Erickson Gold. EAC - SEG Workshop Smithers Oct. 16-19, 1988

888402 Table Mtn

# ERICKSON GOLD CAMP

CASSIAR, B.C., N.T.S. 104 P/4 & 5
Alex Boronowski
TOTAL Energold Corporation
1500 - 700 West Pender Street, Vancouver, B.C., V6C 1G8

## Location

The Erickson Gold Camp is transected by the Stewart-Cassiar Highway approximately 100 kilometres south of the B.C.-Yukon border (figure 1). The Camp is situated adjacent to the world-class Cassiar asbestos mine, both are located within the Sylvester allochthon.

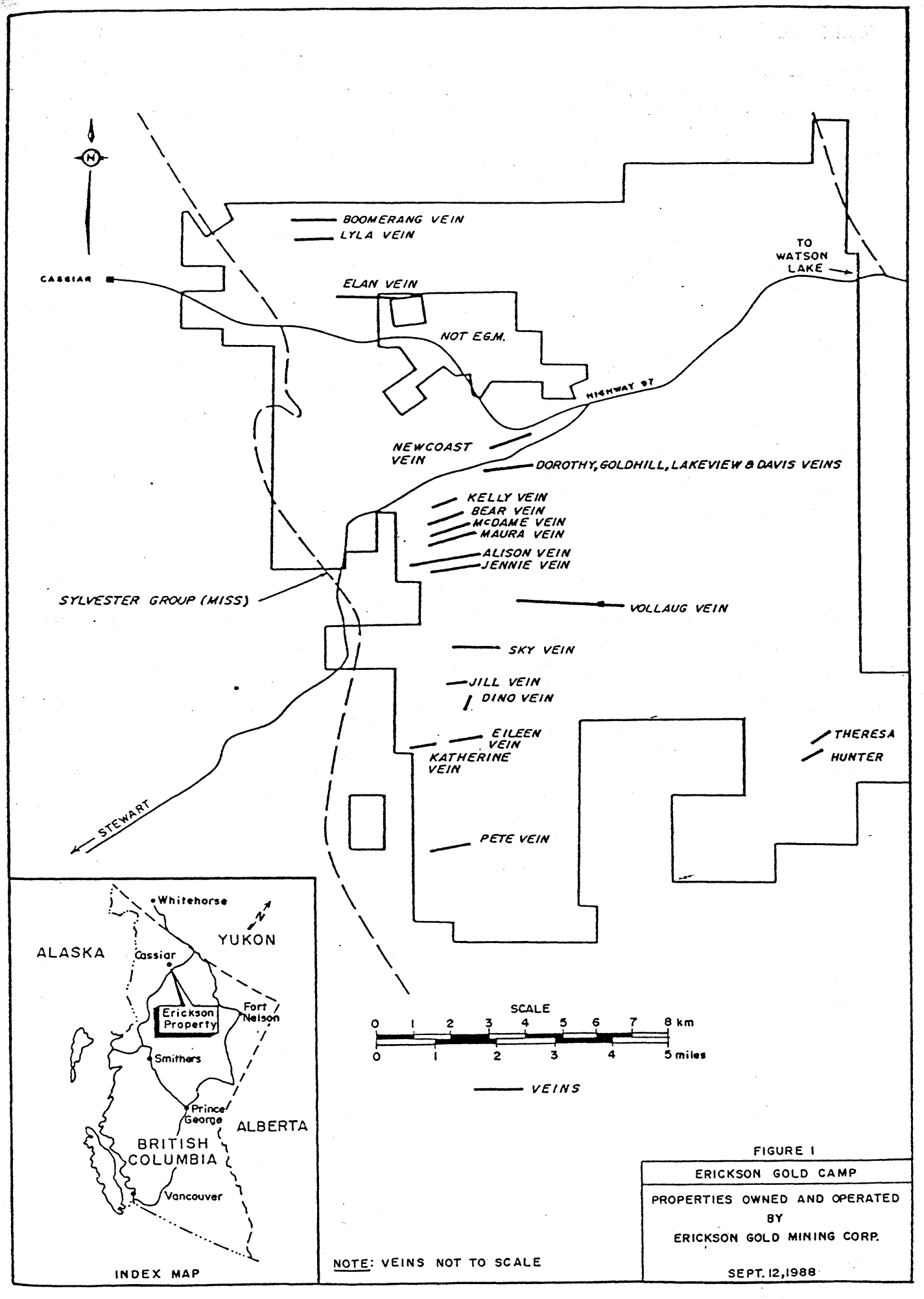
## General Geology

The Sylvester allochthon consists of metavolcanics, metasediments, and ultramafics. The assemblage contains fossils which range in age from Late Devonian to Late Triassic.(Gordy,Harms) The emplacement of the mildly deformed, fault bounded assemblage of oceanic crust occurred between Late Triassic and mid-Cretaceous time.(Nelson & Bradford) The Cassiar Batholith and satellite stocks were intruded along the western margin of the allochthon from middle to late Cretaceous time. Potassium-argon dating of sericite, obtained from quartz stringers associated with auriferous quartz veins hosted within metavolcanics of the Sylvester Group, indicate an early Cretaceous age.(Sketchley)

