Golden Bear : 676464
104K

1998

DATE	TITLE	PAGE
Aug 8	Bear DDH B98-014	2
Aug 8	Ore Hosts — APH is calls	10
Aug 8	Drill Hole Samples	12
Aug 9	Totem Drill Core - Karst	14
Aug 11	Limestone Creek Karst	20
	Mineralized "Rhyolite" Dykes	28
Aug 11	Troy Ridge - Evening Walk	30
Aug 12	Review Field Trip - Do It Twice	36
Aug 13	Summary Brain Storm	48
	Big Sb anomaly	48
	Rhyolite Dyke	50
	Calcite Bx's Faults	52
	Mesel Model	56
	Totem Silica	58
	Soil/Till Geochem	60
	Big Deposit?	62
	Karst	64
	Jasperoid	68
	Fe-Carbonate	70
	Totem Silica Anthem	72
	Age of Mineralization	74

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BEAR ZONE – DDH: B83-014

August 8, 1998 windy, cool

Objective: To sample drill core, look at alteration and examine relationship between oxide and refractory ore.

DDH B83-014 – rough log

0 – 47m massive and fragmental volcanic – non-magnetic
30 m – calcite-qtz veinlets and bx with banding, some vugs lined with quartz, qtz is chalcedonic gray and reddish-purple, some bx including one black fragment (1st?) – cuts volcanic tuff that is soft, some orange weathering developed
DVL-98.50 – HS

– Jim Oliver sampled hole in 1989

47 – 61.05m altered mafic fragmental
47.55 – badly ground core carbonatized volcanic lapilli tuff above
52.8m DVL-98.51 – at least two generations of quartz veinlets, one strongly banded cutting iron-carbonate altered mafic tuff HS

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- some patches of green mica in altered ~~[illegible]~~ mafic tuff,
- alteration variable fades in section from 57.3 to 58.4 m
For example (still non-magnetic)
- alteration drops off and picks up over last 2 metres

~61 - 61.05m - shorter pyritic gouge.

61.26 - 62m completely disintegrated presumably pyritic gouge

Photo 13. - pencil in gouge

62m - 69m - variably pyritized and iron-carbonate altered mafic volcanic - some core (~66m) looks like MFCA, some sections less pyritic and possibly cut by more veinlets of silica and late ~~[illegible]~~ carbonate

DVL-98.52 veined andesite with green mica H, P

63.45m
DVL-98.53 - sooty pyrite band 64m A, TE

69m - 79.55 gradational boundary in terms of content of alteration - difficult to identify lithology change possible transition to massive flow cont.

- minor cp noted on one split piece of core

more altered towards 79.55m

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DVL.98.54 H, TS

- chlorite-calcite veinlet, not ~~str~~ visibly altered, 1st time seeing chlorite
- possible flow or dyke

79.55 - ~80.6m intensely iron-carbonate altered volcanic

80.6m - 82.6m - ground core - orange near top - greenish-white towards bottom - largely clay zone with orange due to some pyrite @ 82.55m - TGS 185 sample

FAULT GOUGE

82.6m - 84.62m - white silicified 1st fragments (can see banding in at least one) in a gray to black siliceous matrix with some sericite or clay minerals

BLACK

84.62 - 86.05 - gray and white silicified limestone breccia to incipient fracturing, orange staining on fractures, some sericite or clay mineral vuggy in matrix, not always present (similar to Totem silica zone)

WHITE/GRAY - mostly white frags, occassionally some black

"white"

DVL.98.55 chaotic silicified bx - HS

86.05 - 88.40 - white subangular silicified clasts in black, siliceous matrix with very tiny vugs - sharp colour boundary with underlying unit, difficult to tell if primary

BLACK

H DVL-98.56

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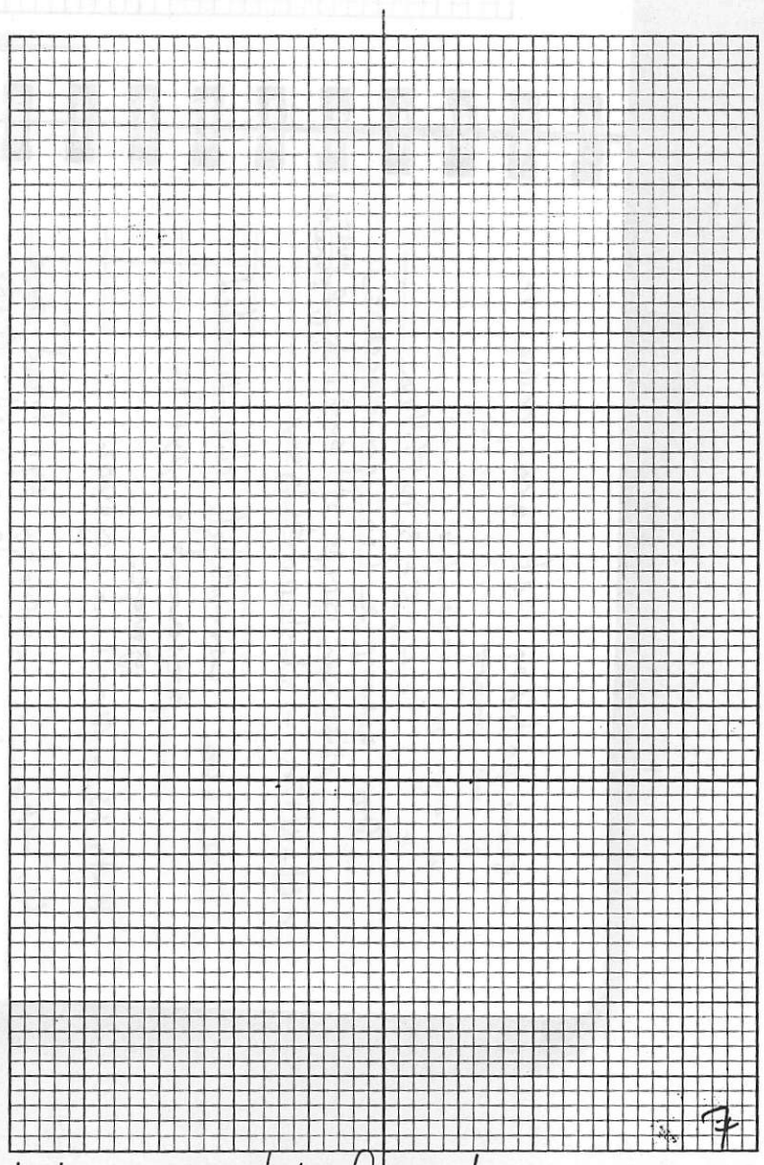
7

METRIC FIELD



black and white fragments in black unit suggest change in primary lithology

88.40 - 93.27 - light coloured gray carbonate that weathers light orange, much of it displays incipient fracturing, scattered siliceous patches which could be alteration or primary chert, some vugs, crinoids?

silicified

DVL-98.57 H; P, TS

92.72 b)
91.32 c)
92.55 a)

93.27 - 94.18 - yoke, black matrix, strongly magnetic, plag phyric,

94.18 - same as 88.40 - 93.27 - mixture of incipient bx, ~~[illegible]~~ [illegible] bx [illegible] occasional poly [illegible] bx

silicified

DVL-98.58 108.1 poly [illegible] bx H, TS

stopped [illegible] hole, core boxes sticking, divider bars missing

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Andrew's stratigraphic calls on mineralization

Ursa - LMGT (@ base) for mineralization possibly (1) minor structural spillover into DOCH

Kodiak A - LMBC ✓ 50/50 Limestone (1)

Kodiak B - DOCH

Kodiak C - DOCH ?

