019785

REPORT OF ACTIVITIES FOR JULY

DENNIS BROWN

31/07/90

Core logging , pit mapping, and setting up databases for pit data were the major emphasis for July.

Detailed and production core logging continued through most of July. Production core logging ended last week of July. Detailed core logging consisted of 1:100 scale detailed discriptions of Vangorda core with selective sampling. Detailed core logging is continuing. All logs are, or will be, made available to the mine geologists.

The amount of pit mapping increased significantly during July as the remainder of the 1152 bench and the 1146 bench were opened up. Pit mapping was carried out on a 1:200 scale of pit walls, pit floor, and active shovel faces. Maps are included in this report. Data collected from pit mapping was entered into a Traverse database in PC-XPLORER and in spread sheets for orientation analysis. Up-to-date, 1:500 scale status maps were plotted and made available to mine geologists and engineers. The most recent status map is included in this report.

A number of F2 folds and faults have been mapped in the Vangorda pit. F2 folds are typically tight to isoclinal, doubly plunging (WNW to ESE. See attached stereo plot), with a well developed S2 axial plane cleavage, particularly in phyllites. Folds in the presently exposed pit wall are developed on a scale of 10's of metres. Locally, S1 is preserved in F2 fold hinges. Small scale, post F2 folds are also found. To date, post-F2 folds show no consistent orientation patterns or overprinting relationships.

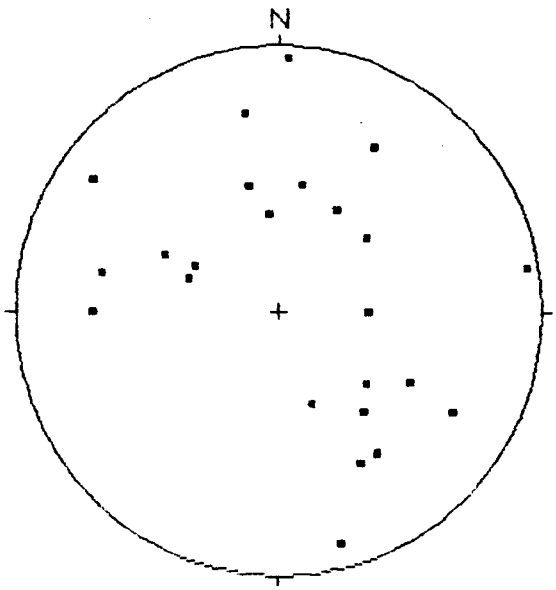
The S2 cleavage in the pit is everywhere axial planar to F2

folds. On the scale of the present pit limits, S2 has a random orientation suggestive of its being subhorizontal (see attached stereo plot). However, there appears to be three possible dip domains within the present pit wall. To the northwest, S2 dips towards the southwest, whereas further east S2 dips more towards the northeast, and in the south corner S2 dips south to southwest. More orientation analysis is in progress.

Faults in the Vangorda pit occur on a number of scales. Faults dip dominantly northwest/southeast, though no well defined maximum orientation exists (see attached stereo plot). Most faults are minor and cannot be traced over long distances. Several faults appear to be of major significance. In particular, the Sump Fault (see status map) in the south corner of the pit truncates the ore body and drops phyllites down in the hangingwall. Orientations of structural fabrics change across this fault. Recognitation of this fault lead to the area south of the fault, in the hangingwall, not being blasted and mined. Another possible fault of some significance may exist along the northeast pit wall where the overburden contact drops vertically. Across this drop in overburden, 3GO phyllites strike directly into 4EC footwall ore. Further, it is across this zone that there is a change in orientation of S2 and in structural style. This may be the 28 East fault.

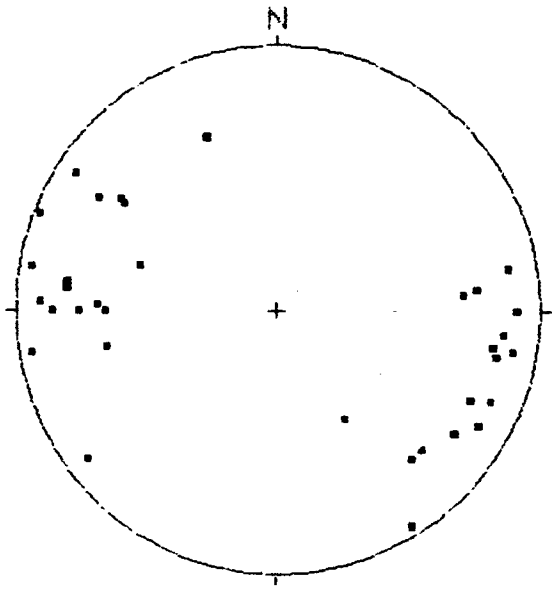
The plan for August is to continue both pit mapping and detailed core logging and to increase the present database and test data interpretations against present interpretations.