## Erickson Gold Mine - Production

To date, Erickson Gold Mining Corporation's production has totalled 540,000 tons grading 0.455 opt.Au. and 0.33 opt.Ag. Of this total 422,000 tons have been mined from quartz veins within steeply dipping shear structures in the Main Mine and Cusac Mine. The remaining 118,000 tons grading 0.306 opt.Au. have been produced from the Vollaug Vein.

During 1987, 95,179 tons were milled at a daily average of 261 tons. The average mill feed grade was 0.42 opt.Au. and 0.20 opt.Ag. with a recovery rate of 92.80% for gold and 90.50% for silver. Operating cost/ton was $117.39. The mill produces a high-grade gravity concentration and a flotation concentrate. Mining techniques employed during 1987 included shrinkage stoping, modified room and pillar, and some selective open-pitting.




NOTE: VEINS NOT TO SCALE

FIGURE 1

ERICKSON GOLD CAMP

PROPERTIES OWNED AND OPERATED BY ERICKSON GOLD MINING CORP.

SEPT. 12, 1988

Erickson Gold Mir - Geology

The auriferous quartz veins at Erickson are hosted in dilatent zones within sheared metabasalts. Gold was probably transported as gold bisulfide $Au(HS)^2$, within hot (350° Celsius), moderately saline water containing dissolved carbon dioxide. Precipitation of gold may have been triggered by: decrease in sulphur and/or decrease in oxygen and/or increase in Fe (Dussell).

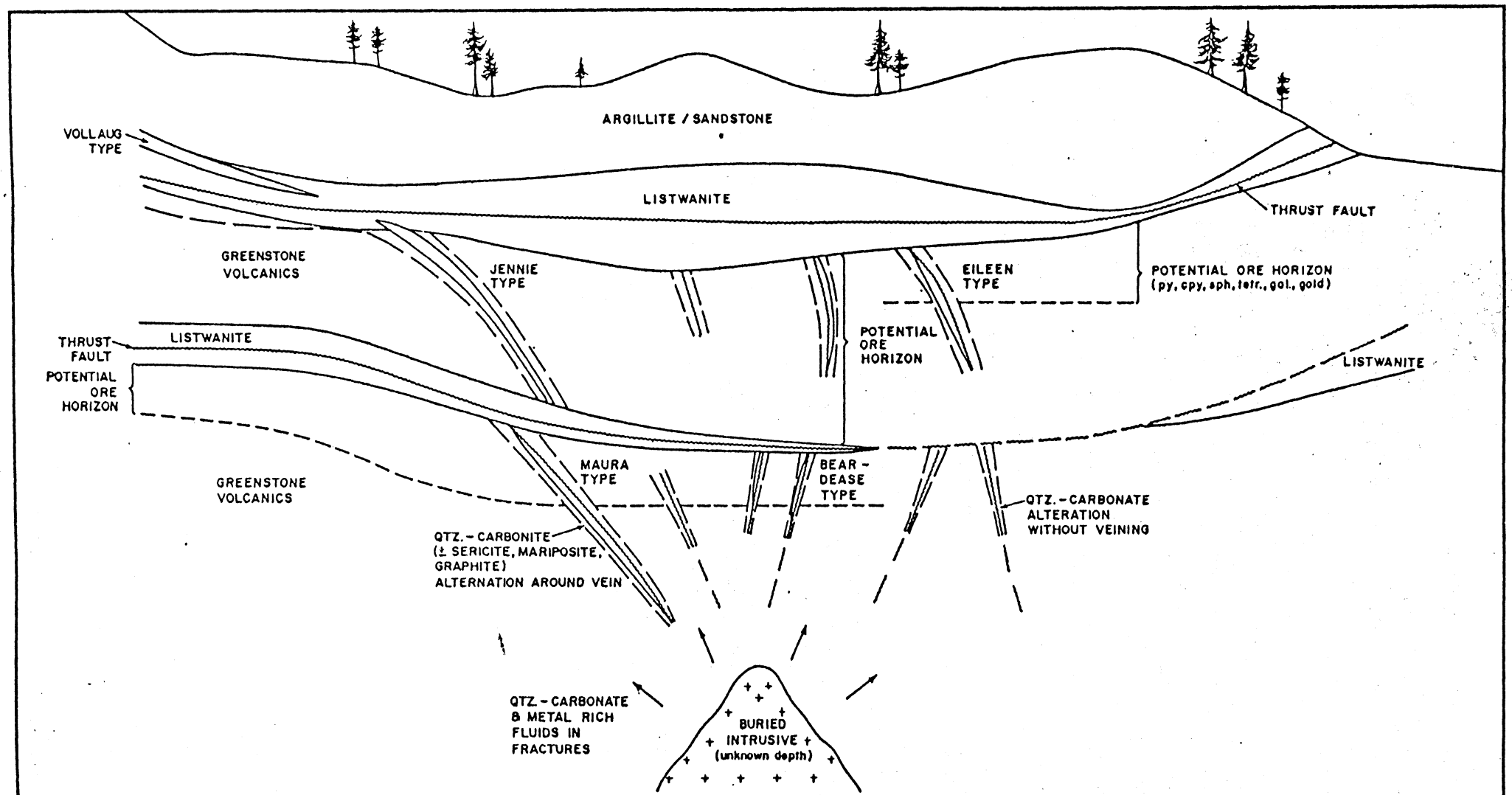
Steeply and shallowly dipping auriferous quartz veins have been mined in the Camp (figure 2). The steeply dipping veins are hosted within sheared basalts and the shallowly dipping veins occurring along the thrust plane between ultramafics and argillite. These structures and crosscutting structures probably represent major crustal breaks which have served as conduits for the auriferous solutions and dilatent zones for trapping gold.