Bear - ?

Grizzly - ? Lost ?
- lot of DOCH in drilling

- bottom of stratigraphy

Kodiak Core

T96 350 - MECA - Dolomite low recoveries from
? T84 072 ↳ gouge doesn't run
T96 349 - thin sliver of MECA
T94 254 - footwall zone low recoveries ← low recovery area

T92 D190 dyke

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DRILL HOLE SAMPLES

Photo 15 – Variation in intensity of carbonate alteration of volcanics at bottom of hole B85-87.

DVL 98.59 gabbro/diorite?

ddh B85/89 23.5m

H (larger sample)

Totem Drill Hole 784/62

DVL 98.60 – white silicified lst fragments in orange-weathering carbonate-rich matrix

~26.5m

H, TS

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TOTEM DRILL CORE - KARST

Aug. 9, 1998 overcast, cool, rainy

Drill Core

T96 DH 350

		Log	COMMENT	GRADE
	0.61 - 5.44	LMSL		
*	5.44 - 7.83	PHYL		
relationship *	7.83 - 10.70	LMSL	banded crackled	
	- 13.47	LMSL	brecciated gouged	
	- 14.40	LMSL	banded crackled	
	- 15.15	LMSL	crackled brecciated gouge	
	21.70	LMSL	ibid vuggy calcite veins	
	28.20	LMSL	banded + crackled	
*	28.20 - 29.18	MFCA	gouged + sheared	
	29.18 - 33.79	LMSL	banded + crackled	
*	33.79 - 36.17	MFCA	py pseudos gouged + bx	
	36.17 - 38.11	LMSL	banded, crackled, vuggy, bx	
	43.89	LMSL	bx?	
	48.96	LMSL	bx	
	* 53.35	LMSL	fractured sheared MFCA	
	* 53.37	LMSL	crackle	
	59.45	"	Bx	
*	59.45 - 60.12	PGTF?	dk gray graphitic limonitic py shear	
*	60.12 - 66.12	PYTF	" " mariposite pyritic shear	
relationship *	66.12 - 66.93	DOCH	Bx, sil, sulp, graphitic matrix	
	66.93 - 74.42	DOCH	Bx	
	74.42 76.13	DOCH	Bx	
	76.13 85.37	DOCH	Bx, vuggy	

no assays

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T 96 DH 349

2.13	6.03	LMSL	Crackled
6.03	7.06	GOUG	rock frags
7.06	18.39	LMSL	vuggy crackled
18.39	18.84	GOUG	20% lmsl frags
18.84	22.13	LMSL	massive
	25.75	LMSL	massive
	34.05	LMSL	Crackled
	41.60	LMSL	crackled
41.60	44.29	LMSL	massive DOCH?
44.29	46.10	MFCA	Sheared
46.10	48.50	LMSL	crackled
48.50	49.65	GOUG	HLBX
49.65	53.03	MFCA	tr 1-2% pyrite
53.03	54.60	GOUG	Spiff clay
	56.08	GOUG	Deep mann
56.08	58.94	DOCH	definite in dk grey chert
	77.62	DOCH	

Could be mined in open pit!!

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Ridge Zone Decalcification? 2&450 ends 450 m or more
T95DH299 (long hole) · west of Fleece Fault

3 - 11m - mineralized Bx
11 - 98m - LMBC, LMST (BN and some Bx)
98 - 99m - HLBX, UNCA (massive) 2.9 l/g/t
99 - 110.5 - LMBC, LMST (CR) in calcite
*110.5 - 125 - BD SLST 0.58 Au
125 - 132 - CR LMST (two values 0.48 Au)
132 - 138 - Bx LMST (several values, including 3.12 Au

also T95DH 304
*72 - 83m BD SLST
T95DH 313

doesn't appear to be a good candidate

2nd 214198 gms

Bars >88% <96% Au
$429 CN $286 - $330,030
24160 gms - 90% pure

two photos done

Dennis Bergen sweeping up went back for second pour - use salt for buttons that look like nuggets

GRD1 G95UG122 start
G95UG118 56 [illegible] m
G95UG127
66.17 to 68.95
not as good?

feldspar/qtz periphery
granodiorite
rachyite
dyke?

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LIMESTONE CREEK KARST

August 11, 1998 cool to warm, sunny minor clouds

Short excursion to Limestone Creek karst hole

Photo 22 – iron-carbonate altered foliated volcanic, still some maroon colour to weathered surface – qtz vein near hammer

GB98.136

Photo 23 – looking NW towards Limestone Ck cave all water comes out here, in 1st

GB98.137

Photo 24 – closeup of green bedded volcanic tuffs, lighter coloured layers slightly more resistant to weathering and broken up to discontinuous due to defm, non-magnetic – iron-carbonate alt'n extends ~30 m from fault – ~~stops~~ contact with non-orange stained rocks fairly sharp

GB98.138

interbedded argillites in O/L

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Photo 25

two bedded blocks of limestone at 45° ∠ in carbonate coxscomb filling

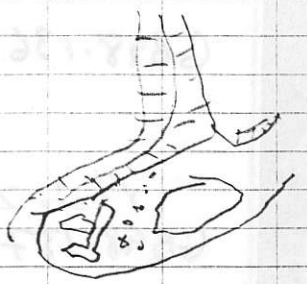
blocks unaltered

G.B 98.139

Photo 26

hammer resting on sediment infill in roughly original position carbonate teeth cut up vertical fracture

GB98.140



- variety of clasts including foliated sediments, mostly 1st brown vuggy matrix semi-consolidated

Host 1st, weathers tan colour, has gray spots that could be crinoids and ~~gray~~ occassional shell fragment?, has jasperoid pods