Faults



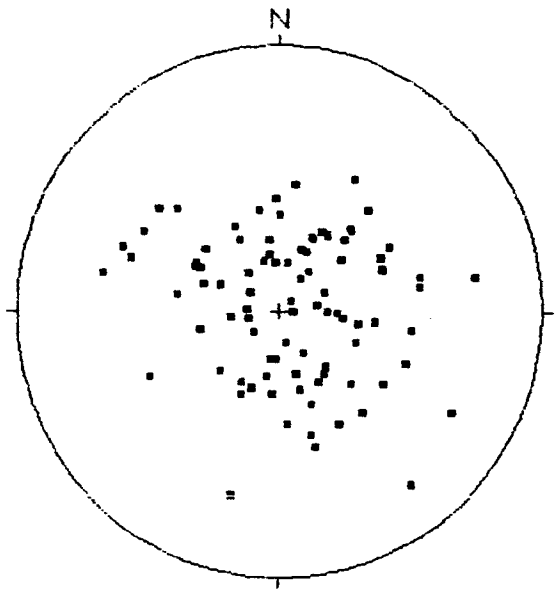
N = 25

L2 1152\1146



N = 34

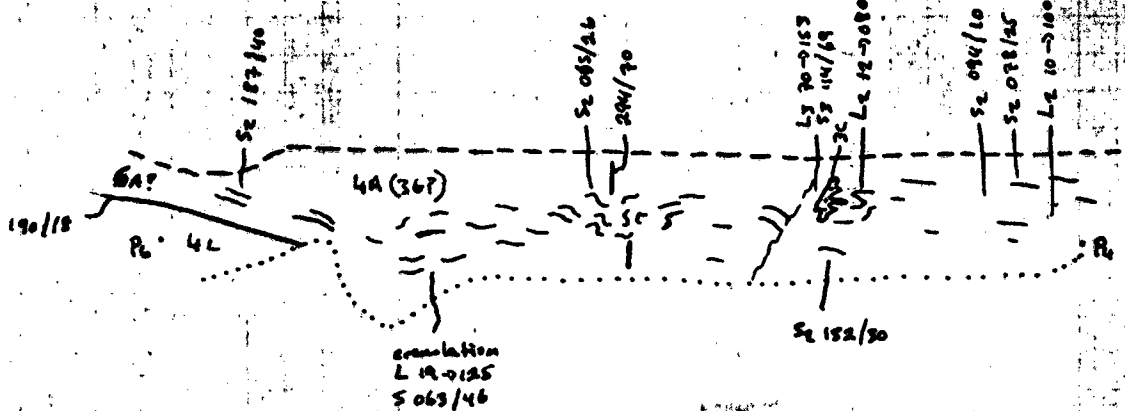
S2 1152\1146



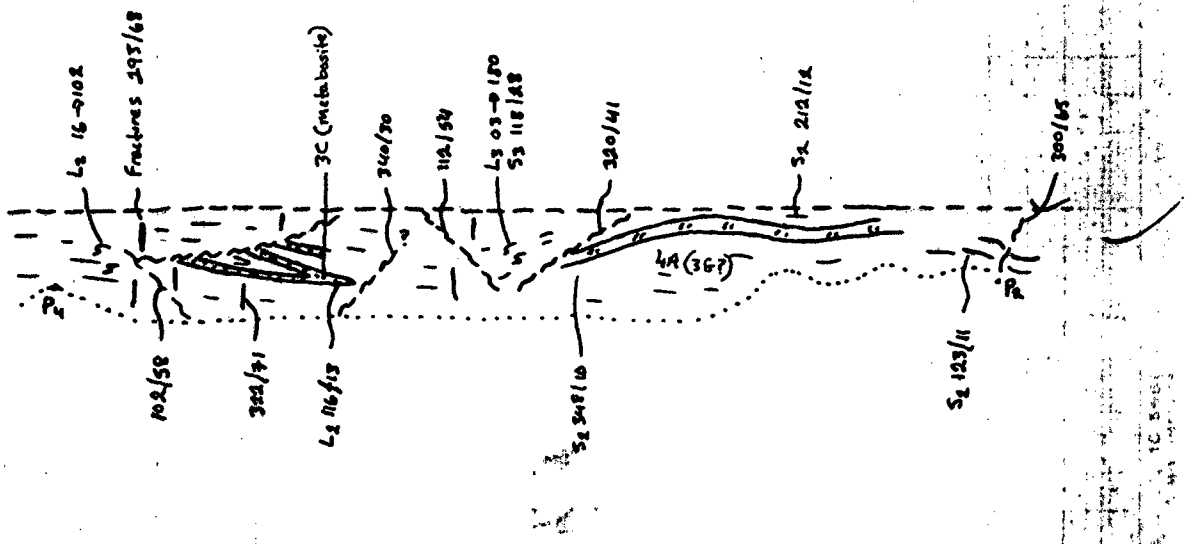
N = 93

Northeast face, Vangorda Pit. Bench 1150

Scale 1:250 06/06/90



Northeast face, Vangorda Pit. Bench 1150 Scale 1:250 06/06/90

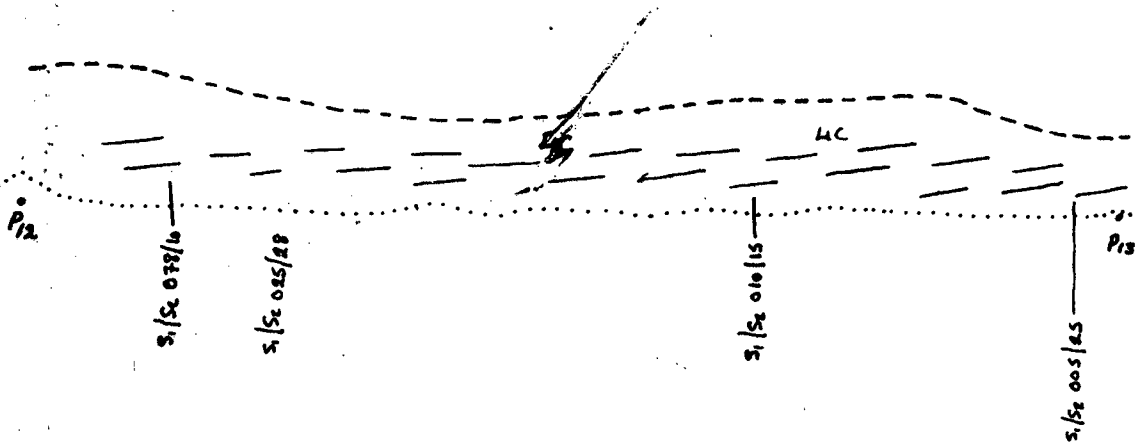


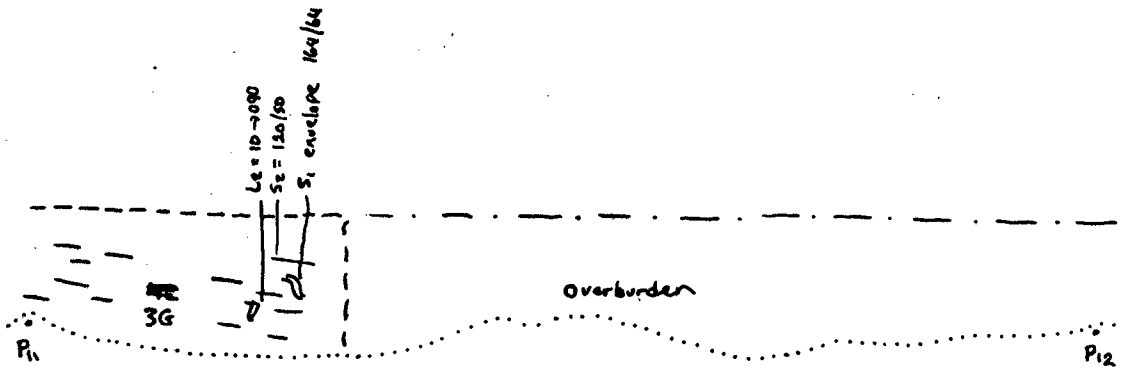
Vangorda Pit Bench 1150

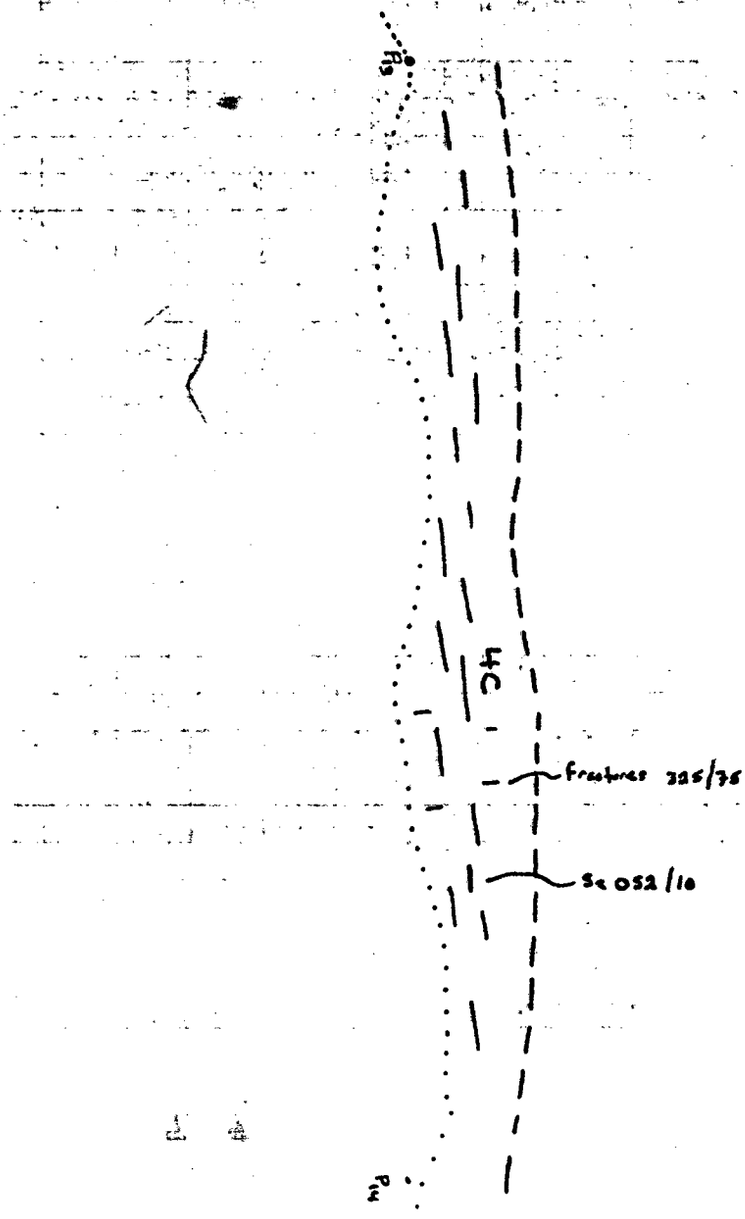
scale 1:200

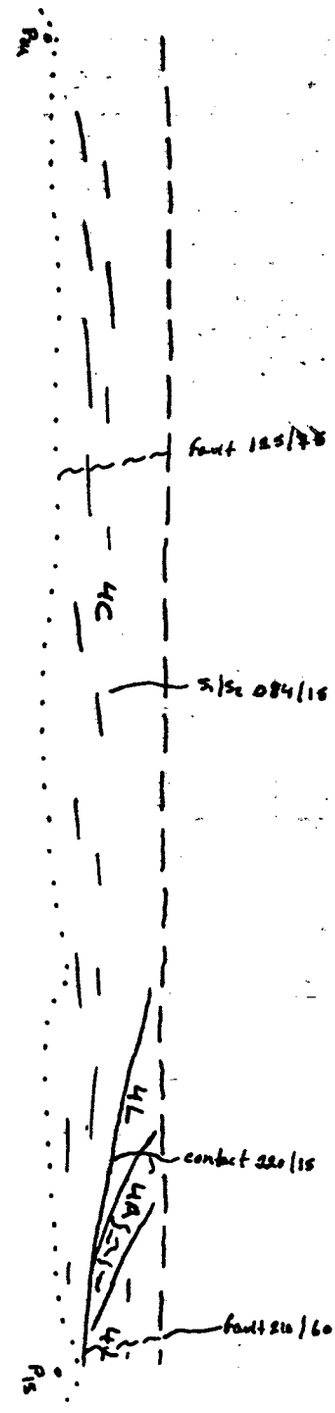
27/06/90

Vangorda Pit. Bench 1150 scale 1:200 27/06/90









Northeast face, Vangorda Pit. 1152 Bench

Scale 1:200

27/06/90

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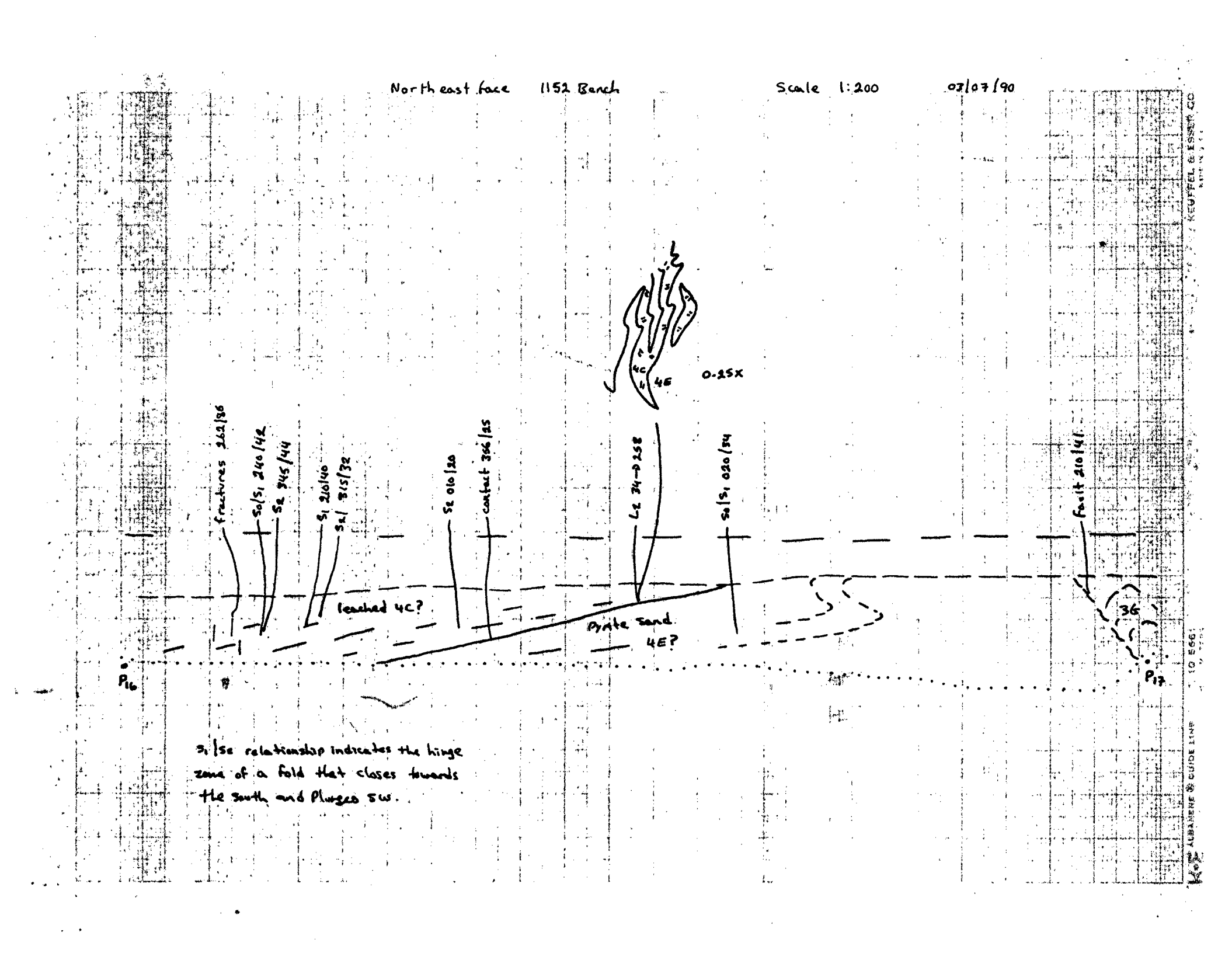
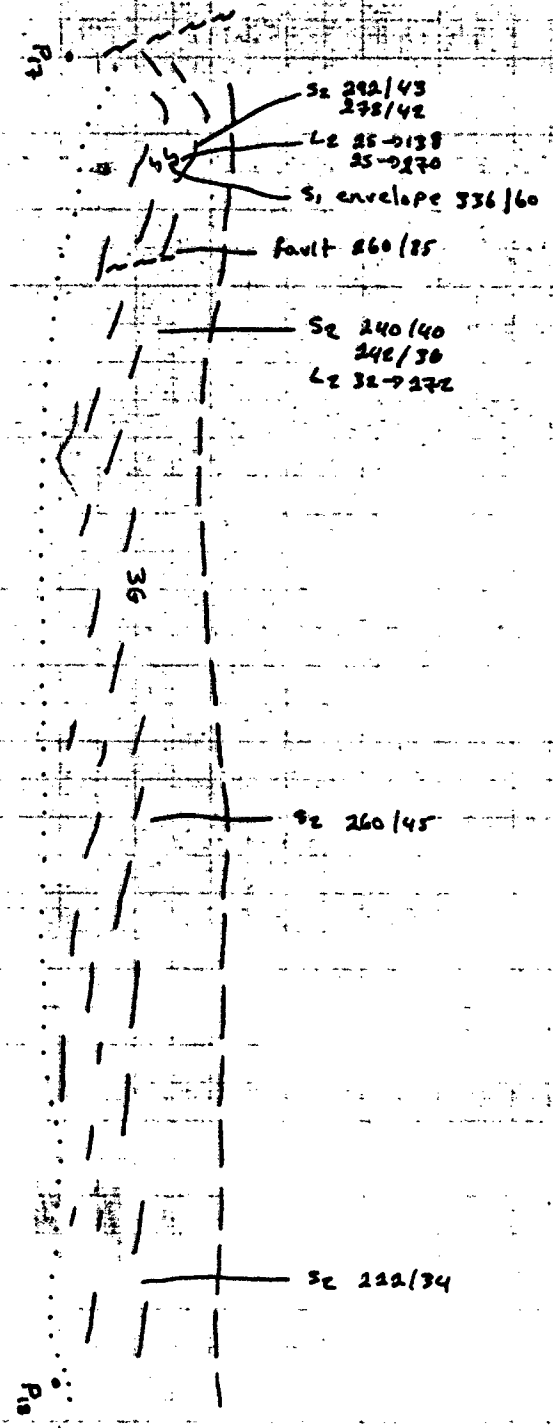
REUFFEL & ESSER CO


Northeast face 1152 Bench
Scale 1:200
07/07/90
0.25X
4C
4E
fractures 262/86
So/S1 240/42
Se 345/44
S1 210/40
Sz/ 315/32
Se 010/20
contact 356/25
Lz 34→258
So/S1 020/34
fault 210/41
leached 4C?
Pyrite sand
4E?
36
P16
P17
S1/Se relationship indicates the hinge zone of a fold that closes towards the south and Plunges SW.
KEUFFEL & ESSER CO
ALBANENE © GUIDE LINE
10 566



East to Southeast face, 1152 Bench

Scale 1:200

03/07/90

East to south pit face, 1152 Bench

Scale 1:200

04/07/90

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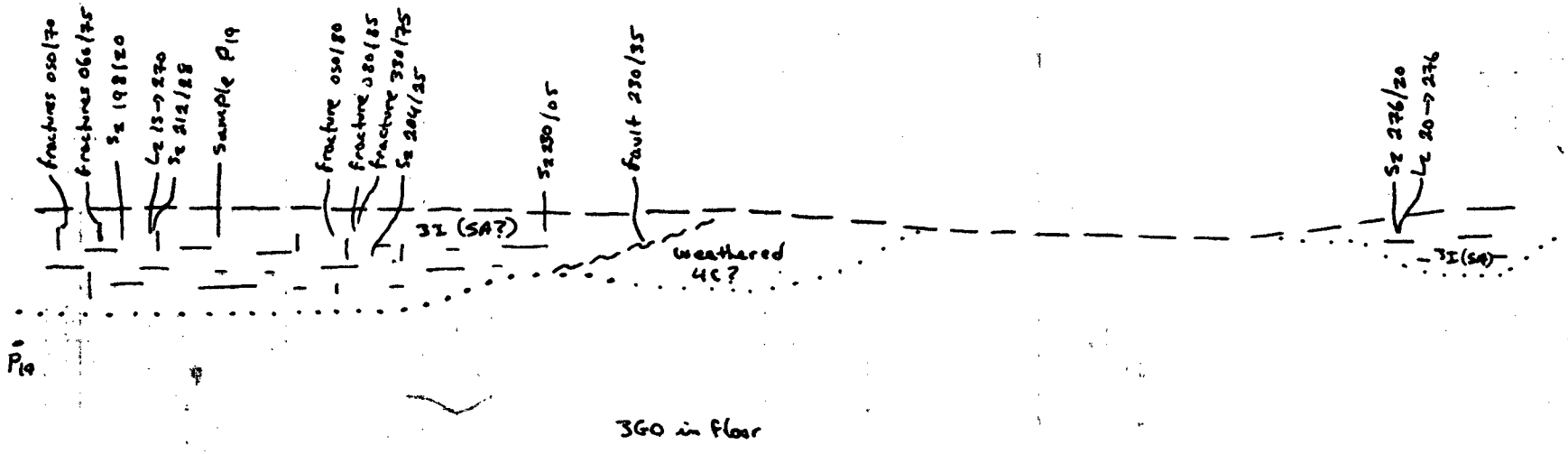
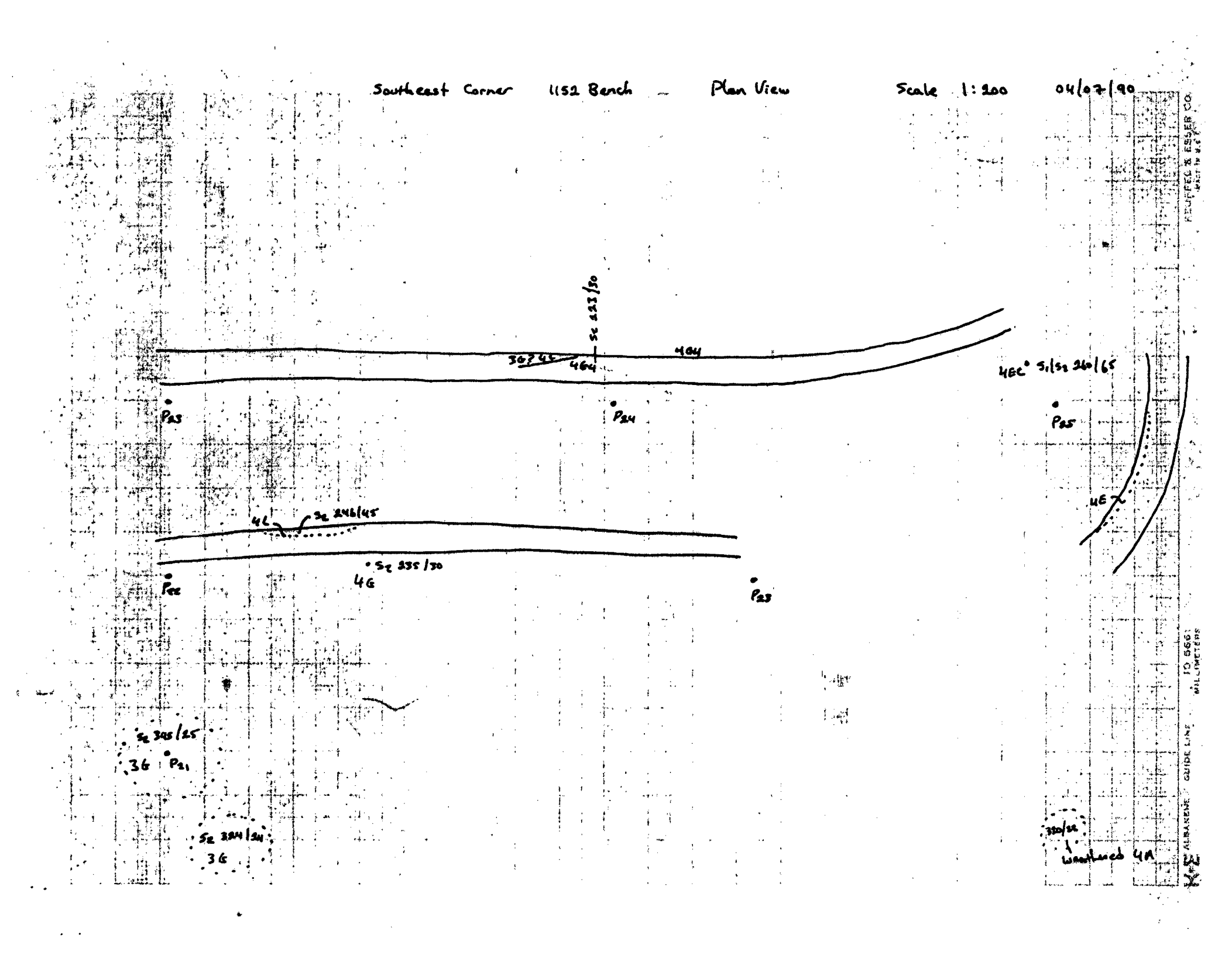
Southeast Pit limit, 1152 Bench Scale 1:200 04/07/90