Listwanite, a metasomatic rock derived by the hydrothermal alteration of serpentinites and possibly komatiitic basalts, are spatially associated with every known economic auriferous quartz vein system except the Taurus deposit. Three classifications of listwanites have been identified within the Camp:

1. Serpentine-Carbonate
2. Talc-Carbonate
3. Quartz-Mariposite-Carbonate

Possibly the listwanite signifies proximity to a deep crustal break, a possible source of gold, and an environment where acidic gold-bearing hydrothermal solutions would be neutralized and enhance precipitation of gold.

Carbonatization, silicification, and iron enrichment are the most pervasive alteration features adjacent to auriferous quartz veins. Carbonate alteration ranges from weak to intense dolomitization as the quartz vein is approached. The alteration zone normally extends less than 15 metres outward from the vein. The bleached white volcanics of the intense carbonate alteration contain an iron enrichment halo consisting of euhedral pyrite crystals. The pyritohedrons range in size from millimetres to several centimetres and can represent up to 10% of the rock. Generally carbonatization occupies a much broader area than the zone of silicification and is most intense within and adjacent to the quartz vein. At least three periods of quartz injection have been noted. Each injection has refractured the previous phase giving the rock a crackle breccia texture. Late clear, grey quartz veinlets within brecciated white quartz is a favorable characteristic of auriferous quartz veins. Carbon alteration is present as amorphous carbon within the basaltic rock and stylolitic laminations within the quartz veins. Stylolitic laminations are most common in shallowly dipping veins such as the Vollaug Vein which has an argillite hangingwall. In summary, intense alteration of basalts within shear zones provides a favorable host for the deposition of gold.




Note: Ore veining on East to Northeast trending faults in close proximity to major Northwest trending structures.

**TOTAL ERICKSON RESOURCES LTD.**

**Erickson Gold Mine**

**CARTOON MODEL OF GEOLOGY AND MINERALIZATION**

SEPTEMBER 12, 1988

FIGURE 2

Shallowly Dipping Veins (Figures 3 & 4)