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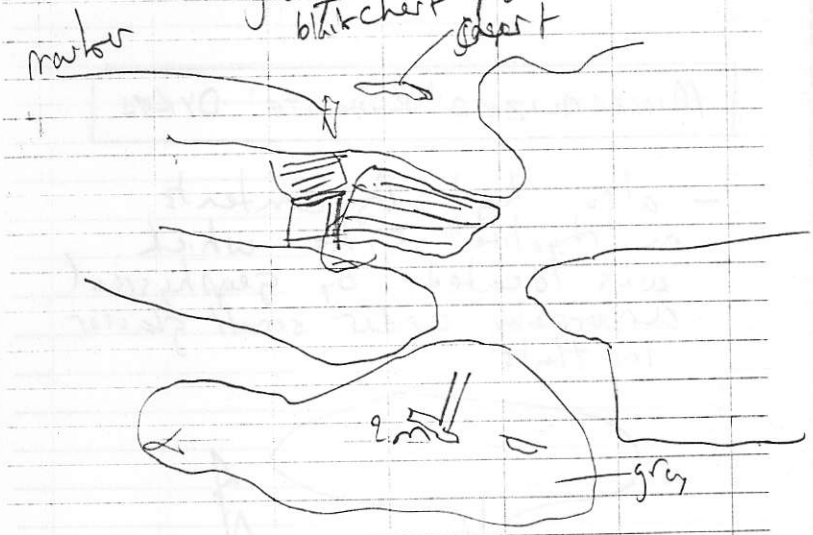
Photo 27 greater variety of large clasts

GB98.141 notebook beside thin bedded limestone (no chert, similar photo 25), hammer on grey, cherty, banded 1st with some argilliceous component and pen is host 1st with black ~~jasperoid~~ blackchert pod



- fragments clearly move till jam in horst

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all core gone!

T92 DH190

FELSIC DYKE 39.94 - 43.31

6-8 g/t Au, except for last 3/4 m which is 70 g Au/t and 71 g Ag/t

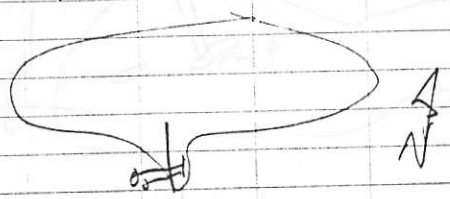
actually intermediate

underlying DOCH mineralized

Beer 98 DDH119

MINERALIZED "RYHOLITE" DYKES

- also high Ag contents in "rhyolite" dyke which was located by geophysical anomaly under small glacier in flats



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TROY RIDGE - EVENING WALK

Aug 11, 1999 Cloudy, cool, breezy

Δ1 - 8km, up Troy ridge to see gabbro

Δ2 - o/c all appear to be chloritic volcanic with at least one volc bx o/c
- debris below 1st big o/c near head of talus has elongate lapilli-tuff fragments

↑ 56E
180

Δ2 small o/c of gray weathering spotted intrusive dyke, minor brown staining on joints, 15-20% 2mm plagioclase crystals in feldspar and ~~ferro~~ mafic magnesian matrix, ferromagnesian mineral is foliated
- no Fe-carbonate alt'n of chloritic fragmentals

steep
160

7m wide

Δ3 - further east along o/c rim on north side of Troy Ridge, get another fg gd dike ~10m wide in felsenmeer

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then a second one in felsenmeer possibly 20 m wide with some very rusty boulders due to ~10% diss pyrite

DVL.98 .111

- interesting dykes are recessive

Photo 28 - 1/2 m dyke cutting metic volcanics, some chilling, with pinkish borders to dyke, kspar extends as little fingers into metic volc's occassionally

DVL.98 .110

.060 - volcanic clast in dyke

GB98-142

Δ4 o/c of black diorite/gabbro f.g. / as suggested by map - rusty in one ~~spot~~ area of felsenmeer

DVL.98 .112

Δ5 ~~Pegm.~~ feldspar - ~~plagioclase~~ quartz dyke - almost pegmatitic, ~15 cm wide no chill, no wallrock altn' looks like narrow qtz veinlet down centre

.030 62E

DVL.98 .111 ?

(113).

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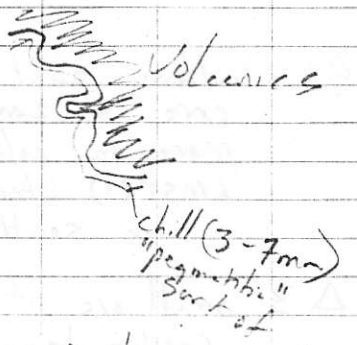
06 another granodiorite dyke
invading mafic volcanic
gets more k-spar rich
in veinlets (near hammer)
appears to be "consuming"
volcanic in contact

Photo



- inclusions of volcanic
in dyke

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REVIEW FIELD TRIP - DO IT TWICE!

August 12, 1998 sunny, cool to warm

Δ1 Aug 4-~~19~~ Δ2 o/c
- equivalent to thinly bedded gray limestone near Ursa
- LMGT(2) equivalent
-

Δ2 walking east, came to approximate core of zone, appears less altered, more tan coloured, could be LMST(1) (Andrew) - fissile unit in south zone

Δ3 small o/c of less altered carbonate has chert pods, stockwork silicification as raised boxwork, soft rough surface right beside intensely silicified white lst fizzes on fresh surface + powdered breathered

Photo 30 chert pod & boxwork
GB98.144

Δ4 near Black fault
- lots of bedding mostly crackle bx, some minor chaotic
- not a lot of breccia, high matrix, ~~polymict~~ monomictic breccia, very limited (<5%, possibly 1-3%) - matrix up to 30%?

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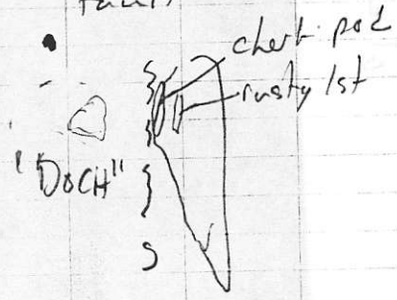
Δ5 same location as DVL.98.13

- Andrew agrees unlikely to be chert, vuggy in places variably silicified probably argillite or siltstone

