
86-20-39	310	5	1
86-20-40	569	5	1
86-20-48	81	8	1

✓ Assay required for correct result

APPENDIX B

ACME ANALYTICAL LABORATORIES LTD.
Assaying & Trace Analysis
852 E. Hastings St., Vancouver, B.C. V6A 1R6
Telephone : 253 - 3158

Geochemical Analysis for Uranium

0.5 gram samples are digested with hot aqua regia and diluted to 10 ml.

Aliquots of the acid extract are solvent extracted using a salting agent and aliquots of the solvent extract are fused with NaF, K_2CO_3 and Na_2CO_3 flux in a platinum dish.

The fluorescence of the pellet is determined on the Jarrel Ash Fluorometer.

Geochemical Analysis for Fluorine

0.25 gram samples are fused with sodium hydroxide and leached with 10 ml water. The solution is neutralized, buffered, adjusted to pH 7.8 and diluted to 100 ml.

Fluorine is determined by Specific Ion Electrode using an Orion Model 404 meter.

Geochemical Analysis for Tin

1.0 gram samples are fused with ammonium iodide in a test tube. The sublimed iodine is leached with dilute hydrochloric acid.

The solution is extracted with MIBK and tin is determined in the extract by Atomic Absorption.

Geochemical Analysis for Chromium

0.1 gram samples are fused with Na_2O_2. The melt is leached with HCl and analysed by AA or ICP..

Geochemical Analysis for Hg

0.5 gram samples is digested with aqua regia and diluted with 20% HCl.

Hg in the solution is determined by cold vapour AA using a F & J Scientific Hg assembly. An aliquot of the extract is added to a stannous chloride / hydrochloric acid solution. The reduced Hg is swept out of the solution and passed into the Hg cell where it is measured by AA.

Geochemical Analysis for Ga & Ge

0.5 gram samples are digested with hot aqua regia with HF in pressure bombs.

Ga and Ge in the solution are determined by graphite furnace AA.

Geochemical Analysis for Tl (Thallium)

0.5 gram samples are digested with 1:1 HNO_3. Tl is determined in the extract by graphite AA.

Geochemical Analysis for Te (Tellurium)

0.5 gram samples are digested with hot aqua regia. The Te extracted in MIBK is analysed by AA graphite furnace.

ACME ANALYTICAL LABORATORIES LTD.
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Telephone : 253 - 3158

GEOCHEMICAL LABORATORY METHODOLOGY - 1984

Sample Preparation

1. Soil samples are dried at 60°C and sieved to -80 mesh.
2. Rock samples are pulverized to -100 mesh.

Geochemical Analysis (AA and ICP)

0.5 gram samples are digested in hot dilute aqua regia in a boiling water bath and diluted to 10 ml with demineralized water. Extracted metals are determined by :

A. Atomic Absorption (AA)

Ag*, Bi*, Cd*, Co, Cu, Fe, Ga, In, Mn, Mo, Ni, Pb, Sb*, Tl, V, Zn
(* denotes with background correction.)

B. Inductively Coupled Argon Plasma (ICP)

Ag, Al, As, Au, B, Ba, Bi, Ca, Cd, Co, Cu, Cr, Fe, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Sr, Th, Ti, U, V, W, Zn.

Geochemical Analysis for Au*

10.0 gram samples that have been ignited overnite at 600°C are digested with hot dilute aqua regia, and the clear solution obtained is extracted with Methyl Isobutyl Ketone.

Au is determined in the MIBK extract by Atomic Absorption using background correction (Detection Limit = 5 ppb direct AA and 1 ppb graphite AA.)

Geochemical Analysis for Au**, Pd, Pt, Rh

10.0 - 30.0 gram samples are subjected to Fire Assay preconcentration techniques to produce silver beads.

The silver beads are dissolved and Au, Pd, Pt and Rh are determined in the solution by graphite furnace Atomic Absorption.

Geochemical Analysis for As

0.5 gram samples are digested with hot dilute aqua regia and diluted to 10 ml. As is determined in the solution by Graphite Furnace Atomic Absorption (AA) or by Inductively Coupled Argon Plasma (ICP).