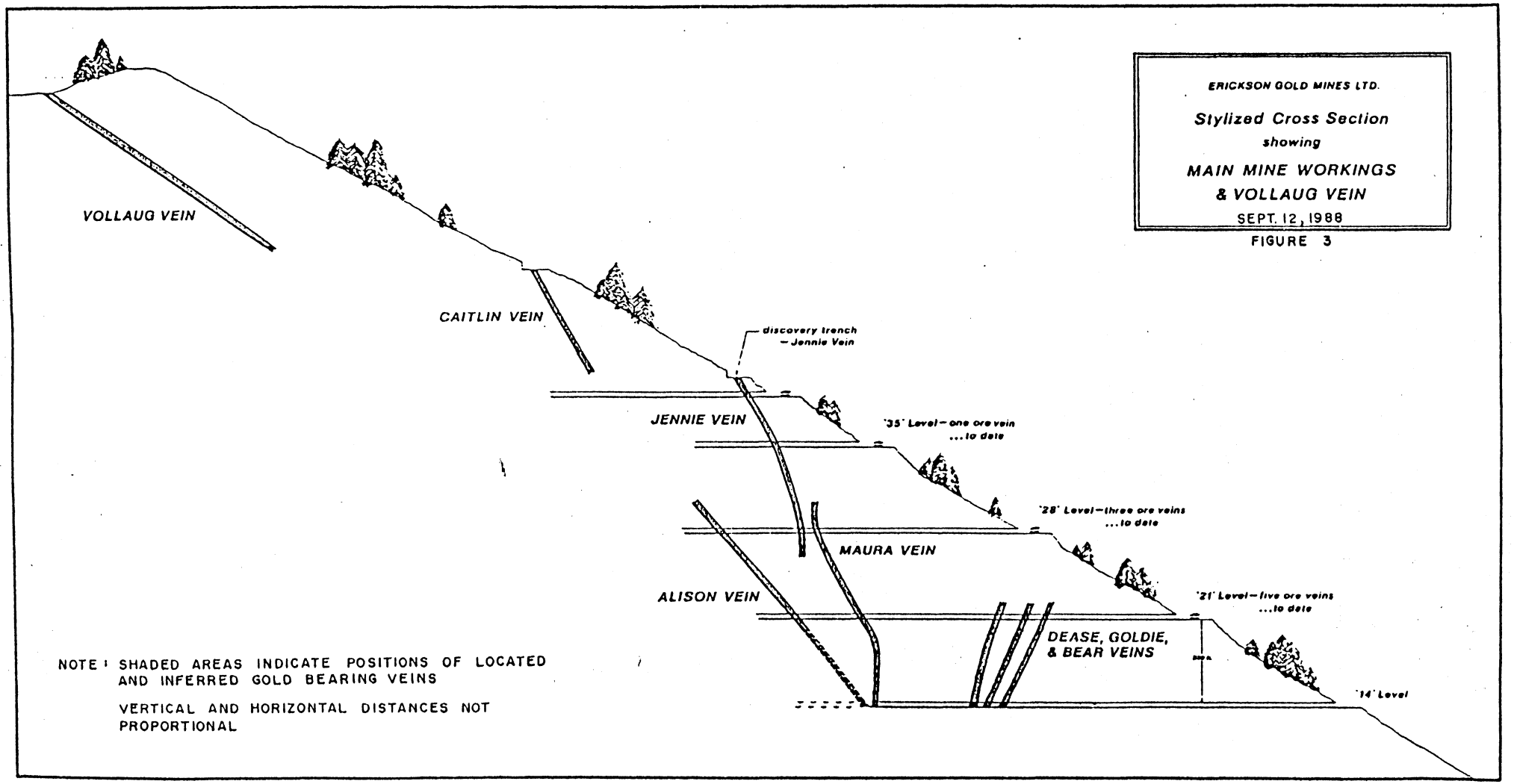
The Vollaug and Jennie's Revenge are the only shallowly dipping quartz veins that have been mined profitably.