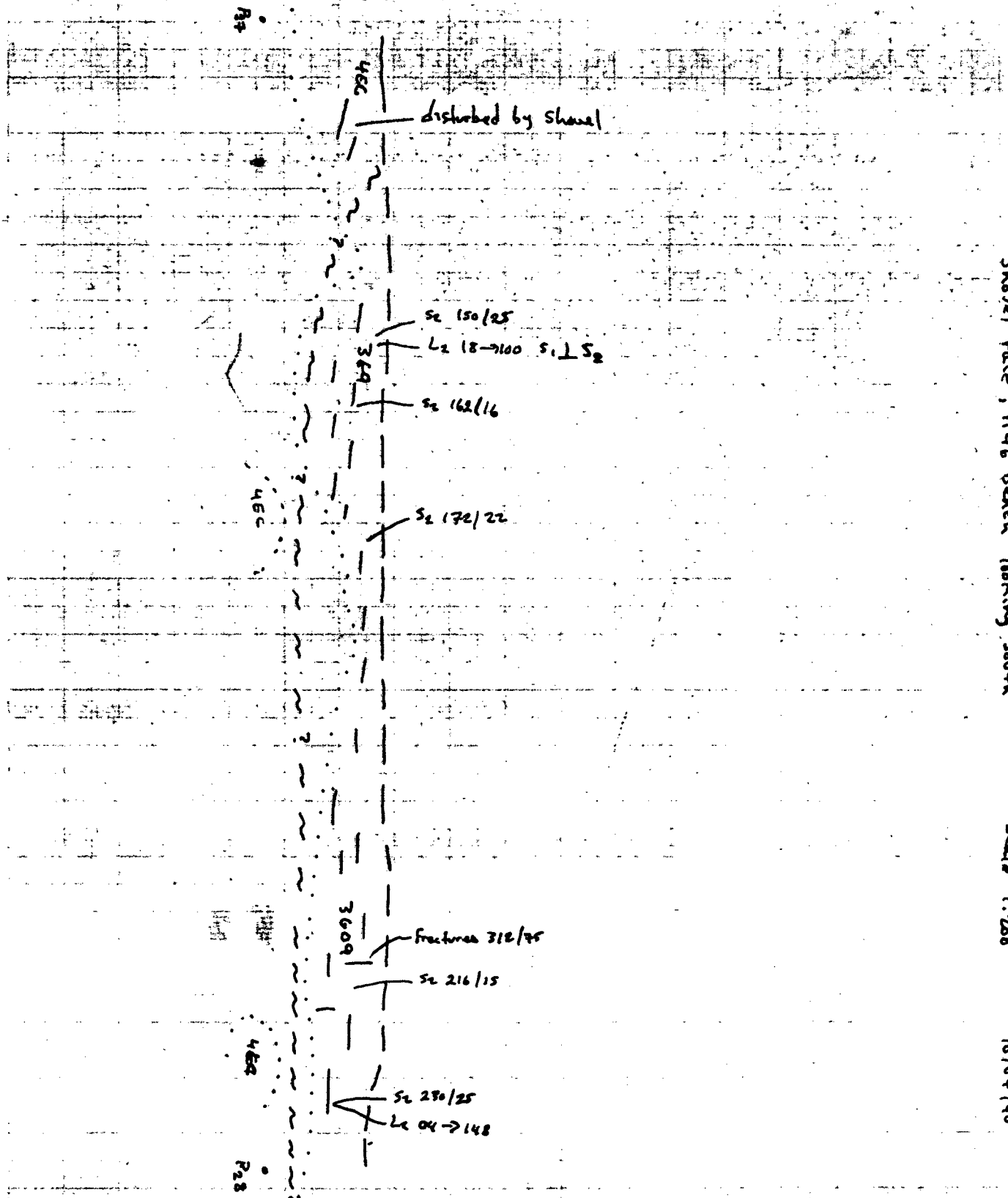
3GO in floor


Southeast Corner 1152 Bench — Plan View Scale 1:200 04/07/90
Sz 123/30
30/45
464
464
P23
P24
P25
4EC Sz 246/65
4E
Sz 246/45
4E
Sz 235/30
4G
P22
P23
Sz 345/25
3G
P21
Sz 334/24
3G
320/22
continued 4A

Sheet face, 1146 Bench looking east

Scale 1:200

10/07/90



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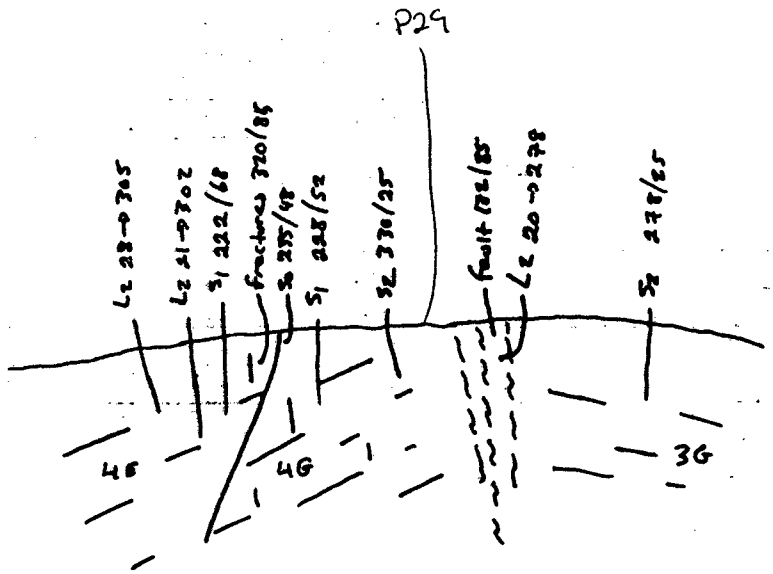
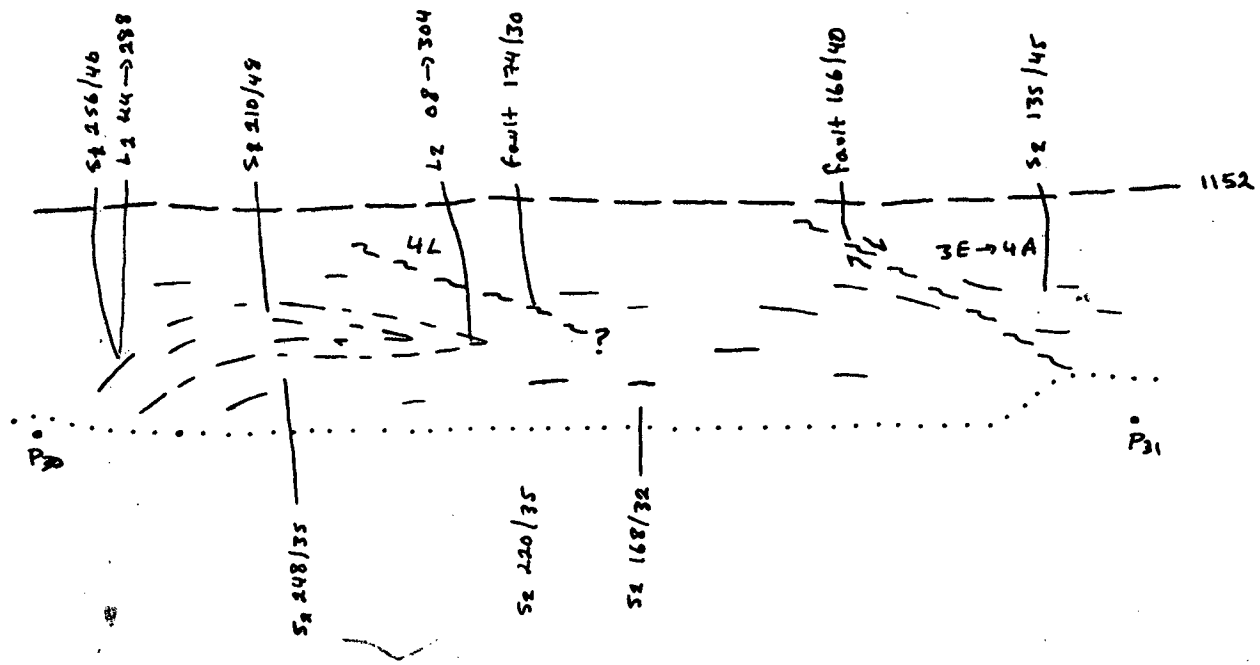
East face of sumpping hole, southeast corner IISE Bench Sections 30:00 to 31:00