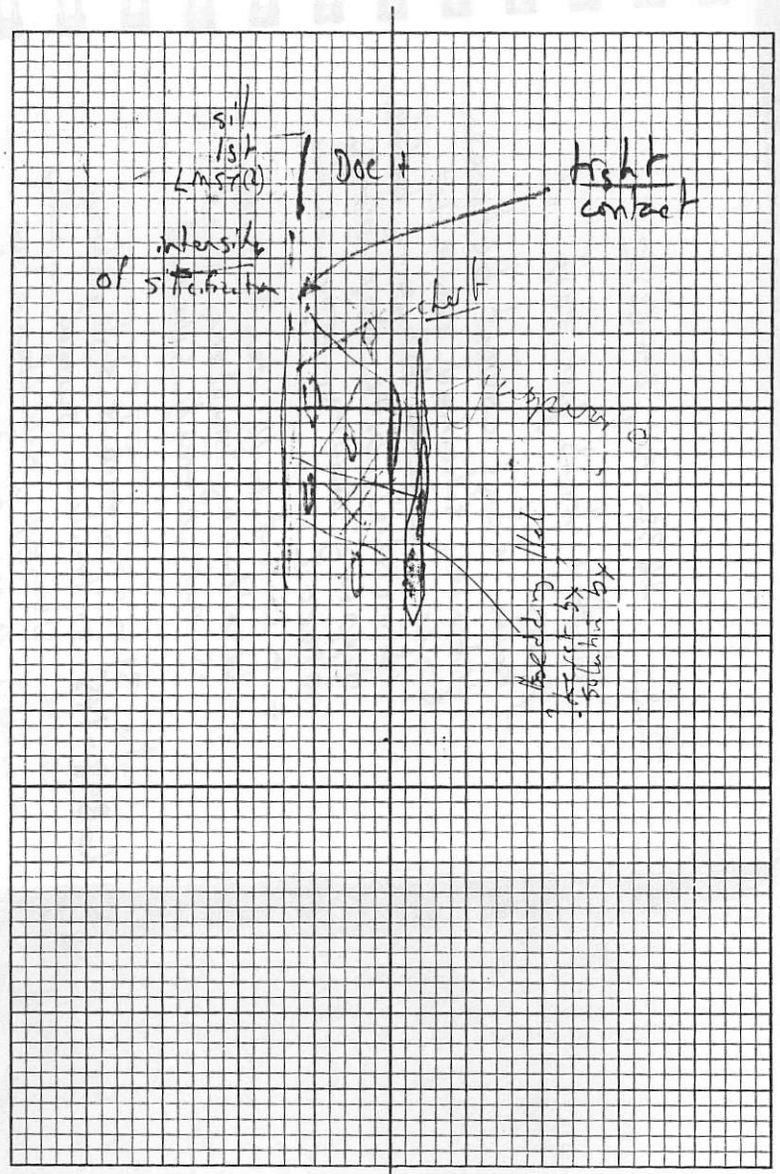
Δ6 same as Δ3 Aug 5/98

3m to o/c of soft limestone with silica stockwork and odd chert fragment
- just ~~west~~ east of minor fault



Δ7 along road towards Kodiak A pit, 75 m before turn south along lip

DVL.98.104 tan-weathering, v. white limestone with patches of fracture controlled iron-carbonate that gives it an incipient crackle bx texture



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METRIC FIELD

△ 8 26325N, 24625E

- silicified knob just east of picket
- knife edge contact between intensely silicified white 1st (~20cm wide to layering before diminishes) with steep westerly dipping layering, some crackle breccia
- in contact with tan to gray weathering limestone that is not intensely silicified

Photo 31 GB98-145 (beside marker) – gray to black, slightly shiny on fracture surfaces, weakly vuggy, silicification along fractures of "DOC" box work silica developed in matrix (beside hammer) – matrix fizzes when powdered

DVL.98.105 – black silicified fractures cutting dolomite with silica stockwork

Photo 33 GB98.146 – hammer on contact between intense silicification and initially iron-carbonate altered, then dolomite

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Δ9 25 m east, stockwork continues to east but black fracture-controlled silicification becomes limited to fracture coatings and odd patch
- then ~~hit~~ come to 7 m x 3 m pod of black jasperoid with moderate rusty stain and 5-10% vugs

DVL.98.106

pod lies bedding
10m east DVL.98.22

Δ10
28006 CMC sample
narrow bedding parallel silicified zone, ~1m wide
angular sil fragments in tan matrix

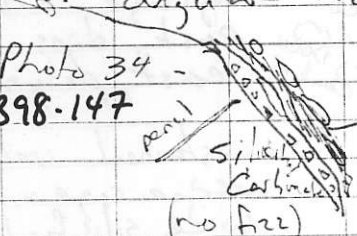

Photo 34 - GB98.147

Photo 35 GB98.148 shows black silica invading parallel to bedding and ? causing [illegible]

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zones of bx breccia on o/c face are probably related to replacement, not primary but difficult to tell

Fleece Bowl

Δ10 white limestone with final siliceous chert? pods which fizz strongly on fresh surface - what are they? - becomes siliceous as across road

Δ11 - old trench with o/c across Fleece Fault

DVL 98.107 - black silicified gouge? along - crude banding along Dacite contact east dips steeply east, polymictic

Photo 87 iron-stained volcanic wedge against blast 30 cm
GB98.149 wide silicified 'fault gouge

3/4m wide zone of bx ~~Dacite~~ grading from Dacite to polymictic bx HTBX

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DVL-98-108 Grizzly Underground Hole G99-373-523'

- gray ~~tex~~ int. textured porphyritic matic intrusive? rock
- appears to be aphanitic, leucocratic but could be intensely carbonate altered
- ~~minor~~ trace diss py (1mm)

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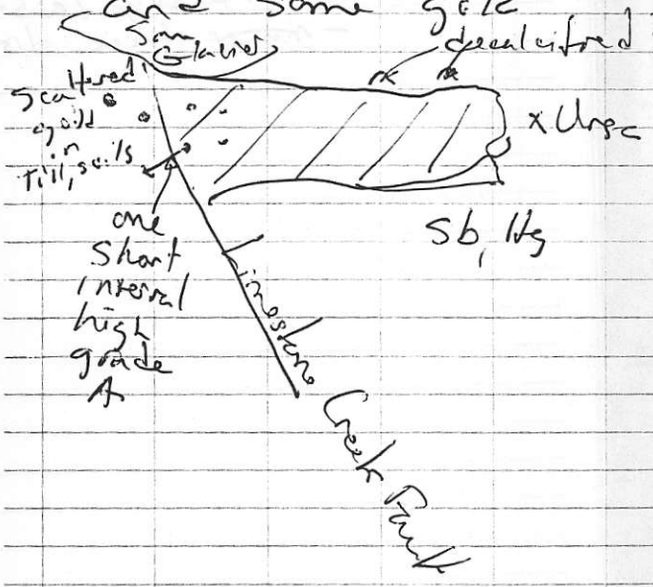
GOLDEN BEAR – SUMMARY
. BRIAN STORM

Aug 13, 1998

- Big Sb anomaly coming off limestone fault with associated Hg and some gold



- possibly two decalcified soil zones on limestone hill just north of fill boundary and Sb anomaly
- examine calcite bx cutting hill and more prospecting on hill

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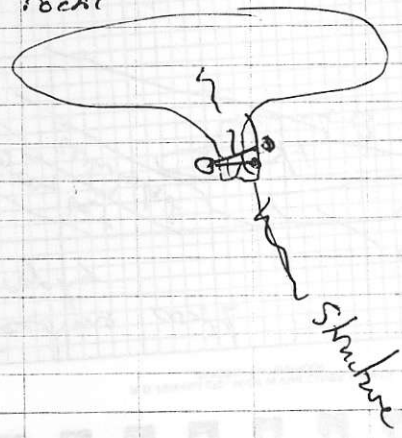
- rhyolite dyke with >50 g/t Ag and no gold
- geophysical anomaly
- cut >100 bf varved clays and "karst" infill in rocks