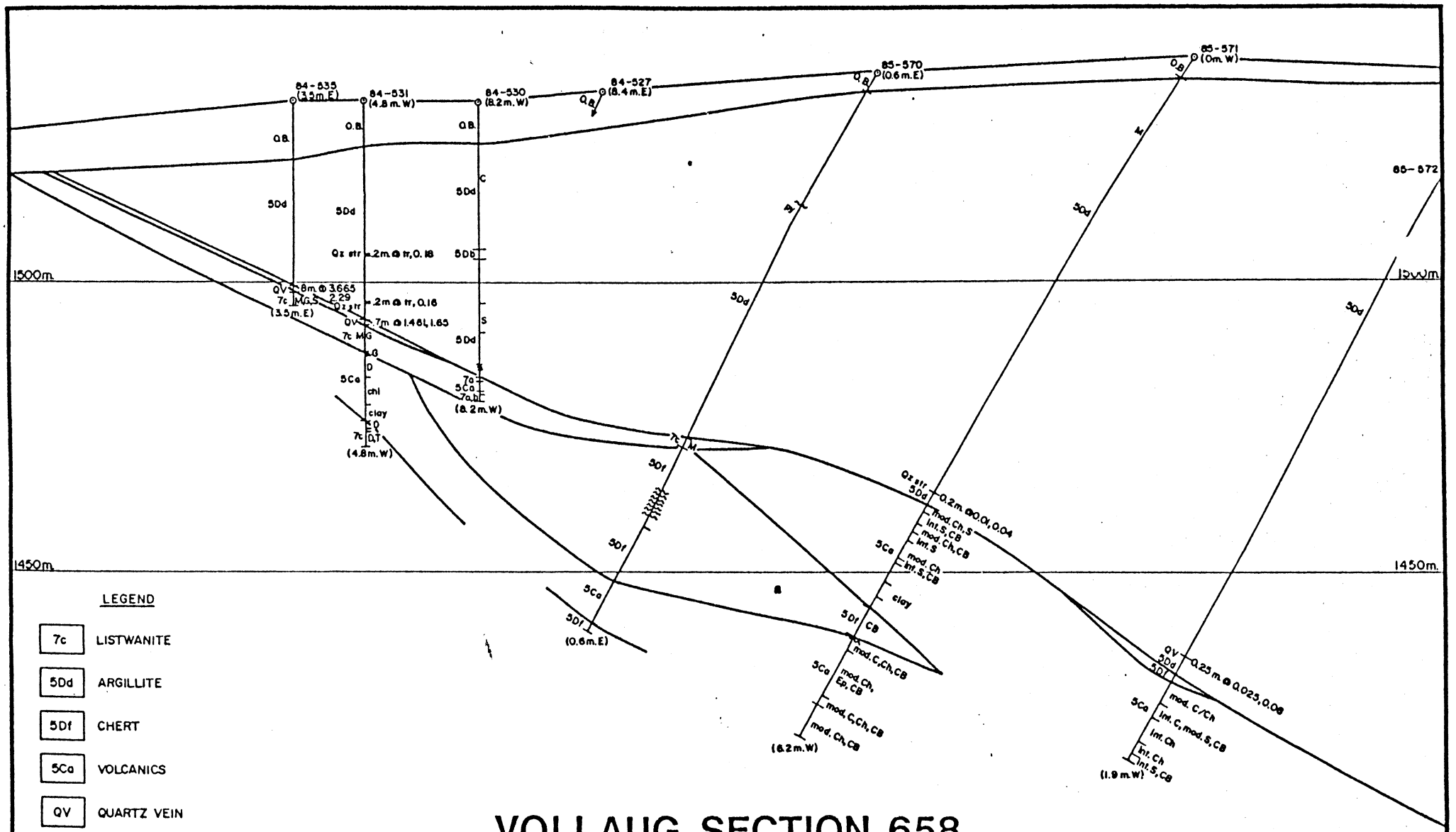
The Vollaug Vein is exposed across an east-west strike length of 2.7 kilometres. The east-west striking vein dips approximately 30° towards the north. The western extent of the Vollaug Vein terminates at the Erickson Creek Fault Zone, which may represent a major crustal break and alteration zone trending 170°. The eastern extent has not been traced beyond Finlayson Creek, another N-S trending structure. The thickness of the vein varies due to deformation within the vein, but thicknesses of up to 3 metres have been intersected.

The Vollaug Vein normally occurs at the contact between hangingwall graphitic argillites and footwall metasomatized serpentinites (listwanite). The listwanites are underlain by metabasaltic flows and interbedded cherts. The Vollaug Vein lies within a shear zone indicating a sinistral strike-slip sense of motion. The vein strikes 080° to 110° and dips between 25° to 40° to the north.

The Vollaug Vein is composed of parallel black graphitic ribbons within milky white quartz. The milky white quartz contains minor siderite. A later stage clear grey quartz occurs as crosscutting veinlets and breccias. Sketchley identified the following minerals within the black graphitic ribbons: clay or white mica and quartz with lesser siderite, graphite, iron and titanium oxides, and free gold. Mineralization generally represents less than 1% of the vein and consists of tetrahedrite, pyrite, sphalerite, galena, chalcopyrite, and free gold in order of abundance. Gold occurs scattered throughout the milky white quartz but is concentrated adjacent to and within the black graphitic ribbons. The hangingwall portion of the vein often contains the higher gold values.

Ore shoots often trend 290° and plunge shallowly to the WNW which is coincident to an axis representing the intersections of the vein and the P shear planes (105-115° and dipping 70-80° South). Lamprophyre and diabase dykes within the area trend 290°.


ERICKSON GOLD MINES LTD.
Stylized Cross Section
showing
MAIN MINE WORKINGS
& VOLLAUG VEIN
SEPT. 12, 1988
FIGURE 3
VOLLAUG VEIN
CAITLIN VEIN
discovery trench
— Jennie Vein
JENNIE VEIN
'35' Level — one ore vein
...to date
'28' Level — three ore veins
...to date
MAURA VEIN
ALISON VEIN
'21' Level — five ore veins
...to date
DEASE, GOLDIE,
& BEAR VEINS
'14' Level
NOTE : SHADED AREAS INDICATE POSITIONS OF LOCATED
AND INFERRED GOLD BEARING VEINS
VERTICAL AND HORIZONTAL DISTANCES NOT
PROPORTIONAL




# VOLLAUG SECTION 658

## (Looking West 90°)

SEPTEMBER 12, 1988

FIGURE 4

Steeply dipping Vein. (Figures 3 & 5)

At the Erickson Gold Mine production has been predominantly from the Jennie, Maura, and Alison veins.

Although all basically similar, the different veins seem to have significant differences in texture, mineralogy and possibly paragenesis.