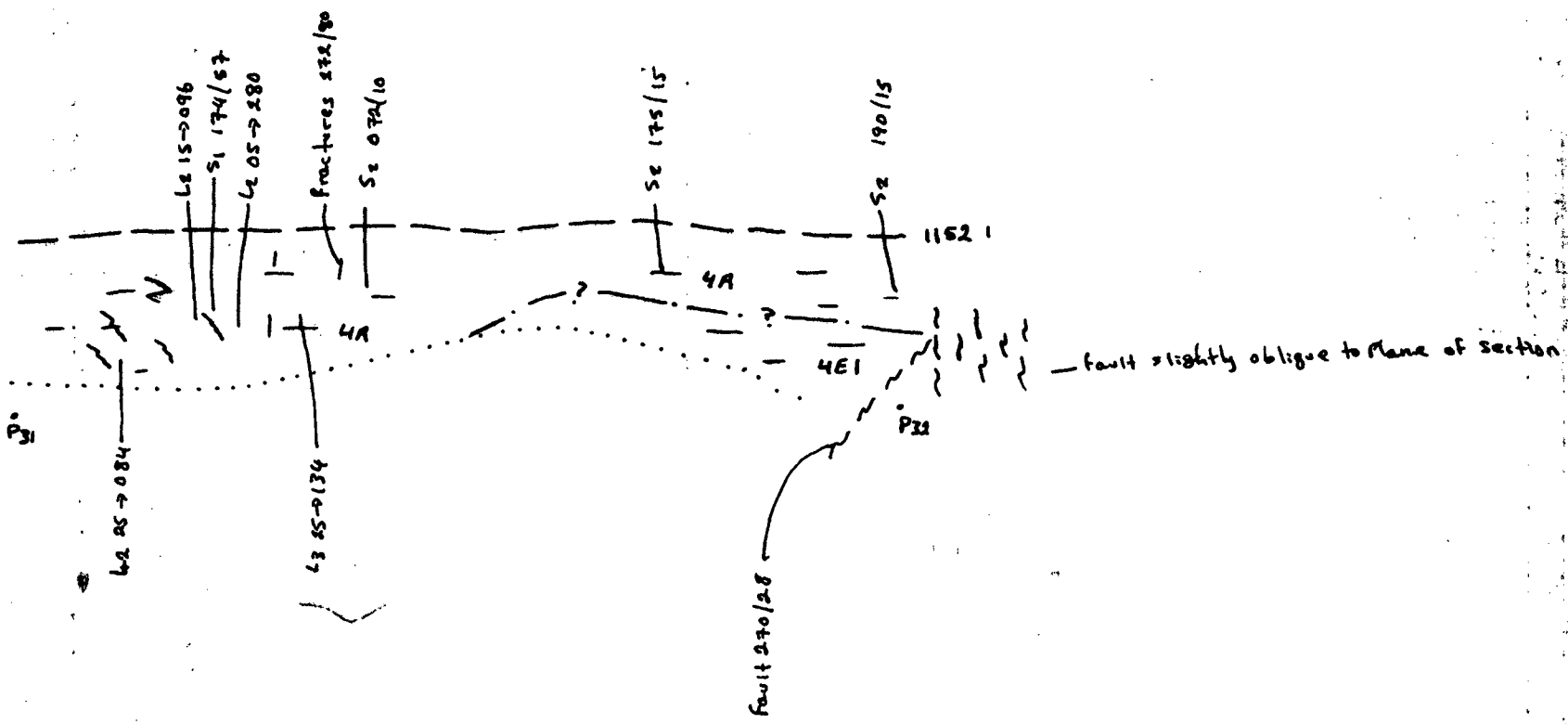
1 metre

Northeast face 1146 Bench Scale 1:200 24/07/90



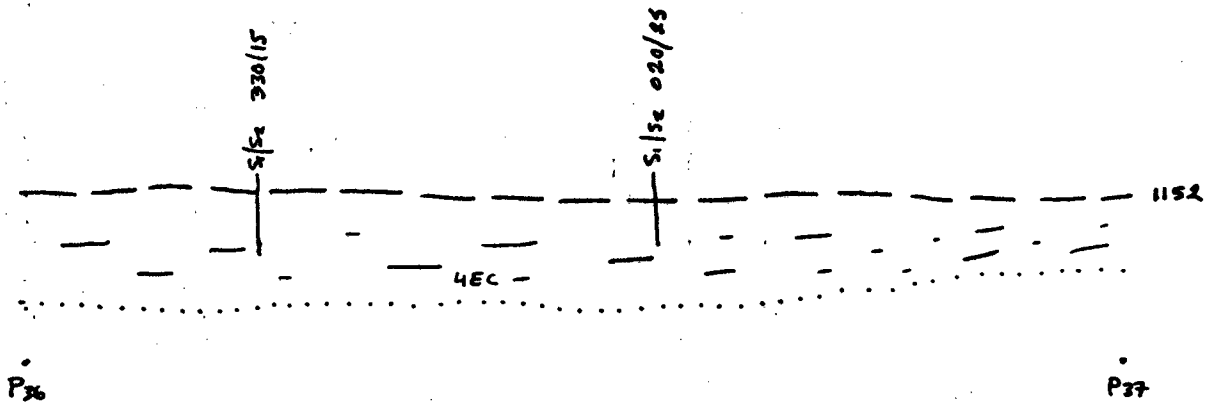
Northeast face 1146 Bench

Scale 1:200 24/07/90

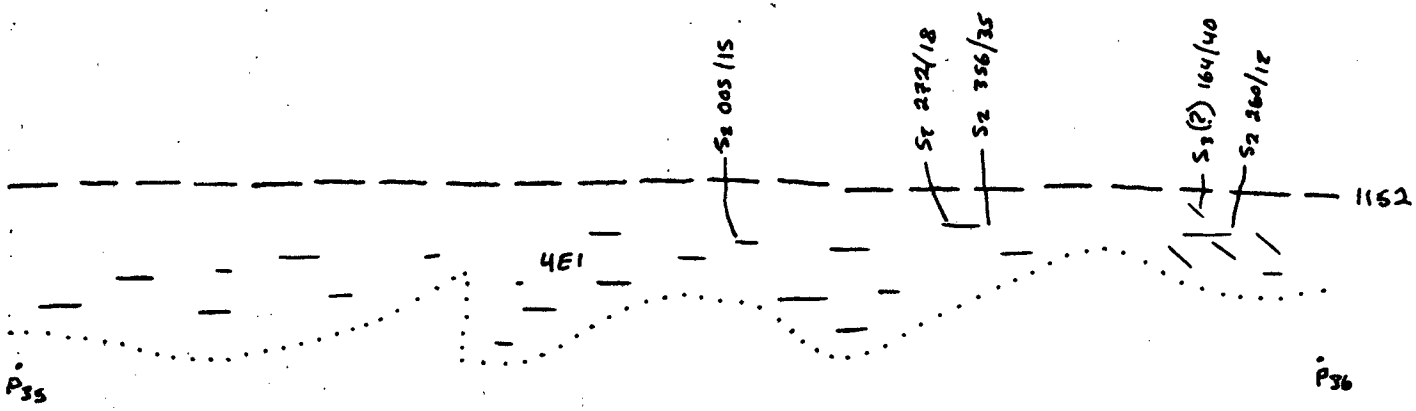


Northeast face 1146 Bench

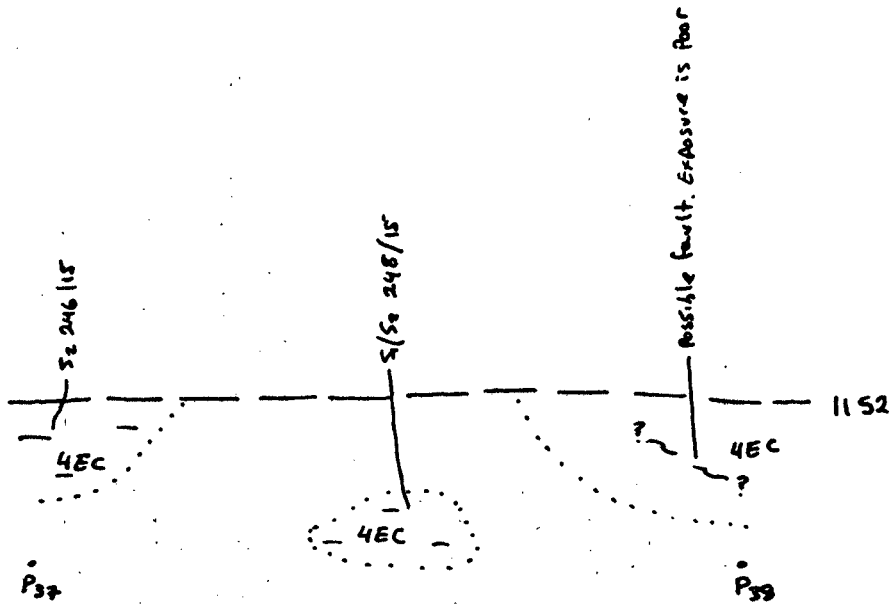
Scale 1:200 24/07/90



Northeast face 1146 Bench Scale 1:200 25/07/90



Northeast face 1146 Bench Scale 1:200 25/07/90



Northeast face 1146 Bench

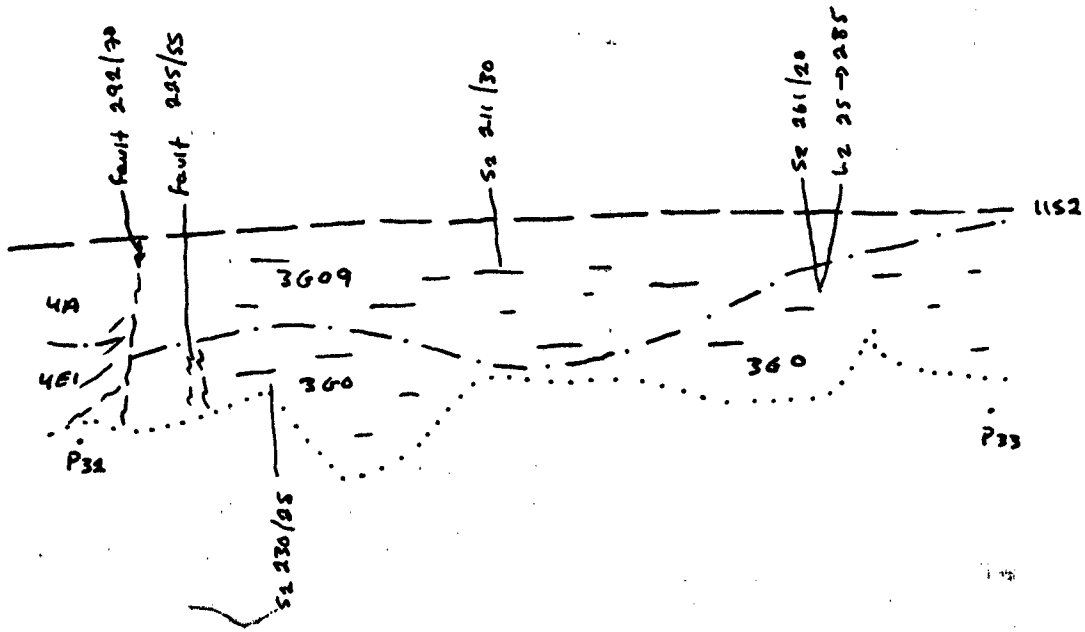
Scale 1:200

25/07/90

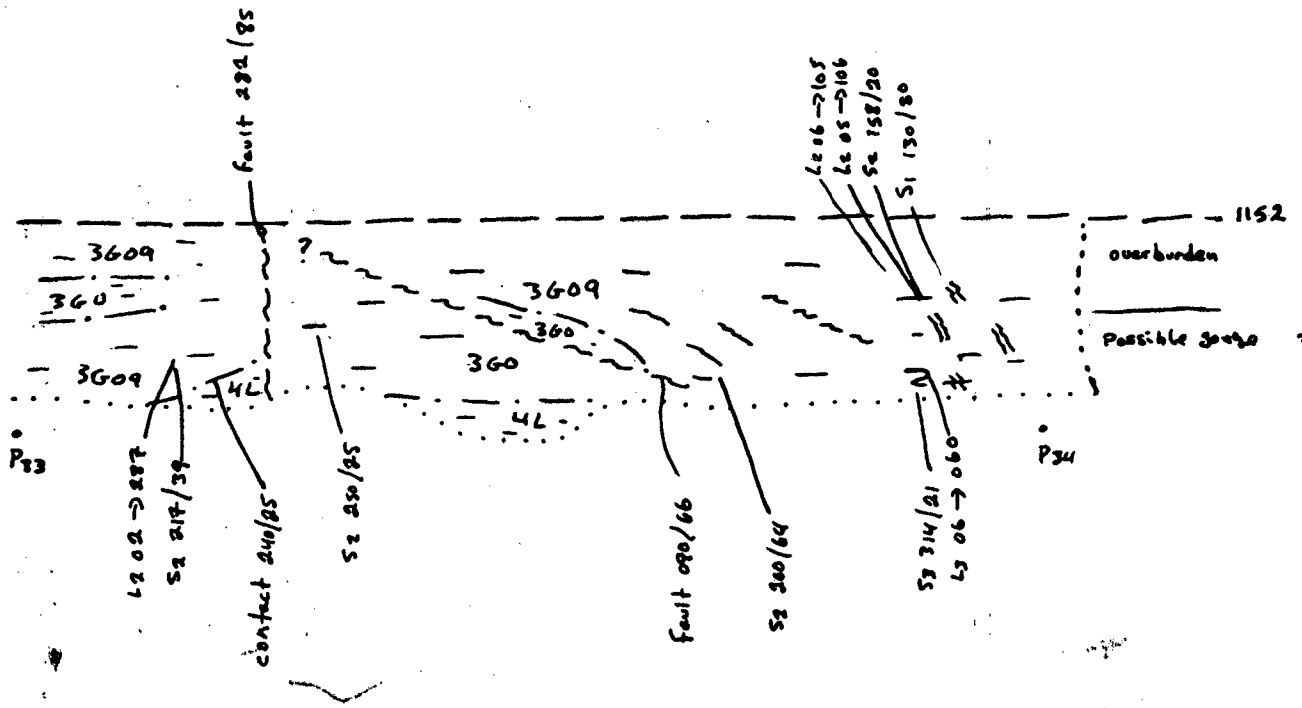
Northeast face 1146 Bench

Scale 1:200

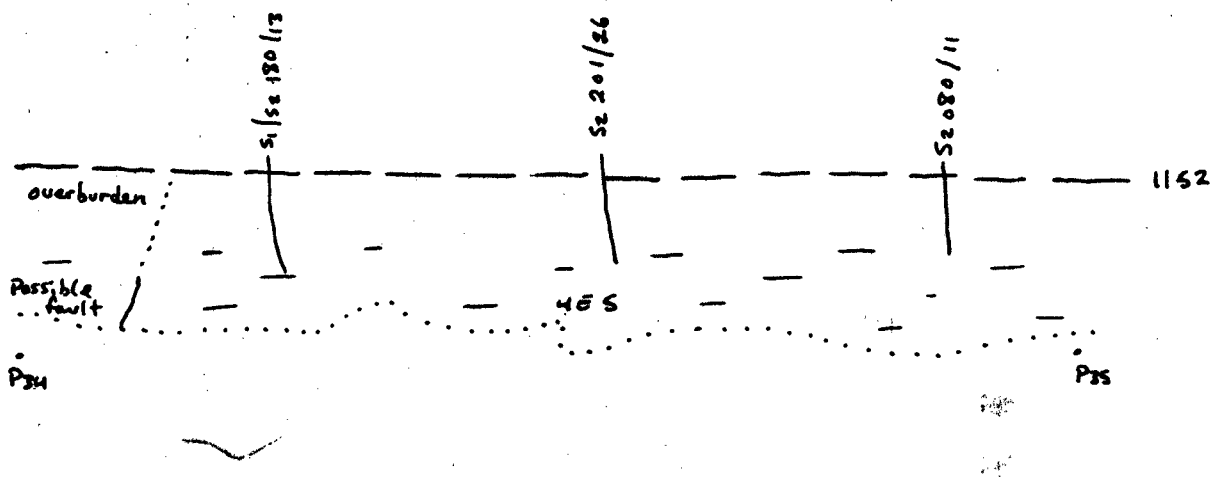
31/07/90



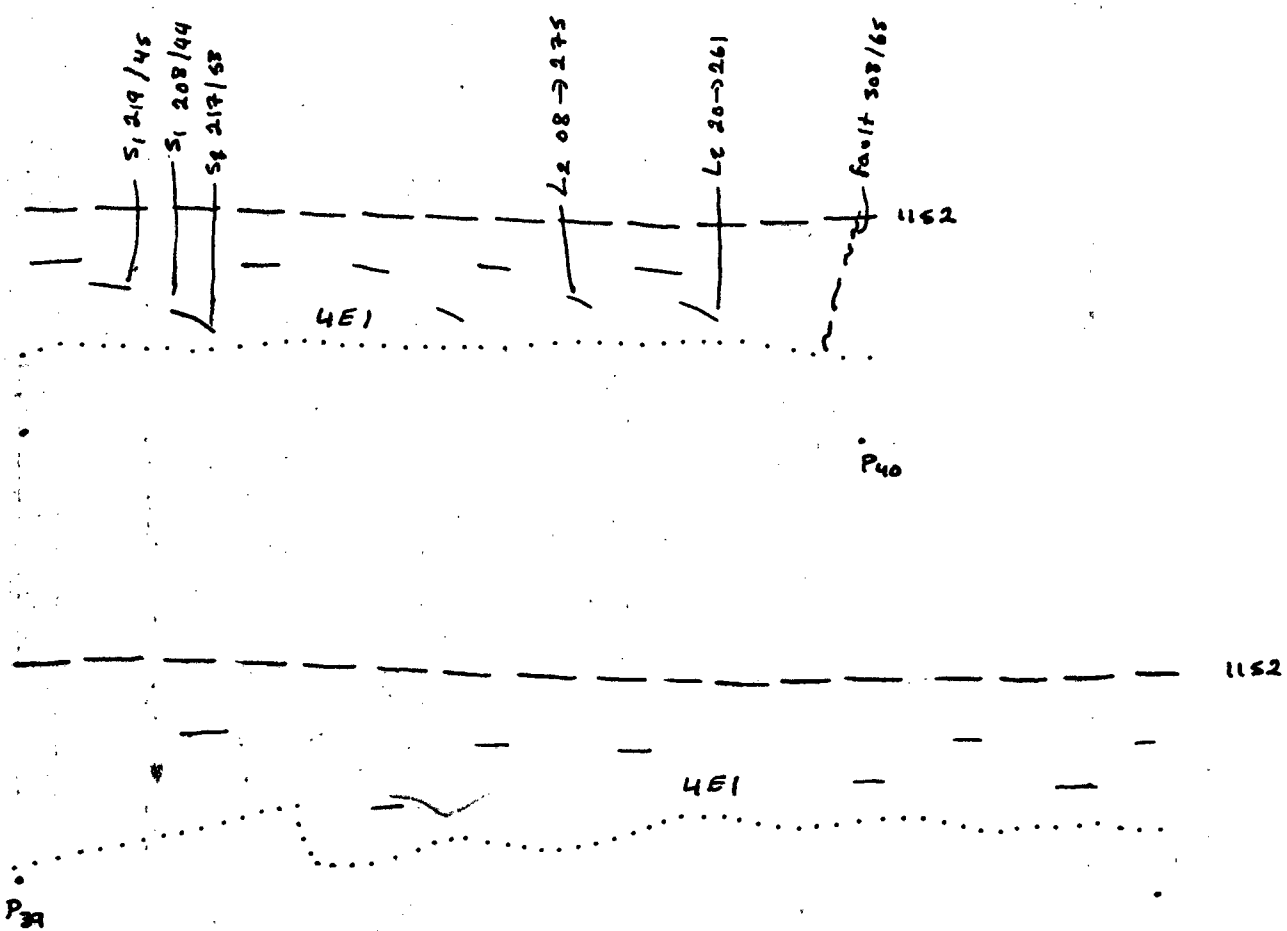
Northeast face 1146 Bench Scale 1:200 31/07/90



Northeast Face 1146 Bench Scale 1:200 31/07/90



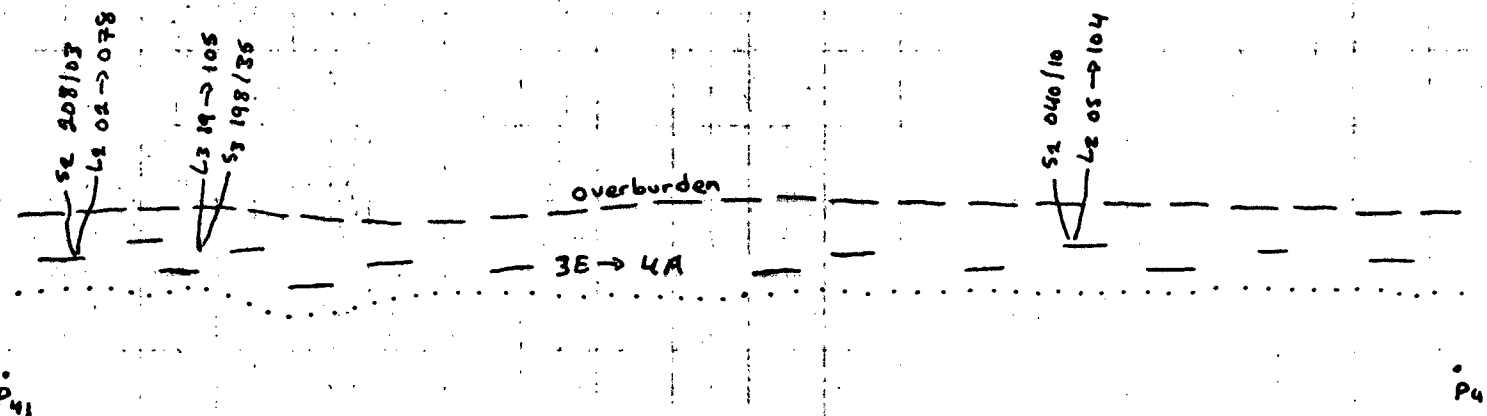
Northeast face 1146 Bench scale 1:200 31/07/90



South face 1146 Bench

Scale 1:200

31/07/90



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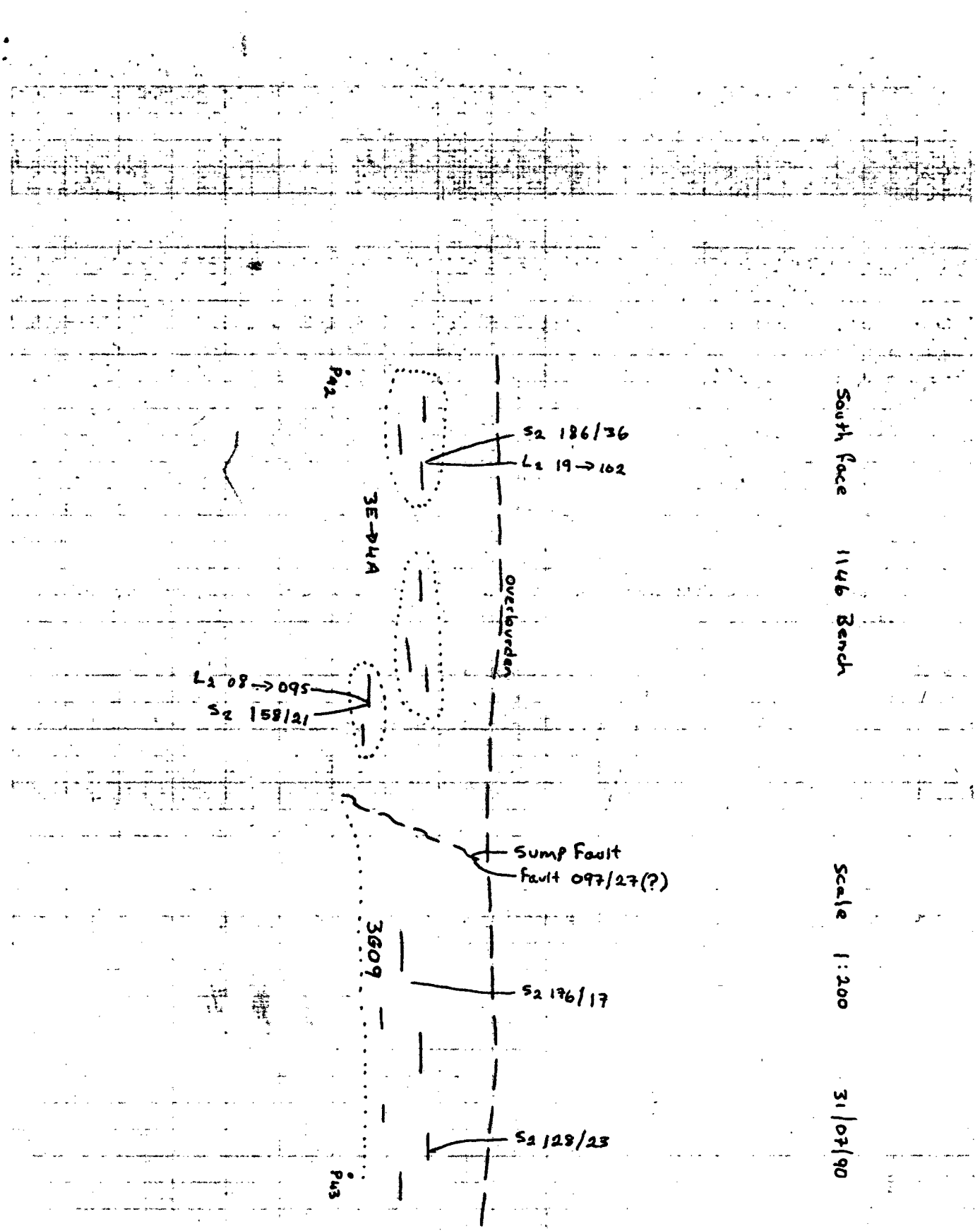