× Ursa N



× Kodiak A

- one hole cut 1 to 2 m wide, ~~v.f.g.~~ aparitic, amygdaloidal?, tan brown, almost waxy surface dyke - could only see little chips as was ground in core
- could bend and connect with calcite bx cutting "limestone Hill"

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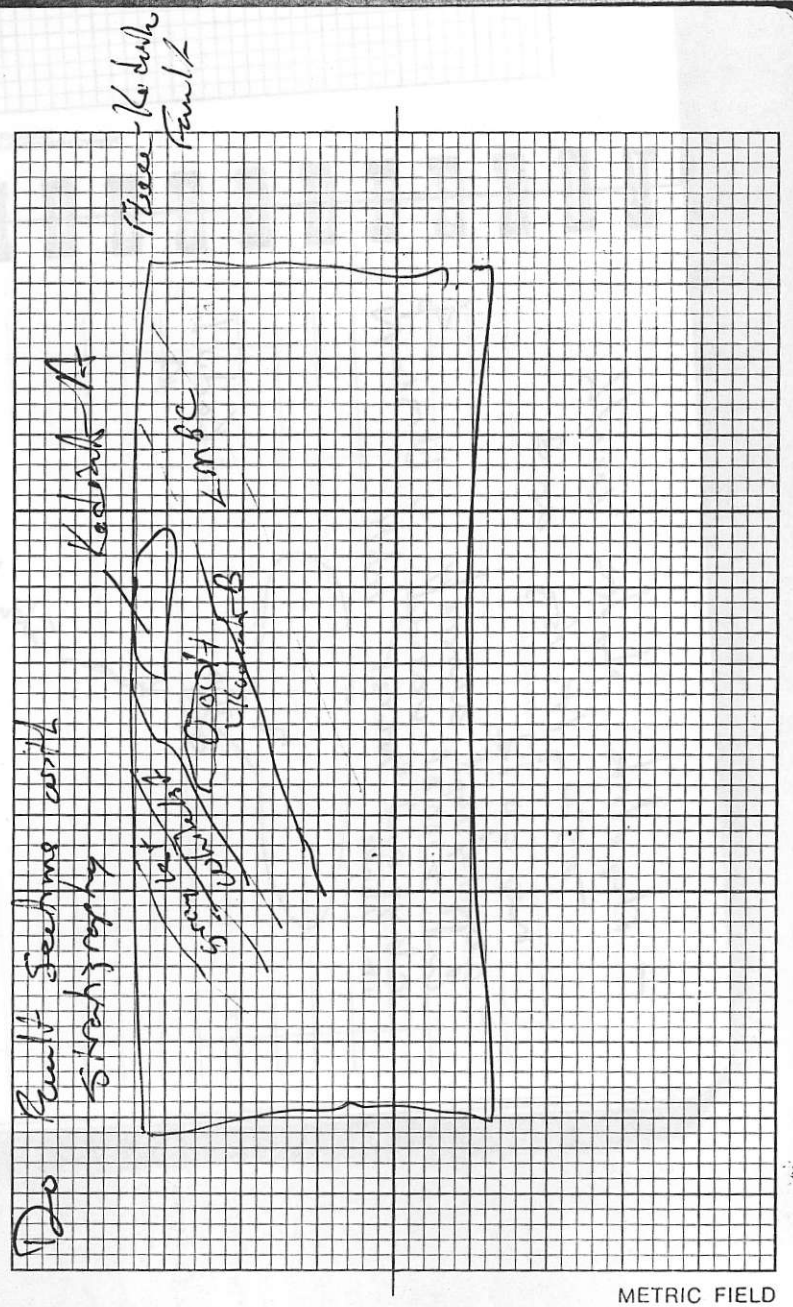
- are calcite bx's ever mineralized
- calcite breccias are late - relationship to basalt dykes? do they predate prop
- calcite bx zones wider in drill core or over emphasized on map?
- Fleece Creek is very linear - could there be a fault there - could explain termination of Fleece structure, cut off Black fault
- does the Fleece fault become the Kodiak fault & placing Kodiak A, B & B in same place
- could the mineralization be following the trace of DOCH down the fault



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METRIC FIELD

- are any of the mineralized zones offset by faults?
  only ursa — few tens of ms?
- suggests faults are young because at least have young block faulting?
- draw up a table of faults

Name Orientations Width
Range Average

Horizontal Extent Structural Character

Associated Distinctive Lithologies Amount of Offset Size (Mj, Minor, Fracture)

Comments Mineralization Within Outside % of mineralized ddh intersections

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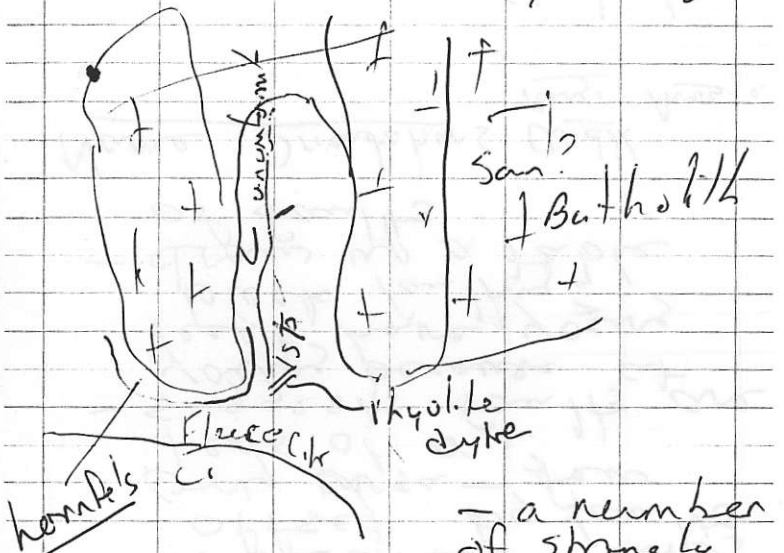
METRIC FIELD

Mesel Model

- could apply
- some dolomite similarities

Karst / limestone, non-conformity, broad silicified zones, dolomitization? pre-ore intrusive bodies (possible cap at G. Bear)
- Highway Creek valley could be very analogous



- a number of strongly geochemically anomalous Au values

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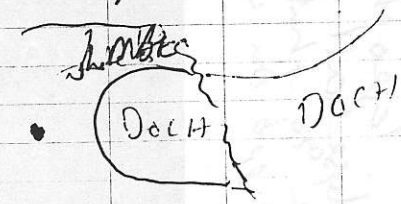
METRIC FIELD