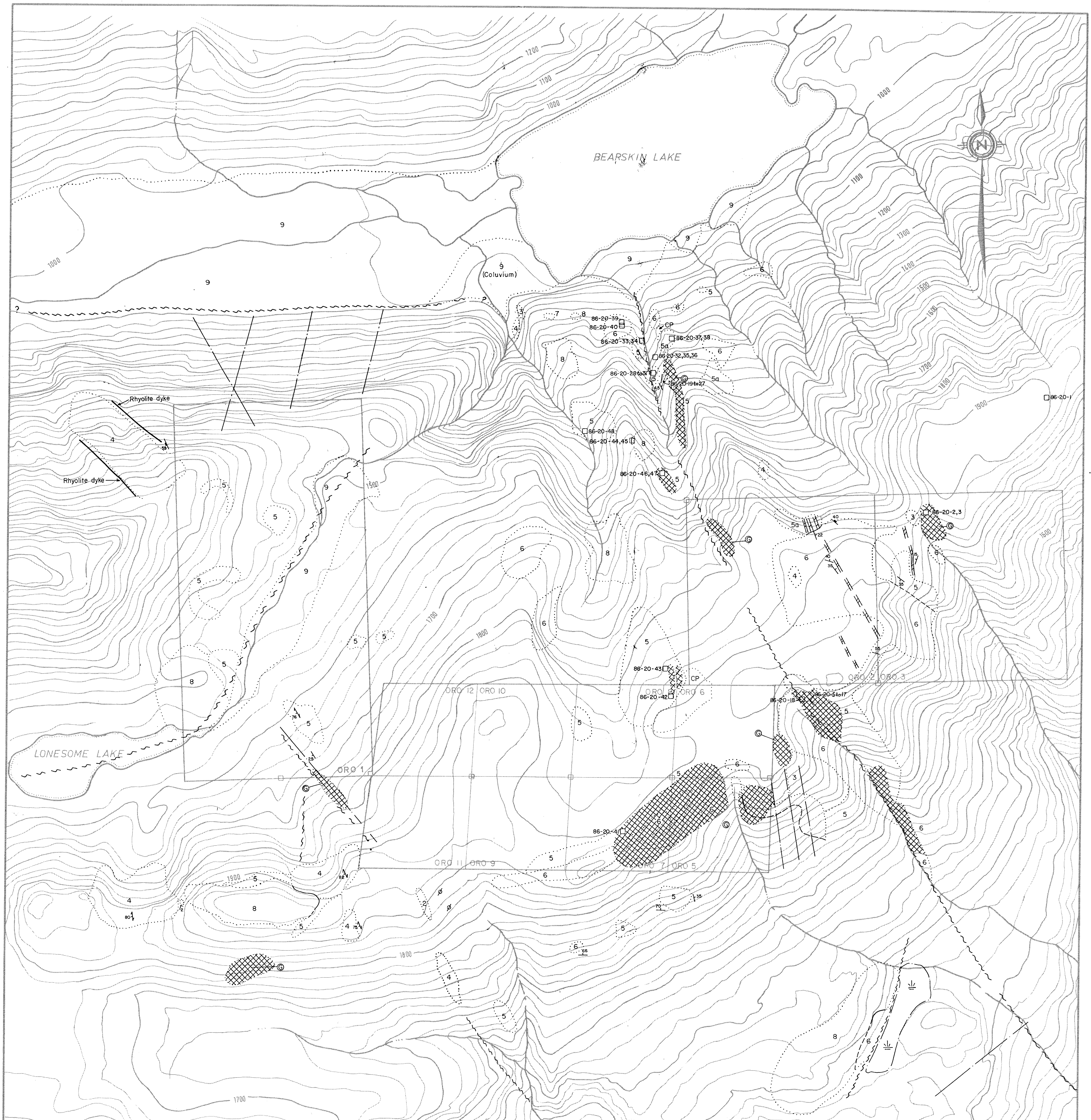
Geochemical Analysis for Barium

0.1 gram samples are digested with hot NaOH and EDTA solution, and diluted to 10 ml.

Ba is determined in the solution by Atomic Absorption or ICP.

Geochemical Analysis for Tungsten

1.0 gram samples are fused with KCl, KNO_3 and Na_2CO_3 flux in a test tube, and the fusions are leached with 20 ml water. W in the solution determined by ICP with a detection of 1 ppm.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

15,894

<u>L E G E N D</u>

QUATERNARY

9 FLUVIAL DEPOSITS; GRAVEL, TILL ETC.

TERTIARY

QUARTZ-IRON CARBONATE ALTERATION

JURASSIC

8 HORNBLENDE DIORITE-MEDIUM TO COARSE GRAINED, GABBRONIC IN PLACES, PLUGS (?)

PRE-UPPER TRIASSIC
-STIKINE ASSEMBLAGE ROCKS-

7 MAFIC FELDSPAR PORPHYRY; DARK GREEN TO GRAY, 1-2 cm FELDSPAR PHENOCRYSTS

6 GREENSTONE; MEDIUM GREEN FRESH, LAYERED IN PLACES, OTHERWISE MASSIVE

5 TUFFS; INCLUDES ASH TUFFS, AGGLOMERATES, CRYSTAL TUFFS AND LAPILLI TUFFS

5a LIMY BED; SILICEOUS LIMESTONES

4 FOLIATED AUGITE PORPHYRY; INCLUDES BASALT (?) FRAGMENTS IN CERTAIN SECTIONS

3 ARGILLACEOUS SEDIMENTS; BLACK WITH GOOD PARTING

<u>S Y M B O L S</u>

GEOLOGICAL CONTACT; DEFINED, APPROXIMATE
LIMIT OF OUTCROP
VEIN ORIENTATION
FOLIATION ATTITUDE
FRACTURE TRACE
FAULT; DEFINED, APPROXIMATE
PORPHYRY
SWAMP
CP CHALCOPYRITE
G GOSSAN

0 100 200 300 400 500 600 700 800 900 1000 M
SCALE 1:10000

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D.J. COPELAND

C.E.C. ENGINEERING LTD.	
GEOLOGY OF ORO CLAIMS	
SAGE RESOURCES LTD.	
FIGURE No	PROJECT No
DATE OCT. 1986	REVISIONS	SCALE 1:10000
NTS No 104K		FILE No
COMPILED BY D.C.		