South face 1146 Bench
Scale 1:200
31/07/90
P42
S2 186/36
L2 19→102
3E→44A
overburden
L2 08→095
S2 158/21
Sump Fault
Fault 097/27(?)
3609
S2 196/17
S2 128/23
P43

South face 1146 Bench

Scale 1:200

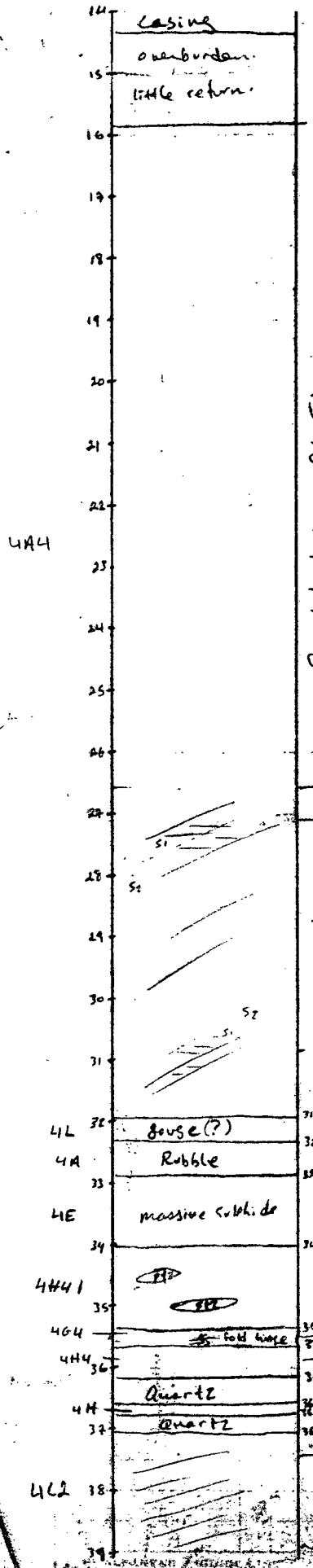
31/07/90

18/06/90

Vertical

DDH V90-115-CL Section 4400E

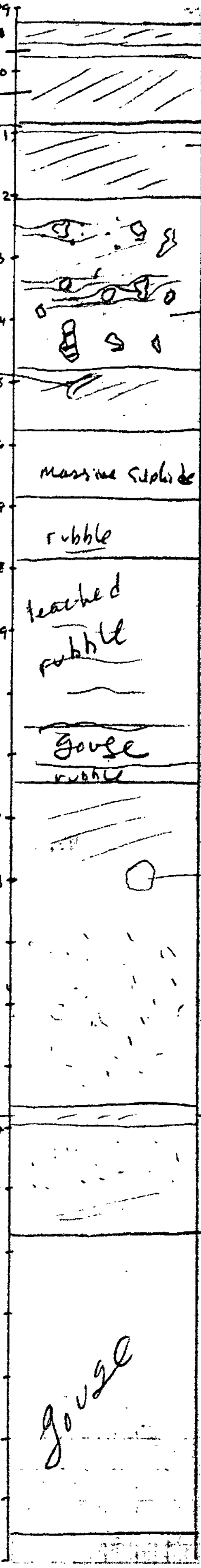
scale 1:100



- weak S_1 (S0?), asymmetry in Z
  S_1 dips 42° towards 180° relative to S_2
- S_2 is defined by graphite and sphalerite.

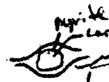
- pyrrhotite facies massive sulphides with quartz rods.
- quite rotted → possibly from groundwater leaching.

- color gets lighter green towards the lower contact
- Repeatedly deformed S_2 → no indication of $S_1 // S_0$



39 — S_2 = 30° - L_2 inreclined — contact is sharp and sheared — layer parallel slip?
3D?8 — 39.23 — contact dips 30° //S_2
3H — 39.56 — S_2 (S_0?) = 52° — porphyroblastic pyrite
39.71
40 — S_0/S_1 (S_2?) 35°
4E — Minor banding in an otherwise massive sulphide.
40.84 — contact dip 43° // $S_0/S_1/S_2$
4H48 41 — ductile flow breccia
4G48 — S_0/S_1 40° — 0.2 to 3 cm - wide bands of massive sulphide in a barite matrix
S_0 = 23°
42 — 42.06 — contact dips 40° // S_0

Flow Breccia (43–44.80)
- clasts rimed by pyrite → Pyrrhotite + sphalerite



- Ductile flow breccia containing clasts of qtz and carbonate up to 2cm across, larger clasts tend to be carbonate. Also - a 5 cm long clast of phyllite
- breccia is baritic for the first 40 cm - then is dominantly Pyrrhotite ± magnetite

DB-90-51

Photo's 3-21, 3-22 ductile flow breccia with quartz and phyllite clasts

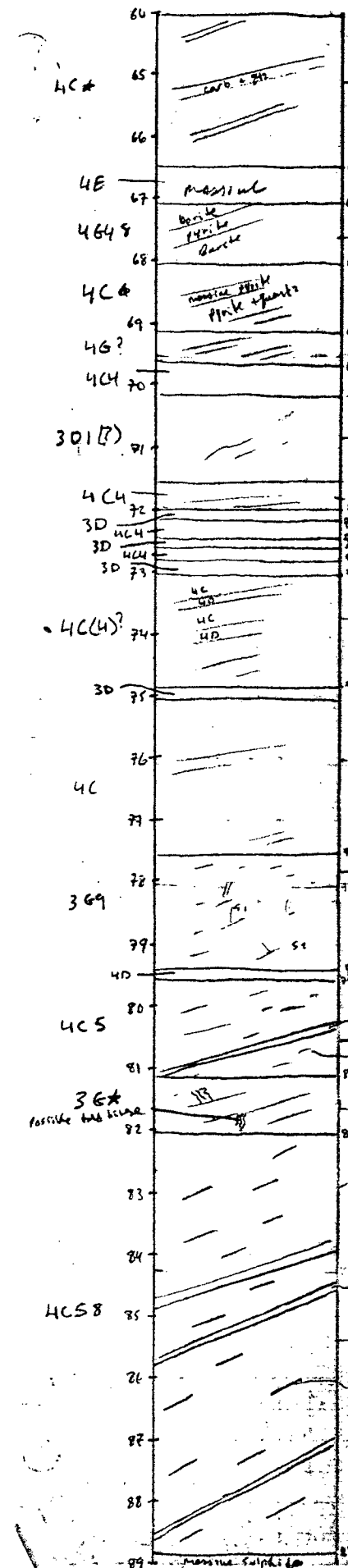
Photo 3-23 gouge in ore horizon

44.80
small fold hinge 45 — S_0/S_1 75°
4G48
- Sulphide banded baritic ore
- contact with breccia is not apparent — in fact this may be brecciated!
45.78

46
4E — massive sulphide — no fabric - broken up.
46.88
47
4G4 — rubble — broken-up and leached → beginnings of fault zone?
47.85

48
49 — leached and rubbley 4E with a 40cm wide gouge zone near the bottom
4E8
50
51
51.42

52 — faintly banded towards the top becoming massive downwards.
S_0 = 55°
53 — quartz + galena + sphalerite + pyrite pod — DB-90-52
4E 54 — pretty much a massive sulphide with very little fabric. Some indication of brecciation
55
56
(3C?) 4L — 56.66 — S_2 = 65° weakly banded.
57 — 56.81
4E?* 58 — inhomogeneously banded
- Some Pb - Zn in bands of sphalerite veins + carbonate.
58.70
59
60 — - sulphide sand in a gouge zone.
61
62
63
4E 64 — leached



64.06 – crudely banded with 1-2 cm wide carbonate+qtz bands.

S_0(?)56° – variably leached.

– local coarse-grained galena.

66.50

67.11 – contact dips 65°

4648 – S_0 = 50 – weakly banded with

68.06

$S_0 \| S_2$ = 68° 1-2 cm wide massive pyrite bands interlayered with pyrite+quartz+carbonate bands

69.19 – gradational contact

69.55 massive pyrite interbanded with barite(?) towards one. chalcopyrite in fractures.

70 inhomogeneous by and poorly banded, Porphyroblastic galena. 3cm wide leached zone near top.

71.17 – contact is sharp.

S_2 = 45° very siliceous with bands of chlorite + muscovite. sharpness of contacts suggests and intrusive.

71.65 – sharp contact.

$S_0 \| S_2$ 75° weakly banded, rich in galena but no sphalerite.

72.01

72.14 sharp contacts

thin intervals of chlorite + muscovite and quartz (3D?) with short contacts interlayered with galena-bearing pyrite-quartzite. Galena appears to predominantly (at least coarse-grained) along contacts with 3D. DB-90-53 galena along contact with 3D

73.48

73.72

73.86

73.05

$S_0 \| S_2$ = 85° poorly banded, possibly galena-bearing (?) pyritic quartzite. chalcopyrite.

74.83 – sharp contact $\| S_2$

$S_0 \| S_2$ = 80° very poorly banded to blotchy, with no Pb-Zn

77.60 Lower contact is gradational over ≥10cm

S_2 = 75° – wispy S_2 foliation defined by graphite.

– weak $S_0 | S_1$ at a high angle to S_2 – asymmetry is M to Z.

79.40

79.56

massive sulphide bands

S_2 = 85° $\| S_0$ – wispy carbonaceous S_2 parallel to $S_0 | S_1$ (defined by massive pyrite bands)

carbonaceous S_2

81.58 – Porphyroblastic pyrite

– Possibly galena.

S_2 = 70 – L_2 plunges 53° calcareous banding at and angle to S_2 → asymmetry may be M

82.02 – lower contact is sharp.

– 1-10 cm wide massive pyrite bands. Pyrite in bands is typically fine-grained.

– Pyrite in quartz-rich bands is coarse-grained and porphyroblastic.

– wispy S_2 defined by graphite.

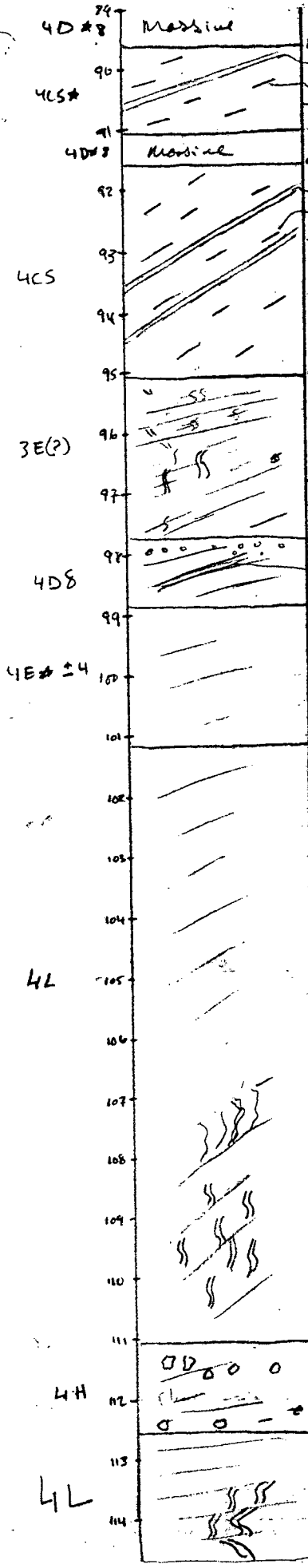
massive pyrite (S_0)

– muscovite (?) on S_2 surface.

$S_0 \| S_2$ 76° – galena ?

graphite (S_2)

89.32 lower contact is sharp dips 72° $\| S_2$



massive sulphide
- lower contact is sharp
- massive sulphide = S_0
- graphite — S_2
- $S_0 \parallel S_2$ 64°
- sharp contact.

- Poorly banded
- wispy S_2
- carbonate-rich.

massive sulphide-S_0
graphite-S_2
— $S_0 \parallel S_2 = 65°$

- asymmetry is Z-M but dominantly M.
- muscovite-rich.
- pyrite

$S_2 = 85°$ - L_2 pitches 145°

- contact is gradational

$S_2 = 65°$ — sphalerite-rich bands (S_2?) and sphalerite-rich breccia near top. whole interval may be a breccia? DB-90-54

sph+mg+py

($S_0 \parallel S_2$?) 25° — extremely discontinuous and inhomogeneous banding of pyrite.
- minor chalcopyrite

- sharp contact

$S_2 = 68°$ L_2 pitches 0°

— The top 5.75 meters is $S_1 \parallel S_2$ → at least S_2 is the only fabric visible.
- Locally sulphide bearing. Sulphide bands are parallel S_2

S_2 dominant fabric
$S_2 \parallel S_1$

$S_2 = 74°$ - L_2 pitches 150° ew

— From 106 meters to bottom of hole, S_1 is at a high angle to S_2 → asymmetry is M.

sharp contact & S_2
- flow breccia
- less pyrrhotite and more quartz-rich towards bottom of interval
DB-90-55

$S_2 = 70°$ - L_2 pitches 0°

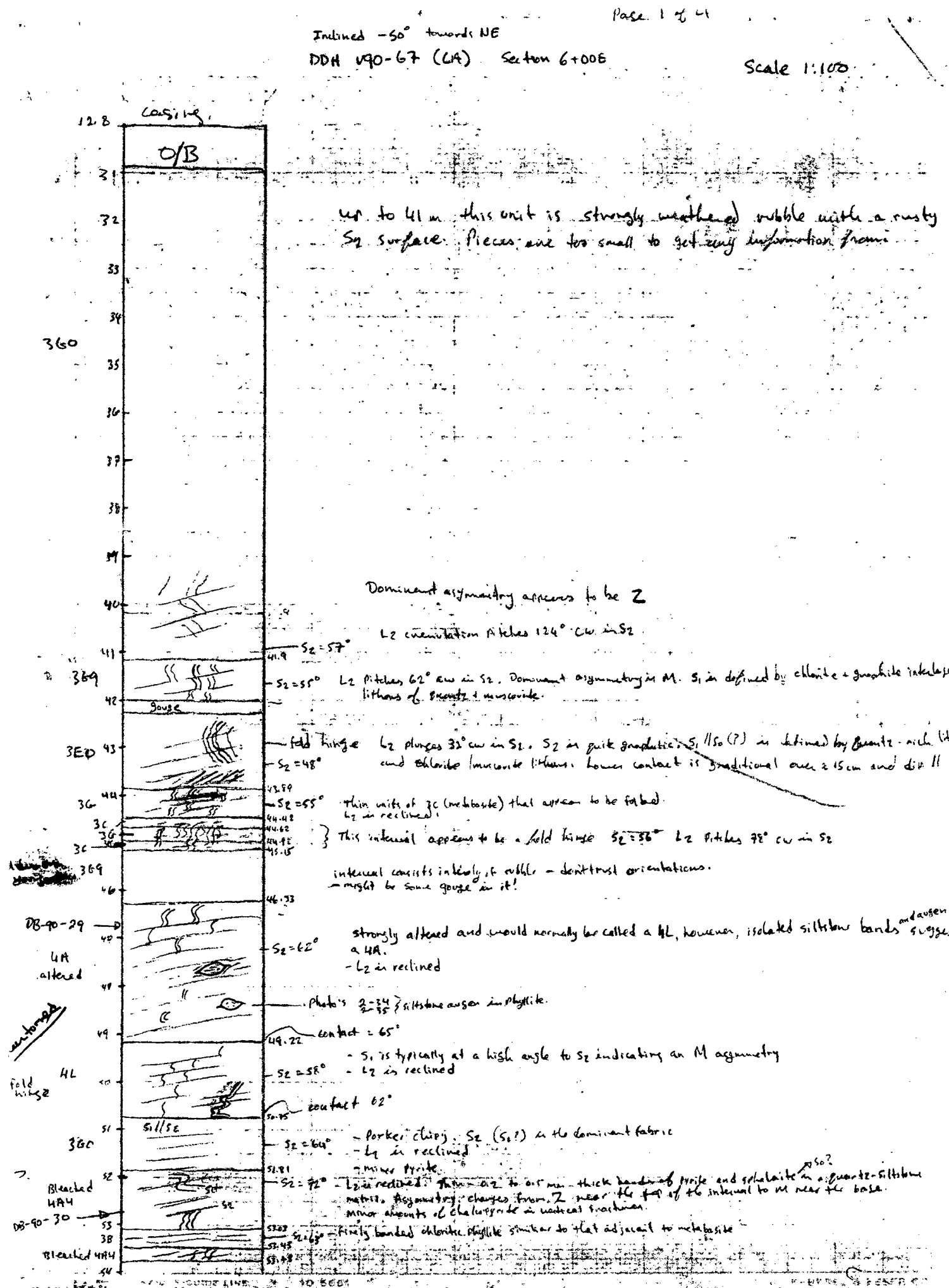
— $S_0 \parallel S_1$ perpendicular to S_2 → fold hinge