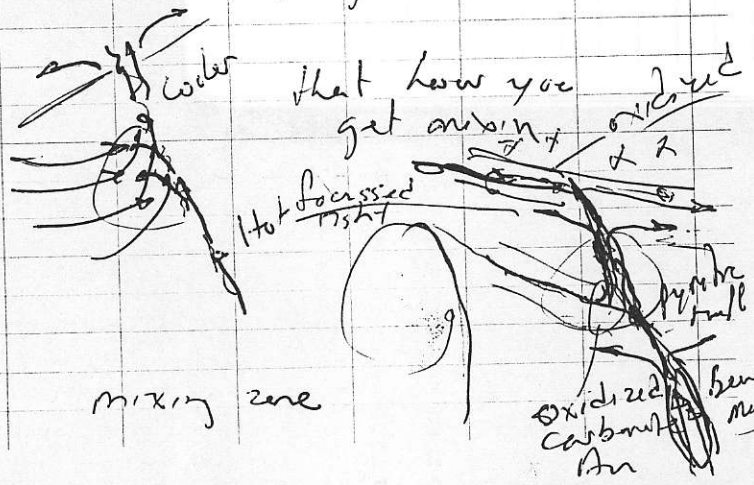
Totem Silica Zone

- core, see Totem silica zone fingering out to the south
- it would seem that rocks at the ridge zone would be extension of that trend, except for fault problem
- however if faults didn't move — no problem



- jasperoid zones in underlying Dacht

oxidized pyrite - can't do this with this model



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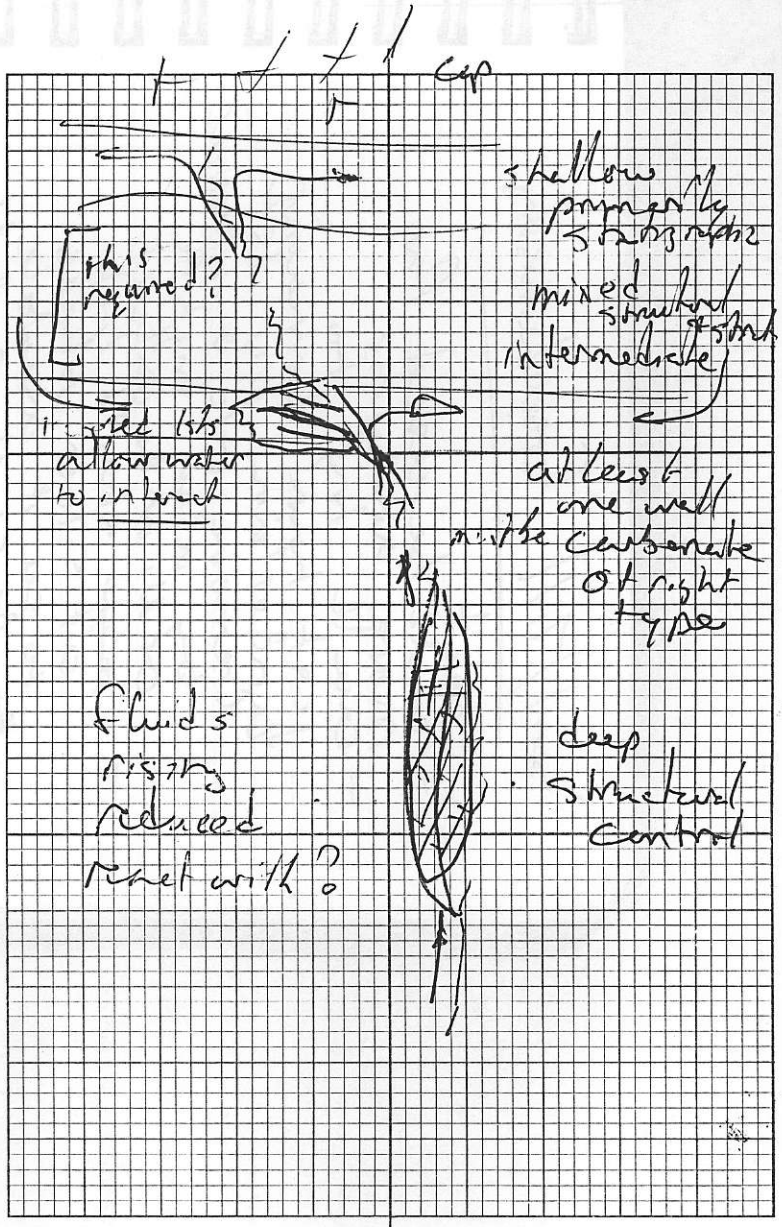

Soil/Till Geochemistry

- great
- could be used for more analysis
- could try to just have domains underlain by 1st (remove rock & intrusives by using high Fe or Ni or Co values
- ~~might~~ should look at silver values to see if useable
- ~~Po~~ As, Sb, Hg probably more reliable than Andrew thinks
- don't count so much on gold for first pass. testing
- calcium excellent
- what about Mg highs for dolomite?
- lithogeochemistry in holes?
- how to use systematically
- need to query Nevada experts for advice geochem - geophysics
- analyse all data to see % that run for >50 ppb Au etc

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BIG DEPOSIT?

where is the big deposit? Is there bigger ones either size-wise or grade-wise

---

northend of Totem Zone has an anomaly SE of Lake 1 soil

- more silicified to the north?
- what are average rock chip values
- probably should be considered a resource

Surprise Ridge drill beneath silica cap, need to drill ⊥ to beds, surface sampling first to determine resource

---

are the silver-rich areas systematic - ie located higher/peripheral to system?

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KARST

age of karsting

Permian/Triassic – pre-volc
Recent – ~~post-?~~ ~~[illegible]~~
associated with
present surface
(Andrew – support)?

units favourable to
karsting

- limestone with chert
pods (DOCH)
- LMBC? (Gernie's Grotto)

- same now as then?
probably
- old karsts had open
spaces before hydrothermal
event? (probably) – no
crystal growth or
dissolution (more likely)
- what about sediments
like Mesel example?
- most Permian karst
development bedding
parallel, tight
- ~~[illegible]~~ solution brecciation,
~~yes~~ seems to be a
distinct possibility

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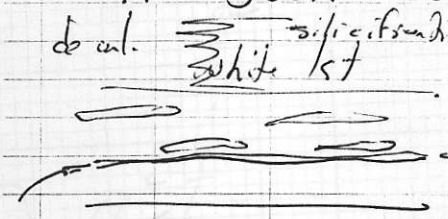
- does a karst situation in Doch develop like



less permeable?

more permeable?

← karst cavity

fluids early cause
- dissolution
- crackle bx
- collapse

no

dolomite - fluids don't react
- follow open spaces and fractures
- fill spaces and eventually replace rock as fluid matures, so get late stage, higher grade Au

white lst - initial fluids react and start silicifying, create porosity, solution collapse, eventually all silicified
- matrix carries most gold (that's where sulphides are?)