At least three periods of quartz injection have been noted within an economic quartz vein. Each injection brecciated the previous quartz deposition. Veins are often cross fractured (tension gash direction) and contain dusting of pyrite along these fractures. Stylolitic-type textures parallel to the margins of the vein are common. These textures are composed of graphite and probably represent a solution line between quartz injections. Often inclusions of country rock occur within the vein. The strike, dip, and thickness of a vein can vary.

Jennie Vein

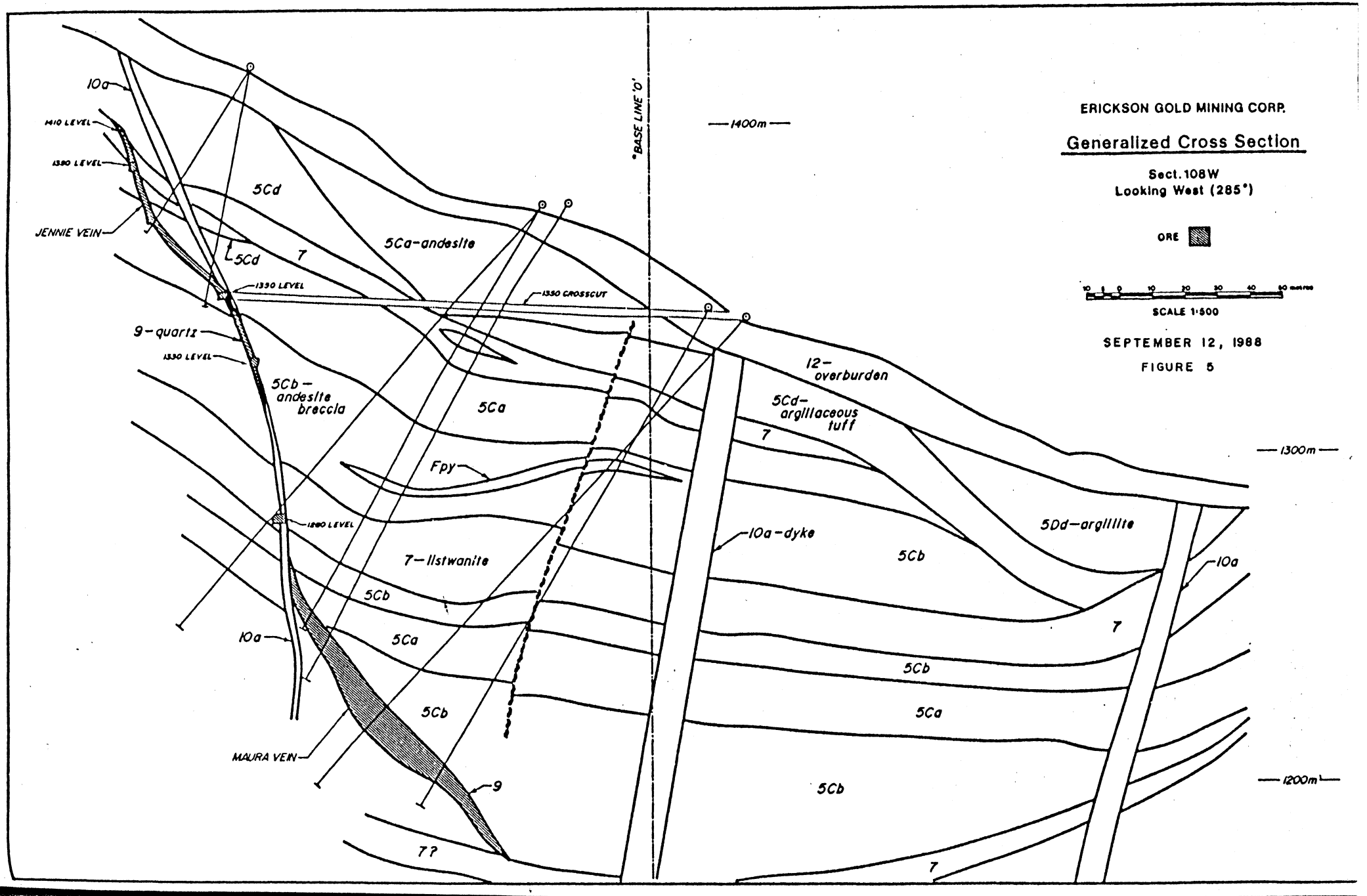
The Jennie Vein strikes 105° and dips 60° towards the north. Thicknesses vary between 1 and 6 metres. The ore shoot has a maximum strike length of 200 metres on the 1350 metre elevation adit. The vein has been mined down dip for approximately 240 metres. Gold occurs as irregular free blebs in quartz and between sulphide grains. Gold has also been found as fine disseminations within pyrite and tetrahedrite. Minerals noted are pyrite, tetrahedrite, gold, sphalerite, and chalcopyrite.