$S_2 = 74° \pm L_2$ pitches 0°

Inclined −50° towards NE

DDH V90-67 (C4) Section 6+00E

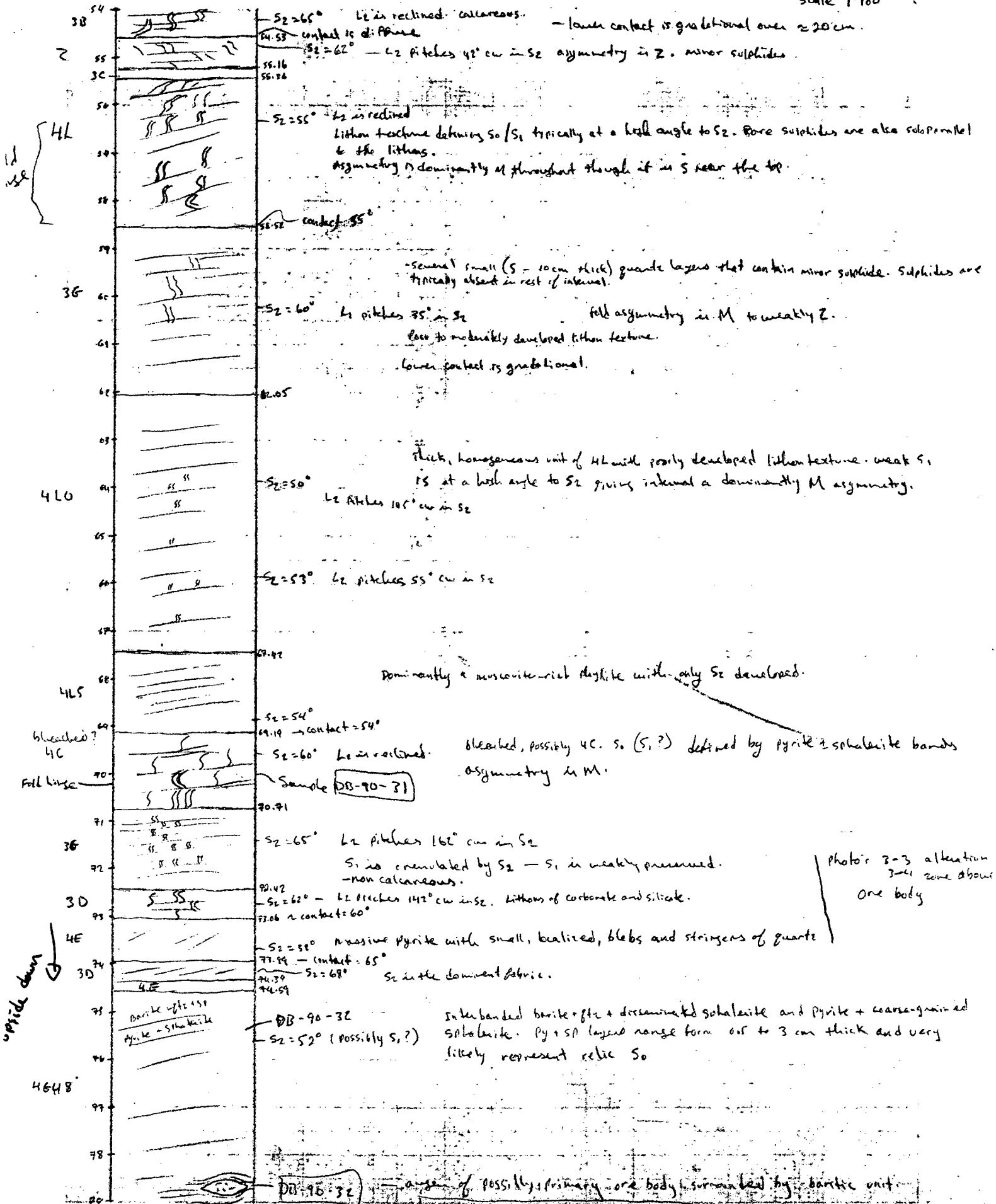
Scale 1:100



Inclined -50
Section 6+00E
DDH V90-67 (CA)

Page 2 of 4

scale 1:100



79.75 — Lower contact is a gouge — bottom 4 cm of barite zone in massive pyrite.

80

81 Gouge — Centimeter sized coherent bits in gouge are 3D. At least they are calcareous and chloritic. Also, there are quartz fragments.

82.11 — thin interbands of barite + quartz and sulphides (pyrite + sl). Magnetite occurs locally. random quartz blebs. Total Pb + Zn is probably low

4B4 83 — $S_2 \approx 60°$

84.0 / 84.16 Flow breccia — brecciated clasts of quartz and sulphides in a sphalerite + pyrite porphyroblastic matrix. sphalerite-rich for ≈ 3 cm on each side of breccia. Sample DB-90-34

4G4 85 pyrite + sl. / barite + qtz + mag — $S_2 = 65°$ Unit is much more magnetite-rich, and sulphide layers are thicker (0.5 - 1.5 cm) than above the breccia. Discontinuous lillims of quartz + dolomite(?) and quartz + magnetite. All fabrics appear to be transposed in S_2. Local blebs of c

86

86.55 — lower contact is sharp and fault. Clasts of phyllite along contact.

87 — $S_1 : 68°$ massive(?) pyrite, magnetite, barite, sphalerites brecciated zone. — Sample DB-90-35

~ contact ≈ 55°

— $S_2 = 58°$ very sphalerite-rich breccia. 0.2 - 0.5 cm thick bands of pyrite near top of interval grading to disseminated pyrite by the middle. The amount of quartz also decreases towards the bottom. Chalcopyrite filled fractures. DB-90-36 — ≥ 15 % sphalerite

88 88.19 — contact, 68°

pyrite / barite + mag — $S_2 = 64°$ Massive sulphide with thin bands of barite + magnetite defining S_2. — isolated quartz blebs. may contain carbonate — very little Pb - Zn

4E6A 89 pyrite — Fold hinge — fold hinge defined by massive sulphide band; grades downhole into a 4E — lower contact is gradational

89.61

90 — $S_2 = 70°$ thin interbands of sulphides and barite. At the top of the interval the bands are ≈ 0.2 - 0.5 cm thick, increasing in thickness (≈ 1 - 2 cm) near bottom. Sulphide bands describe S_1 and barite S_2. Increase in sulphide content downhole.

— possible fold hinge

91 barite / pyrite — rare quartz + carbonate blebs.

4G4

92

93 pyrite / barite + sphalerite — $S_2 = 66$ more sphalerite-rich downhole. Sphalerite is fairly coarse-grained.

93.63

4D#6 94 — $S_2 = 65°$ Inhomogeneously banded. Pyrite bands interlayered with qtz + carbonate + magnetite + sphalerite ± galena bands. Contains clasts of both quartz and carbonate. DB-90-37 — galena is typically coarse-grained near quartz blebs, often there is an intervening sphalerite veil.

94.6 — contact ≈ 65°

95

4G48 pyrite / barite + sl / pyrite — $S_2 = 72$ — Regularly banded, with local development of porphyroblastic pyrite (buckshot), — Quartz and carbonate breccia(?) — sphalerite in barite bands

96

4E4G#8 96.22 — contact ≈ 45°

96.67 — $S_2 = 78°$ thin (1 → 2 mm) bands of barite + sphalerite + magnetite. Pyrite is porphyroblastic at lower contact. DB-90-38

fold hinge 97 — thinly interbanded pyrite and barite + sphalerite + magnetite. Pyrite bands define S_1 and barite bands define S_2. quartz and carbonate clasts

4G4 pyrite — pyrite / barite + HP — $S_2 = 74$

97.84 — contact ≈ 75°

98 — variably siliceous massive sulphide. Quartz occurs as coarse-grain (desiminated?) patches. Carbonate occurs as rare clasts. Minor, coarse-grained sphalerite.

4E48*1 99 dolomite — local dolomitic bands define S_1 (S_0?) and are folded. L_2 plunges ≈ 80° to core axis. — S_2 is difficult to determine

100 — S_2(?) ≈ 40°

100.70 —

4E 101 — massive pyrite with minor quartz. ≈ 90 - 95 % pyrite.

101.71 — very sulphide-rich (0.5 - 2 cm) bands and thin layers of barite ± mag ± quartz

102 — S_1(?)

4G4#8 — $S_2 = 58°$

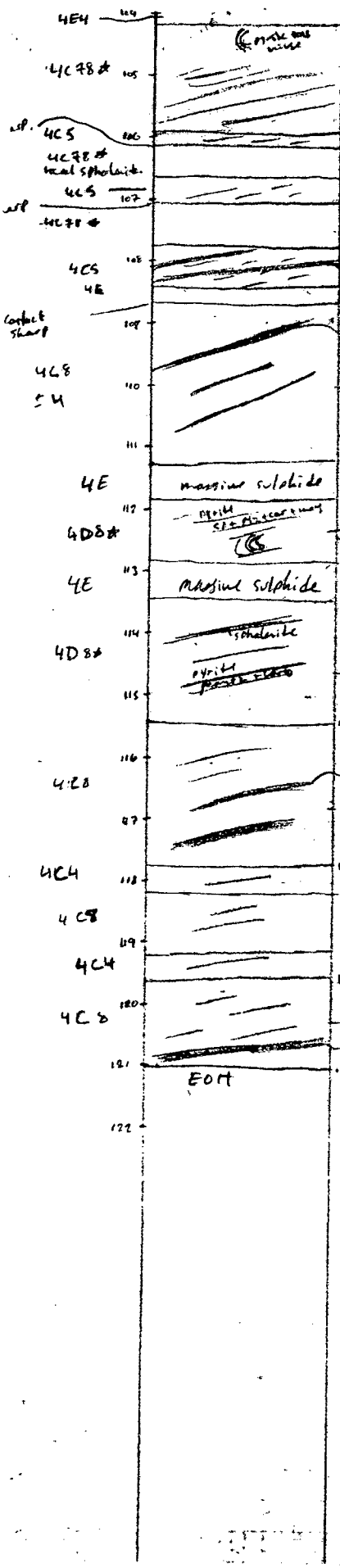
[4E46] 103 102.96 — thinly banded with pyrite bands and quartz + magnetite + sphalerite + carbonate bands. Sulphide bands define S_1 (S_0?). Pyrite is locally porphyroblastic.

4D ** pyrite — $S_2 = 68°$ — Z asymmetry

104 103.17 — contact ≈ 65°

inclination = -50 NG

DDH U90-67(CA) scale 1:100



104.17 Thin band of massive sulphide with ≈ 10-15% quartz.
- inhomogeneously banded, though locally descrete bands may occur.
- vertical fractures in sulphide band infilled with quartz and carbonate -

$S_2 = 55°$ → (S_1 // S_2)

105.91 — interval becomes slightly carbonaceous - vertical fractures infilled with chalcopyrite.
106.05 $S_2 = 46$
106.66 — poorly banded massive sulphide.
107.04 S_2 51° moderately carbonaceous quartzite [Sample | DDH-90-40]
107.72 - quite massive - no fabric discernable.
108.40 — massive sulphides - no fabric.
108.68

Photos 3-8 interbanding of graphitic and non-graphitic pyrrhotite sulphides
3-9

massive sulphide bands:
- slightly bleached with 4-5 cm wide massive sulphide bands running through it.
- vertical fractures filled with chalcopyrite.
- no apparent folding.

$S_2 = 55°$
111.31 — contact is gradational over ≈ 15 cm
111.86 — contact is sharp.

DDH-90-41
S_2 (S_1 ?) 62°
112.86 — contact 58° sharp.
113.48 — contact is gradational

interhomogeneously pyrite and sphalerite + qtz + carb. + very banded. bands are on the scale of 0.2 - 1 cm. Extensive fracturing of quartz-rich bands.
— Pyrite is porphyroblastic in sphalerite-rich bands.
— massive sulphide - no fabric.

0.2 - 1 cm wide sphalerite-rich bands in a pyrite-quartz matrix.
$S_2 = 62°$ — Porphyroblastic pyrite in sphalerite-rich bands.

115.45
116 — massive sulphide band
$S_2 = 56$
117.27
118
119
119.66
120
$S_2 = 82$
— massive sulphide bands
121.0

These divisions are descrete but in general sphalerite bands occur in localized areas and in associated with porphyroblastic pyrite.
There does not appear to be any folding of brecciation.
Banding better with 4C8 and 4C4 as well as 4E as a distinct cyclic appearance

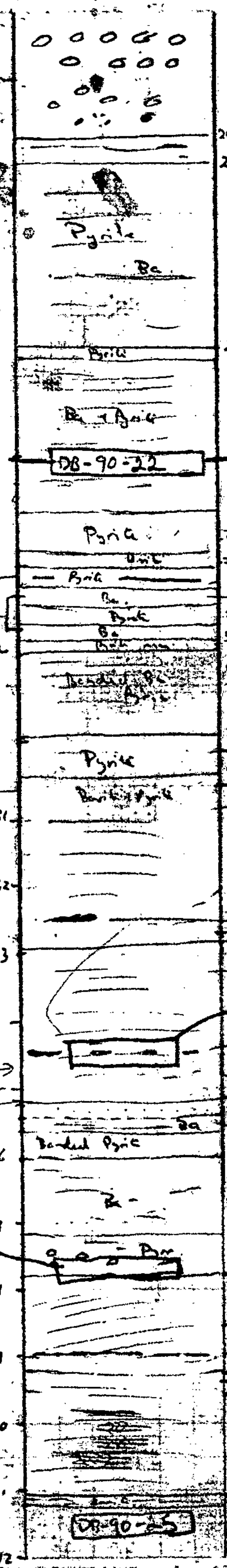
overall right side up from ≈ 114 metres.

Section 7400E

10/6/90. DETAILED LOG. V90-84 TOTAL 243'

SCALE 1:100. VERTICAL HOLE
Depth from collar.

Note in sulphides
Banding is probably S_0



61B. 20 — OVERBURDEN TO 61.9' Glacial Till Granite Boulders.

21 — 20.99 WEATHERED MASSIVE SULPHIDE – LIMONITE GOETHITE + PYRITE
21.28

22 — Broken core (rotted at top).
Massive pyrite with barite bands.
23.98 Rusted and partly weathered.