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JASPEROID

why does jasperoid extend so far laterally? below silica zone - porosity

- amazing knife edge contact between silicified 1st and "DOCH" silicified

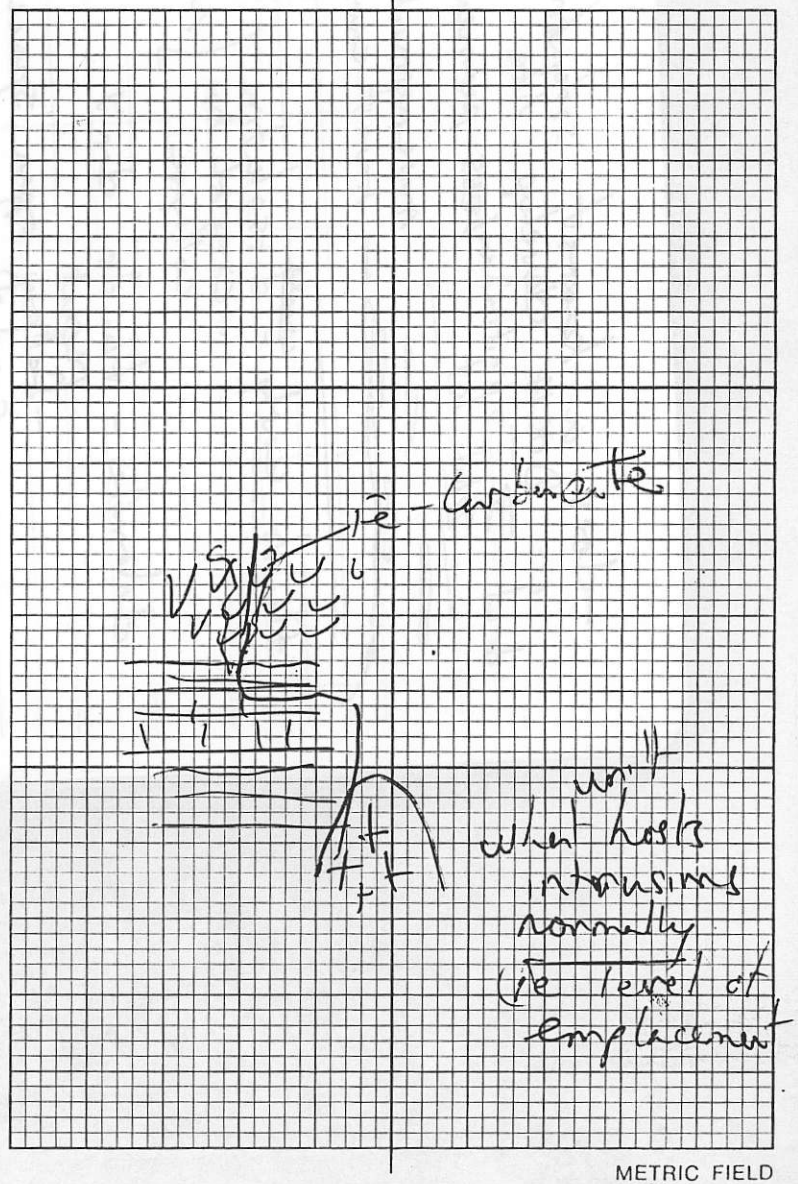
---

Crackle DOCH on Surprise Ridge equals stockwork silicification in dolomite matrix to chert pods ("boxwork") which stands out on weathered surface

---

two ~~phases~~ or three phases of pyrite

- brassy 1-2mm, pubic and pyritohedrons, diss., coated with hematite, sometimes ?? replaced (this type with Fe-carbonate)
- black sooty pyrite, very fine-grained (not identifiable) macroscopically, always?? refractory - not so in open pit (repent)
- microscopic pyrite oxidized and replaced by hematite and goethite



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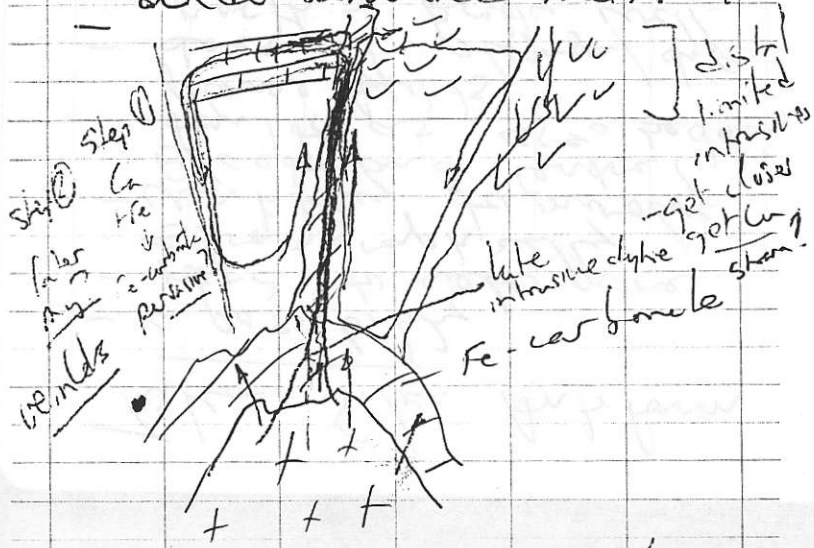
METRIC FIELD

Fe-Carbonate

- read Jim Oliver's thesis about broad zones
- Fe-carbonate, green micaceous clay, diss pyrite
- envelopes in volcanic rks and mafic intrusives to Quilts
- broad zones related to intrusive rocks in other places
- associated with mineralization and albitic alteration
- undersaturated melts?!
-