Maura Vein

The Maura Vein strikes 060° and dips 60° towards the north. Thicknesses of the vein range up to 9 metres. The ore shoot has a strike length of 160 metres on the 1210 metre elevation adit. The vein has been mined for approximately 200 metres down dip.

Sulphides (pyrite, sphalerite, tetrahedrite, and chalcopyrite) occur as bands paralleling the strike of the vein. Generally, these bands occur towards the centre of the vein - never within 1 metre of the footwall and seldom along the hangingwall, although fine disseminated tetrahedrite is occasionally found along the hangingwall of the vein.

The footwall often contains alternating quartz-carbonate layers 5 - 10 centimetres wide with brecciated quartz and volcanic fragments cemented by carbonate. This layering and brecciation is thought to be a late, post-mineralization stage.


ERICKSON GOLD MINING CORP.
Generalized Cross Section
Sect. 108W
Looking West (285°)
ORE
SCALE 1:500
SEPTEMBER 12, 1988
FIGURE 5
"BASE LINE '0'
1400m
1300m
1200m
10a
1410 LEVEL
1390 LEVEL
JENNIE VEIN
5Cd
7
5Ca-andesite
1350 LEVEL
1350 CROSSCUT
9-quartz
1330 LEVEL
5Cb-andesite breccia
5Ca
12-overburden
5Cd-argillaceous tuff
Fpy
1290 LEVEL
7-listwanite
10a-dyke
5Db-argillite
5Cb
MAURA VEIN
9
7?

Mineralization occurs as irregularly shaped coarse-grained clusters of pyrite approximately 10 centimetres wide, patches of fine-grained mixtures of pyrite-tetrahedrite-chalcopyrite, and individual disseminated grains of sphalerite, tetrahedrite, chalcopyrite and pyrite. Stronger zones of mineralization (5% sulphides), up to 2 metres wide and 10 - 15 metres long, are associated with zones of "stylolitic" graphite textures.

Clear grey quartz filled fractures occur perpendicular to the walls of the white quartz Maura Vein. Carbonate and quartz filled fractures parallel the walls of the Maura Vein but dip 70 - 80° towards the south.

Alison Vein

The thickness of the vein ranges between 1 - 3 metres. The vein has a strike length of 90 metres on the 1280 metre elevation adit and has been traced down dip over a 190 metre interval. Graphitic styolites are contained throughout the vein but the abundance decreases westward. Disseminated fine to medium grained chalcopyrite, sphalerite, tetrahedrite and pyrite occurs throughout the vein. But the greatest concentration of sulphides occurs within 50 centimetres of the vein's footwall or hangingwall. The footwall contains up to 1% pyrite of which the majority (75%) is coarse-grained disseminated pyrite. The hangingwall contains up to 0.3% sulphides of which 50% is pyrite.

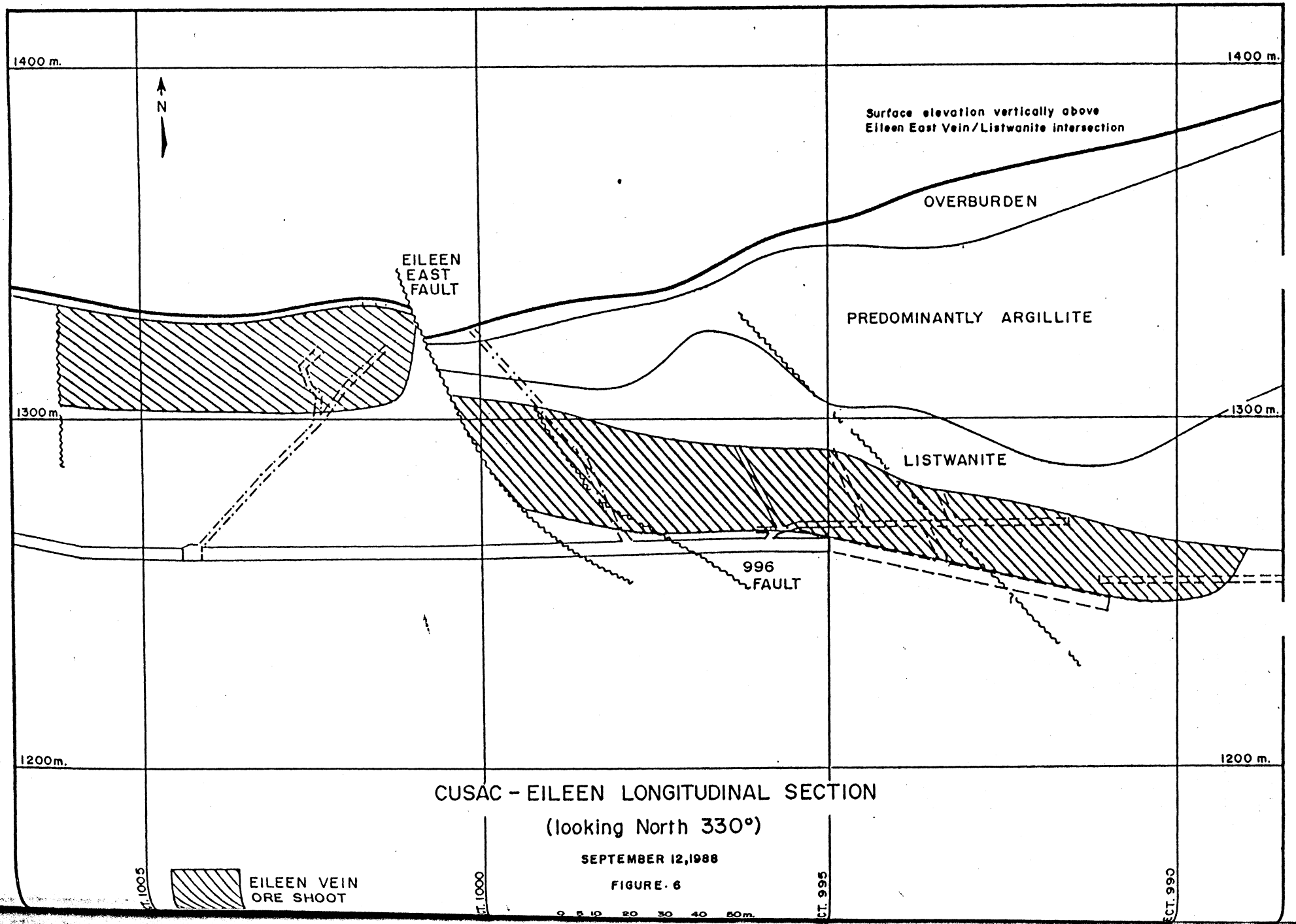
The vein contains cross cutting quartz-carbonate and clear grey quartz veins.