23
4G pyritic. Pyrite

24 — 23.98 Thin Banded pyrite [probably more massive above. S_2 to core axis 63°.
Baritic ore – pyrite bands 0.1 – 1.0 cm thick. Strong banding: ZnS + PbS.
25 Granular/banded texture
4G.

26 — S_2 to core axis 32°.

26.45 — massive granular banded pyrite.

27 — Baritic sulphides + magnetite Magnetite
Banded pyrite with magnetite band in centre — S_2 36°
[Fold hinge] 28 — 30 cm Barite
24 Pyrite band — S_2 17° / S_2 35° — Pyrite hinge, Ba lower contact
— S_2 46°

29 — Banded barite pyrite
4G. + magnetite grains. — S_2 – 65°

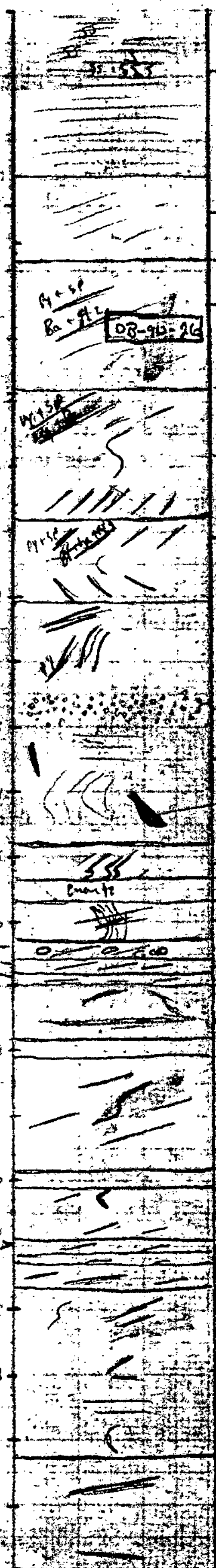
30 — 29.91 Layer of Banded pyrite massive no evidence of fold hinge
4E — 30.33 some coarse crystalline ZnS.
— S_2 54°
Possible fold hinge — Fold 31 — Banded Barite + pyrite with fold pair — Fold is reclined. FA parallel to long axis of S_2 on core
— Little ZnS
4G.
S_1/S_2 32 — Small folds S asymmetric
— Barite layer — S surface 15°

33 — 32.90
Zns + Pyrite + Magnetite – Barite sulphides – less barite bands here.

4G. 34 — DB-90-23
Boudinaged
Possible fold S_2 — S_2 60° to core axis
Fold hinge 35 — 35.09
Barite at base + bleached. S_2 45 to core axis
20 cm baritic sulphides – S_0 15° to core axis
4E 36 — 44 cm Banded pyrite with some ZnS – Magnetite bands – strong fabric defined by Fe_3O_4 S_2 52°
— S_0/S_2 56 to core axis
— Banded Barite ore with ZnS + FeS_2 + magnetite strongly banded
4G. 37 — 37.51 S_0/S_2 48°
DB-90-24 — Ductile flow brecciated Pyrrhotite – Strong banding
4H 38 — 37.80 contact 28° to core axis
Muscovite-chlorite phyllite – strong S_2 – Qtz vein. — lineation Pitch LH down 045° clockwise
4A? S_2 54° to core axis from Dip direction line = clockwise
39 — Qtz vein
39.26 — S_2 65 S_0/S_1 90° Z asymmetric
? 4A 40 — Strongly foliated pyritic graphitic with FeS_2 + ZnS along foliation planes – preferentially = S_2
S_1 + S_2 subparallel with
Z
4S 41 — 41.03 – contact 68° Z asymmetric. 30 cm of barite ore
DB-90-25
4A 42 — Highly folded and foliated Sulphide rich graphitic
... 42.22 ...

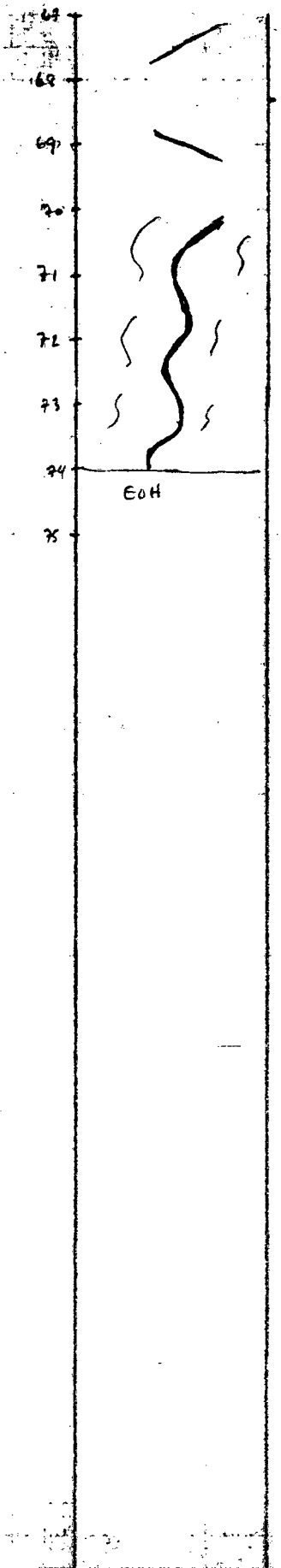
DDH V-90-84
Section 07+00E

Metres



Unit	Depth (m)	Annotation	Description
4A4	42–44	S2 67°	Foliated and sheared pyrite ± ZnS with graphite. S2 67° M asymmetry – fold axis [illegible] pitch [illegible]0° clockwise in S2 plane. Graphite with [illegible] S2
4E	44–46	S2 = 47°; contact – 52°	Banded Pyrite with quartz defining banding. Small patches of coarse grained sphalerite and quartz
4G4	46–48	S2 = 55°; DB-90-26; contact – 55°	Banded baritic sulphides. Banding is defined by 4–5 mm thick interlayers of quartz + barite and Pyrite + sphalerite. S2 has a constant dip. Magnetite patches.
4D8 (fold hinge)	48–50	S2 = 45°	Inhomogeneously banded with 0.5 – 2.0 cm Pyrite bands and 1 – 5 cm magnetite-rich barite-sphalerite bands. Magnetite bands define S2 and Pyrite bands define S1
4G8 (fold hinge)	50–51	S2 = 54°	0.2 – 0.5 mm thick interbands of quartz + barite + magnetite and Pyrite + sphalerite ± mag. Fold axis is ⊥ to core axis and would have a pitch of 0° on S2.
	51–52		carbonate-bearing, non-graphitic quartzite, magnetite. Vertical fractures filled with Pyrrhotite + chalcopyrite. Locally Pyrite is [illegible]
4D8	52–55	buckshot; S2 = 45°; fracture	This section appears to be strongly deformed and possibly extensively folded. Fine-grained Pyrite forms S2 whereas buckshot texture Pyrite forms S1(?).
3E268 (fold hinge)	55	S2 62°; contact 62°	L2 is defined. 0.2 to 0.5 mm wide bands of sphalerite + magnetite.
	55–56	30°	massive quartz pod with small amount of disseminated Pyrite. Silicified 3G
3G09 (fold hinge)	56	S2 – 58° – L2 pitch 335° CW in S2	0.1 – 0.3 mm wide bands of Pyrrhotite
4H	56–57		ductile flow breccia – Some sphalerite banding
4E	57	S2 = 66	
4D	57–58		Coarsely banded 4D with 5–10 cm bands of pyrite and coarse-grained sphalerite. Layering is chaotically oriented and is possibly folded.
4H	58		ductile flow breccia
4D	58–60	S2 = 45°	0.5 to 1 cm Pyrite + sphalerite + magnetite bands in a quartz-rich matrix. Some bands may in fact be S1, in which case the asymmetry is S
4E4	60	54°	Sulphides are weathered and rusty
4C (fold hinge near 60)	60–61		Variably banded. Bands consist of Pyrite + mag + pyrr, and locally quartz-rich layers. Vertical fractures infilled with chalcopyrite and pyrrhotite.
4E4	61		rusty weathered sulphides
4E4	61	S2 = 55°	Quartzite with 2 cm wide sulphide bands S2 = 76°
4E78	61–64	S2 = 60	1–2 cm wide Pyrite + pyrr + mag bands in a dominantly quartz-rich matrix. Several small-scale fold hinges – possibly an overall hinge zone.
4C	64–66		1 – 10 cm wide bands of Pyrite + pyrr + mag in a dominantly quartz-rich matrix. Possibly intersect in a fold hinge – the sulphide bands can be easily traced down the length of the core

DDH V90-84
Section 7+00E



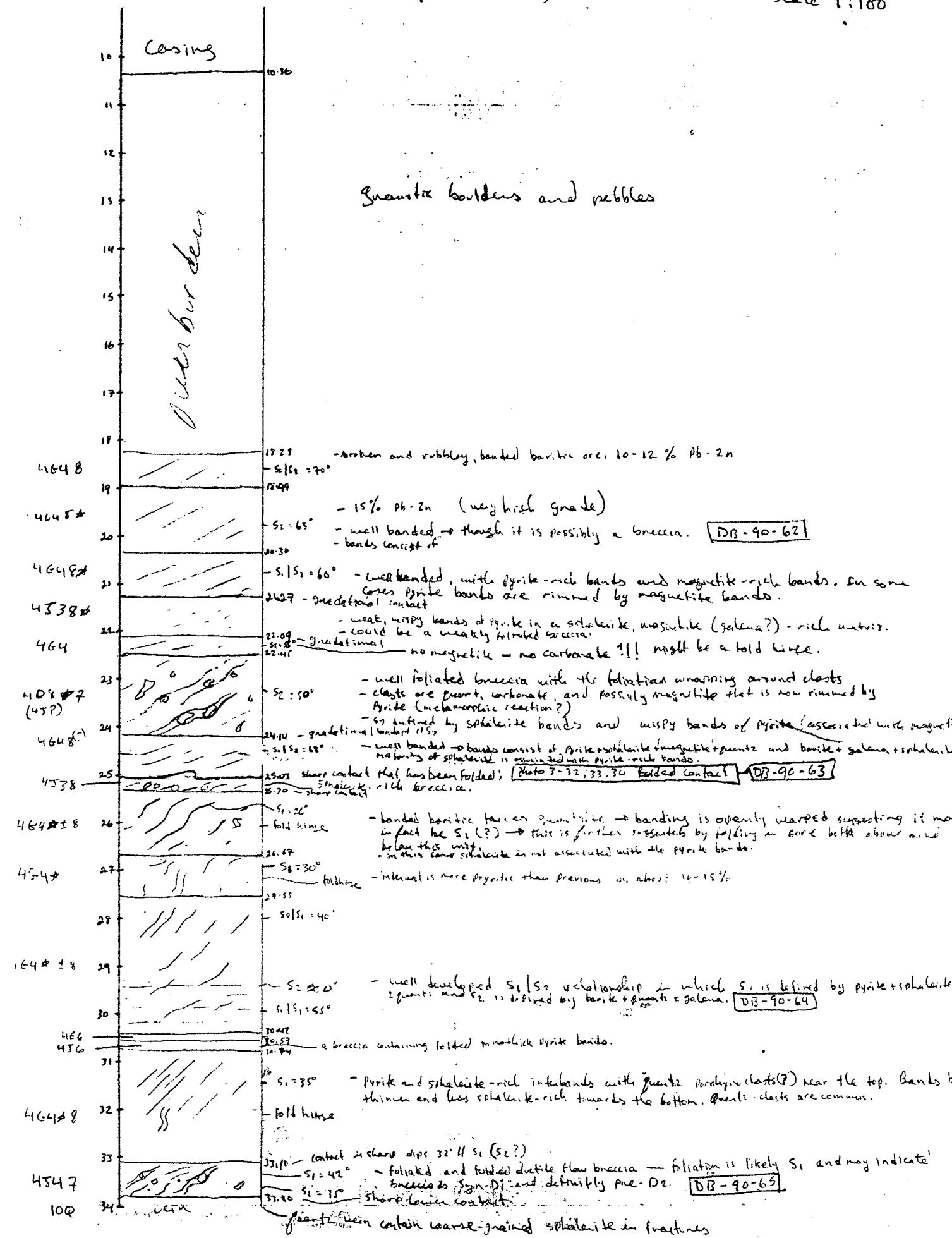
subhorizontal fractures infilled by chalcopyrite and pyrrhotite.

Intensity of folding increases towards the bottom of the hole

very little one

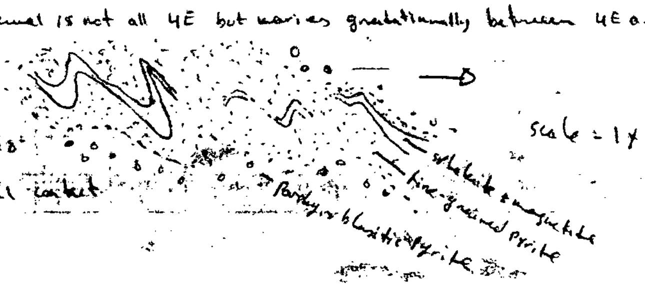
Inclined -76°
V90-108 (CN) Section 4+00E