- does this dolomitize limestones?
- is it same age as Au?
- clearly a J/K event

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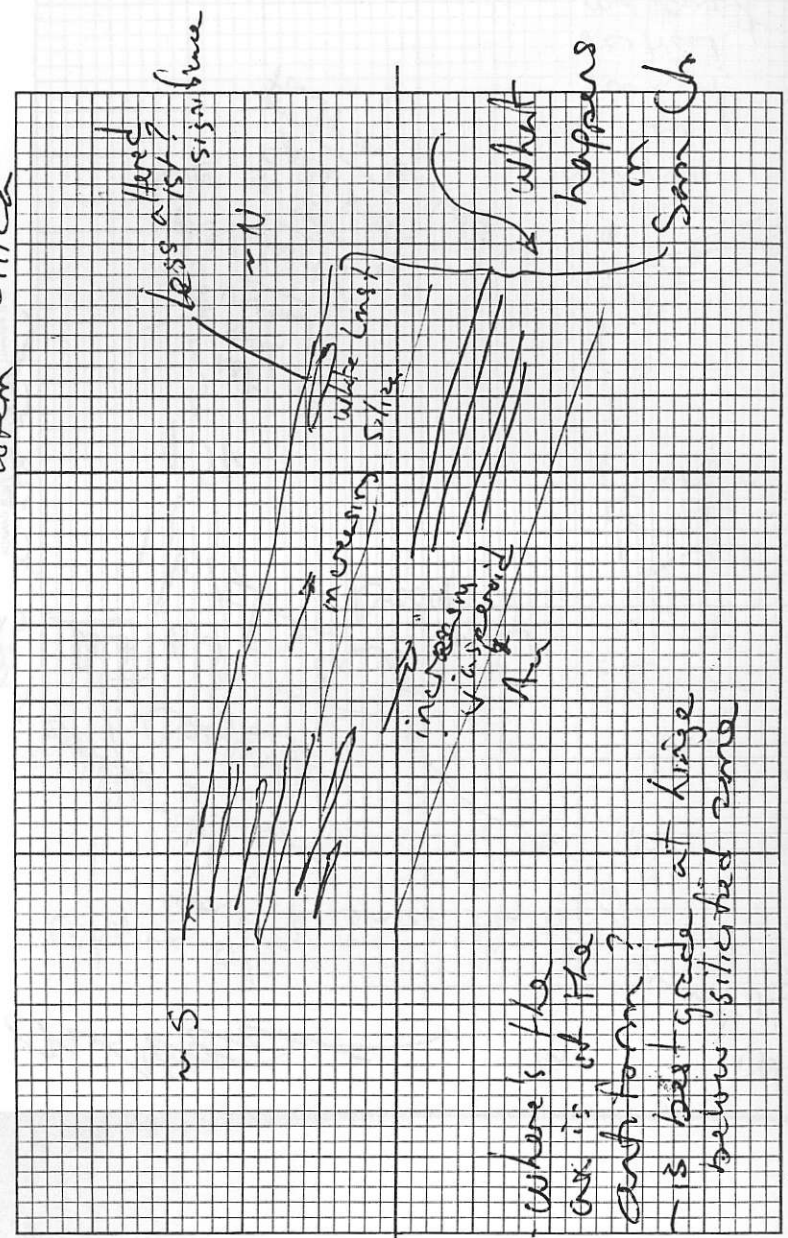
Taken Silica

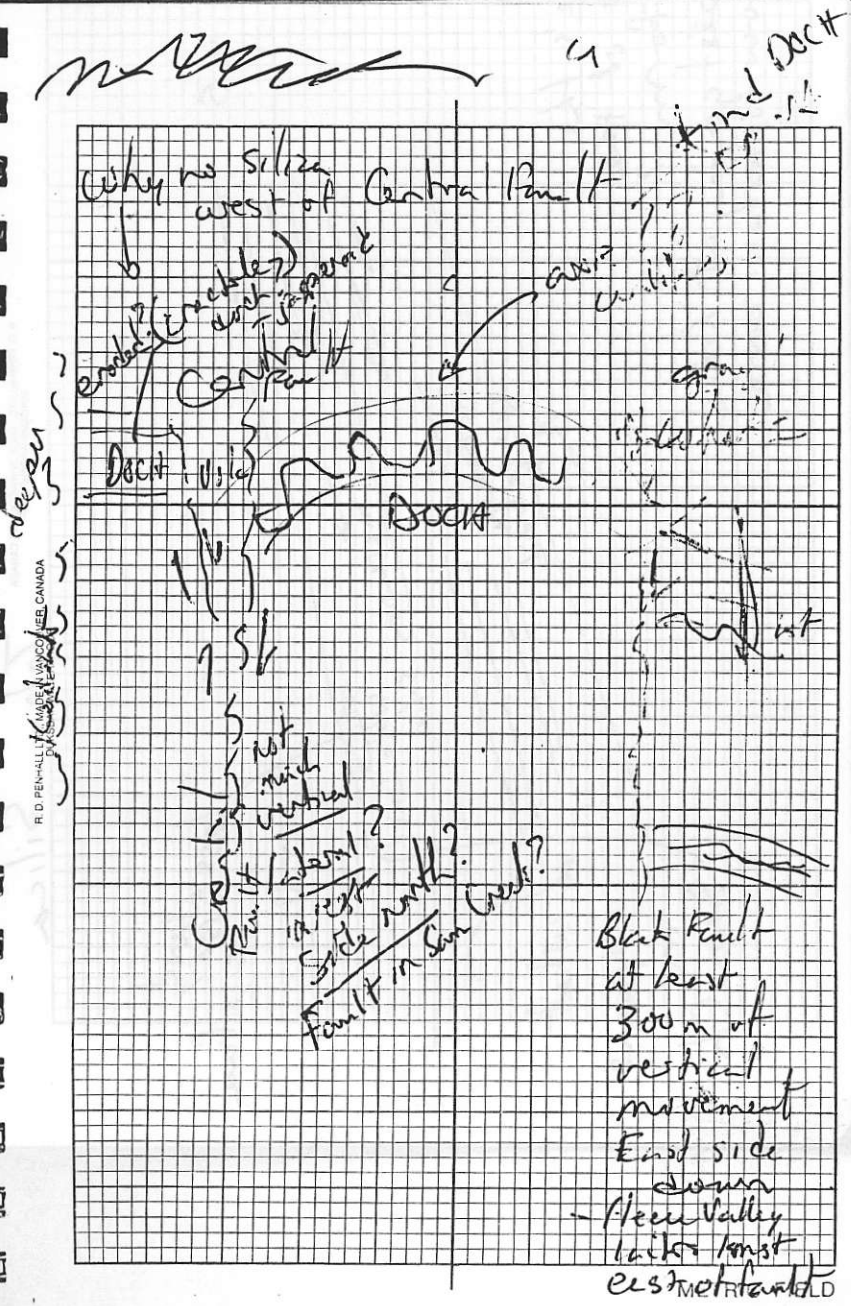


METRIC FIELD

71

Totem Silica Antiform

- a possibility
- hard to determine stratigraphically
- unlikely to involve Blacks and Central faults as 45% bedding plane faults
- does it plunge/dip north – pretty well has to keep favourable stratigraphy at surface!
- doesn't have right strike & dips for dip slope interpretation
- any 1st unit relatively thin?? – well bedded
- eroded volcanics & intrusive?



Age of Mineralization

Relative

- older than basalt dykes
- older than ~~movement~~ calcite breccias and recent karsts
- older than movement on some faults
  - Ursa
  -

only vertical tectonics

Sloko volcanism & intrusions (2nd)

faulting, folding

Jurassic intrusions (1st) guess

more extensive offsets to consider

- younger than Triassic volcanics
- younger than some/all Triassic intrusions
- younger than all significant folding?? - how to tell one bodies not folded
  - can we tell for sure

Absolute

Pb-Pb,

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Criteria for Depth of Zoning

- fluid inclusions
- metal ratios — alteration } also lateral
- mineralogy — ore
- width of system
  - wide/flaring near surface
  - tight deep?
- intensity of alteration?
- proximity to intrusion
  - also lateral
- style of deformation if roughly contemporaneous
-

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what about thrusting?