Eileen Vein (figure 6)

The Eileen Vein is located in the Cusac Mine approximately 8 kilometres south of the Main Mine area.

The Eileen vein averages 1.5 metres in thickness. The ore shoot has been mined over a strike length of 300 metres and down dip for approximately 30 metres from the listwanite contact. The shoot plunges to the east and follows the dip of the listwanite contact. The vein has an average strike of 060° - 070° and dips 60° to the north. The shear structure hosting the Eileen Vein demonstrates a sinistral sense of motion.

Mineralogy is similar to the Main Mine area but the average grade of gold (0.90 opt.Au.) is considerably higher. Pyrite occurs as coarse-grained and fine-grained knots throughout the vein but increases in amount towards the wallrock contact. Generally, gold values are higher towards the wallrock and listwanite contact. Sphalerite, tetrahedrite, and minor galena occur within the pyrite knots and normally indicate better gold grades.




CUSAC - EILEEN LONGITUDINAL SECTION

(looking North 330°)

SEPTEMBER 12,1988

FIGURE- 6

## Late stage dolomite v ns

McDame Vein

The McDame Vein strikes 105° and dips steeply south. The layered dolomite-type vein achieves widths greater than 3 metres. The vein consists of quartz and carbonate, displays colloform and brecciated textures with a small amount of pyrite. Quartz occurs as quartz fragments in brecciated areas and in the form of silica flooding of the matrix. The structure has not demonstrated that this system becomes auriferous at depth. The late stage dolomite-type veins do not contain the alteration assemblage as found around quartz veins. According to B. Nesbitt these veins are isotopically distinct from to the auriferous quartz veins.

## Exploration Techniques

During the last decade the exploration techniques have evolved as the search for new auriferous quartz veins has advanced from surface discoveries to hidden deposits.

Initially the exploration department relied upon geochemical soil sampling, trenching and gold-silver assays. Presently several pathfinder characteristics are utilized to grade the potential of a vein or area for hosting an economic deposit. These pathfinder tools were developed as a result of detailed geological mapping, geophysical orientation surveys, and the use of multi-element geochemical analysis.

Presently, the following characteristics are utilized for evaluating a target or target area:

- intensity and extent of alteration (carbonatization, silicification, and addition of carbon)
- spatial relationship to listwanite
- character and composition of the multi quartz injections forming the auriferous quartz veins
- presence of an iron enrichment within and surrounding the quartz vein
- mineralogy of the quartz vein
- arsenic geochemical soil and rock anomaly
- type of structural deformation and orientation of structures
- a geophysical VLF anomaly indicating favorably orientated structures

The auriferous quartz veins are relatively small targets and therefore it is essential to utilize the above criteria for assessing the potential of an area for hosting an economic deposit.

## Acknowledgment

This compilation is based upon a decade of data collecting and interpretations by the staff of Erickson Gold Mining Corporation, provincial and federal geologists, the universities, and independent theses.