Scale 1:100



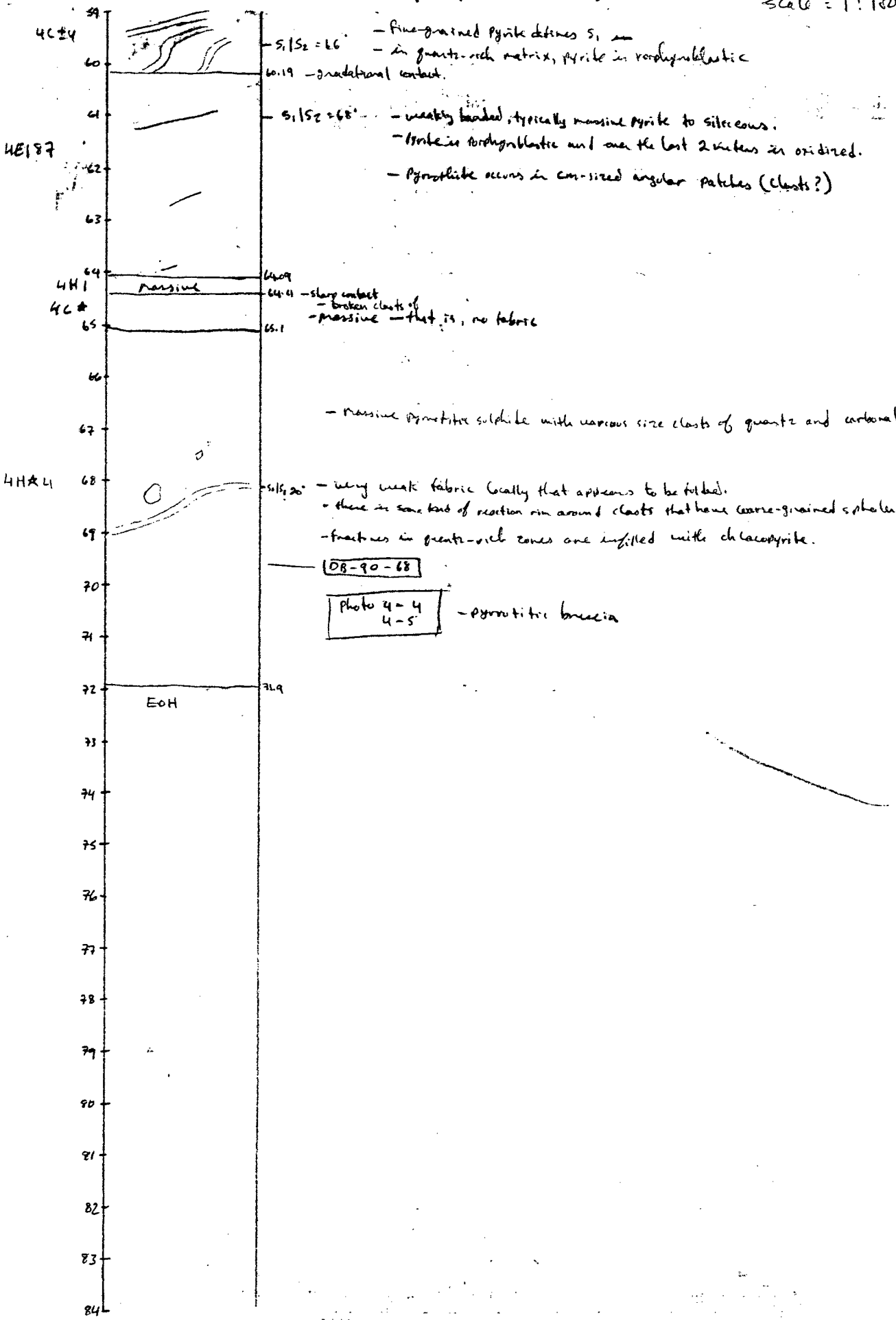
V90-108 (CN) Section 4+00E

34 — Quartz vein
- 34.27 — slightly carbonaceous phyllite that is variably silicified. Quartz occurs as fine-grained pods. (3G091; qtz)
35
- 34.91 — sharp contact
- thin wisps of phyllite in massive quartz (10Q; phyllite)
36
- 35.99
- $S_2 = 55°$ — variably siliceous phyllite. (3G091)
37 — minor coarse-grained pyrite and sphalerite (qtz)
38
- 37.9 (10Q)
- 38.32
- S_2 is very chaotic near quartz vein (faulting?)
- $S_2 = 55°$ — L_2 pitches 140° in S_2
39
- $S_2 = 75°$ — S_2 is openly crenulated, possibly by F_3. (3G0)
40 — Poorly preserved lithon texture with a Z asymmetry. Asymmetry is not very trustworthy.
- 40.41
41 (S_3)
- $S_2 = 85°$ — L_2 pitches 30°
42
- $S_3 = 25$ // S_1 — local and poorly preserved S_1 at a high angle to S_2
- weakly developed S_3 dipping parallel to S_1
- dominant fabric is a penetrative S_2 (3G09)
43
44 — asymmetry in Z.
45
- 45.26 Sharp contact parallel to S_2
- $S_2 = 96°$ — asymmetry in Z (4A478)
- Penetrative S_2 with parallel bands of sphalerite + magnetite and pyrrhotite + magnetite (?)
46
- 46.09 — sharp contact // S_2 (3C); vertical fractures infilled with carbonate + pyrrhotite.
- 46.29 — asymmetry in M (4A478)
- $S_2 = 68°$ — Fold hinge — Folds pitch 0° in S_2 [DB-90-66] — Sphalerite is now along S_1/S_0 as is pyrite.
47 — asymmetry in M. — some polymetric folding of thin quartz/calcite veins. (3C)
- L_2 pitches 0° in S_2
- 47.22
48
- $S_2 = 74$ L_2 pitches 15° cw in S_2
49
- Penetrative S_2 with no preservation of S_0/S_1 — ~~at least not as lithon textures.~~ S_1 may be present as pyrite + sphalerite + magnetite bands parallel to S_2. (4A4)
50
- modal abundance of pyrite increases significantly (5-10% to 40-50%) over the last meter.
- Pyrite is commonly porphyroblastic
51 — lower contact is gradational over a meter to meter and half.
- 51.20
- Interbanded pyrite and sphalerite + magnetite (4D8)
- 51.48 — sharp contact
52 — massive (4E)
- 52.09
- flow breccia? (4J) — Porphyroblastic magnetite ± sphalerite + pyrite + pyrrhotite ± galena.
- 52.42
- massive (4E)
- 52.75
- flow breccia (4J)
- 52.95
53
- $S_1/S_0 = 70$ — siliceous massive pyritic quartzite
54
- fold hinge — fine-grained pyrite defining S_1 along with magnetite ± sphalerite. [DB-90-67]
55
- Patches of dolomite
- $S_2 = 50°$ — broken apart, angular clasts of magnetite + quartz ± galena. (4E184)
- S_2 seems to be defined by porphyroblastic pyrite — though not always. Sphalerite may also define S_2. Porphyroblastic pyrite appears to be D_2-related.
56
- Internal is not all 4E but varies gradationally between 4E and 4C with 4E dominating.
57
58
- Sinemlogs ~28°
- $S_2 = 62$
- 58.70 — gradational contact
59



N-90-108 (CN)

scale = 1:100



- Fine-grained pyrite defines S_1
- in quartz-rich matrix, pyrite is porphyroblastic

- gradational contact.

- weakly banded, typically massive pyrite to siliceous.
- Pyrite is porphyroblastic and even the last 2 meters is oxidized.
- Pyrrhotite occurs in con-sized angular patches (clasts?)

- sharp contact
- broken clasts of
- massive — that is, no fabric

- massive pyrrhotite sulphide with various size clasts of quartz and carbonate

- very weak fabric locally that appears to be folded.
- there is some kind of reaction rim around clasts that have coarse-grained sphalerite
- fractures in quartz-rich zones are infilled with chalcopyrite.

DB-90-68

Photo 4-4
4-5

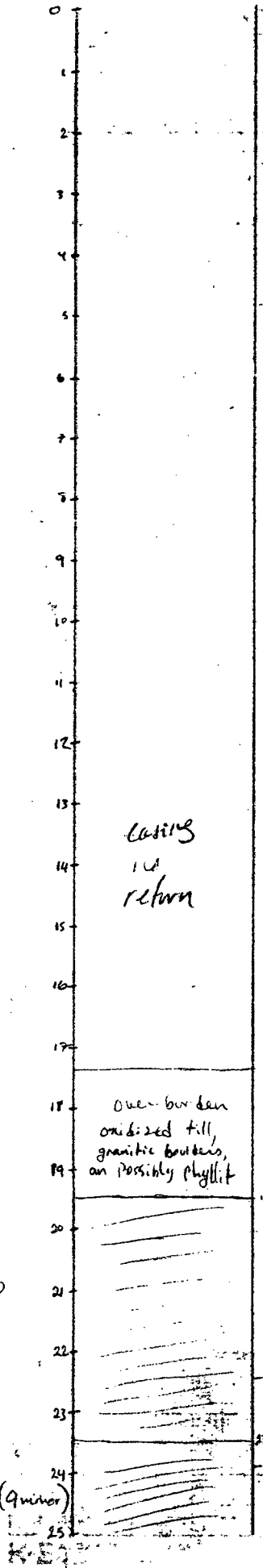
- pyrrhotitic breccia

Vertical

Section 4+00E

DDH V90-116 (CK)

Scale 1:100



- light grey-green phyllite
- somewhat oxidized over the top meter and half.
- interval is broken and rubbly.

$S_2 = 74$ L_2 pitches 140° cw in S_2. Lithon texture is not developed and the only fabric present is S_2.

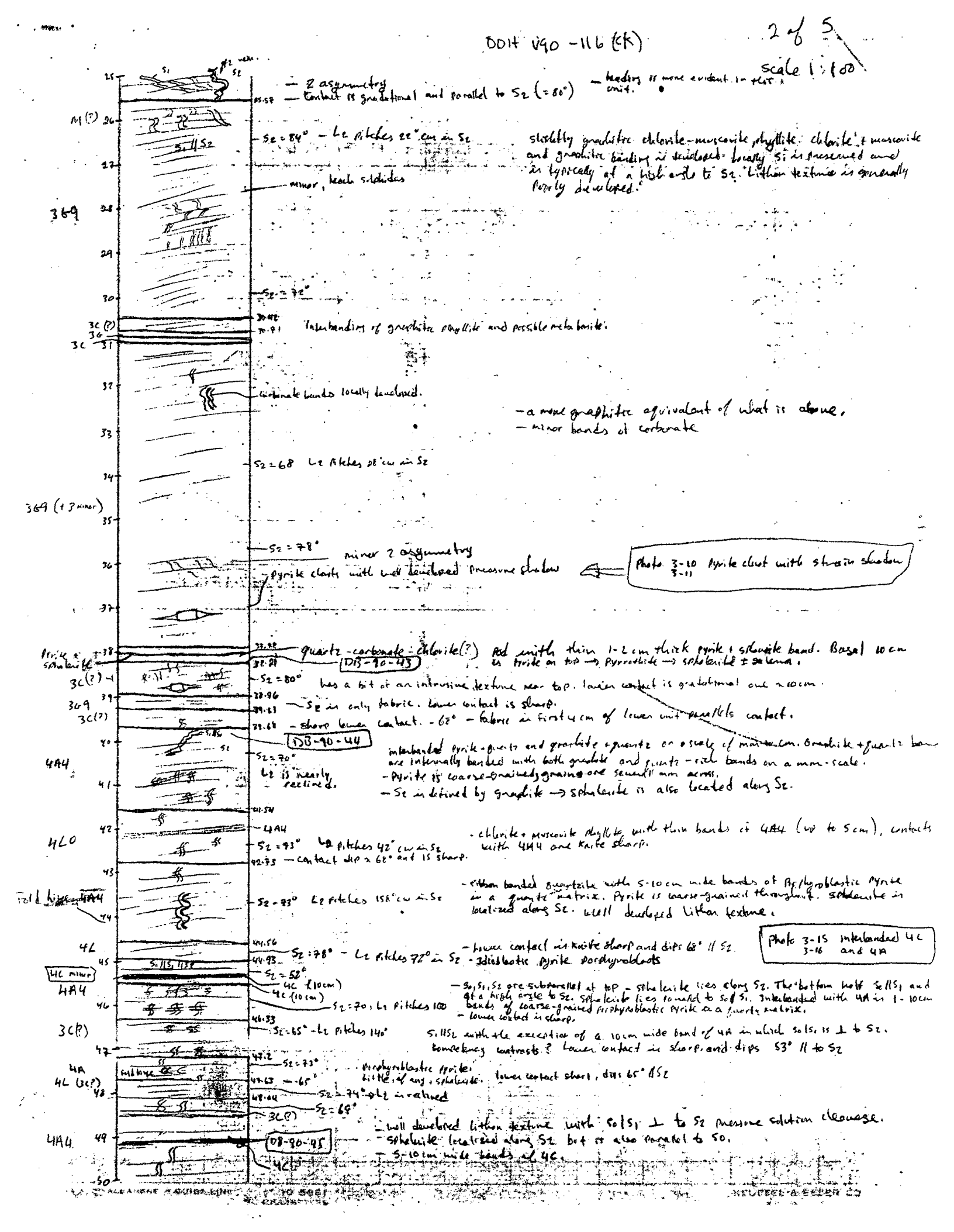
- more graphitic equivalent of the above unit and grades into it. Position of the boundary is arbitrary.

$S_2 = 80°$ L_2 pitches 140 cw in S_2

- better developed lithon texture than above, but still not great

DDH V90-116 (CK)

scale 1:100

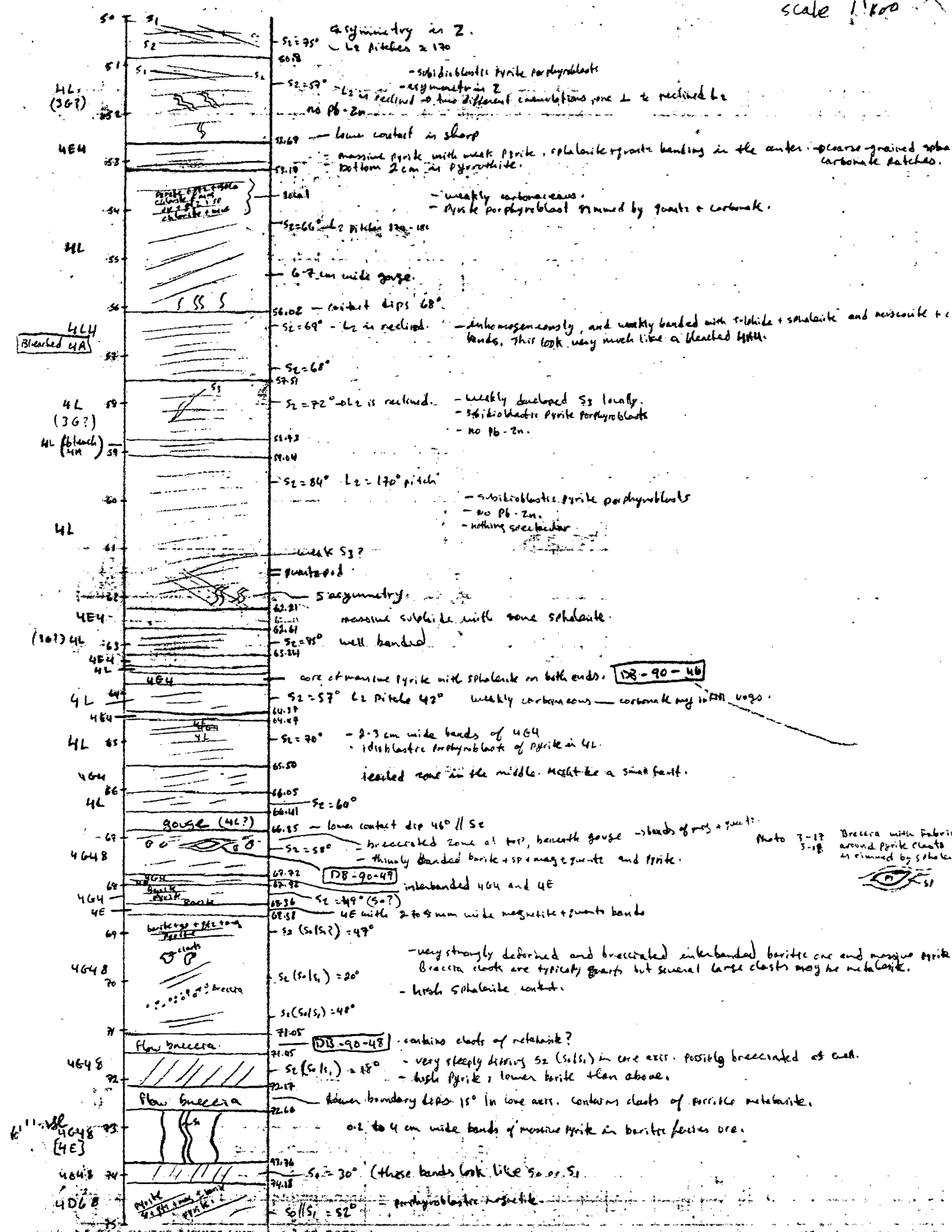


4+00E

3 of 5

DDH V90-116 (CK)

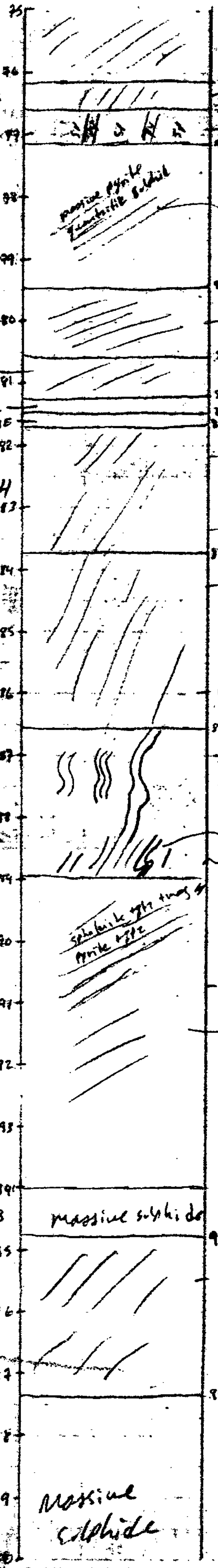
scale 1:600



4+00E

DDH V90-116 (ck)

Scale 1:100



95 – Barite content increase toward the bottom of the unit and becomes more like 4G4.

96.19 – 4E3 – S_2 (S_0?) 30°

96.57 – 4D8 – S_0 = 17° – 2-3 cm bands with very sphalerite-rich quartzite.

97.17 – 4E±4 – S_0 / S_1 = 30° – 0.5 cm wide bands of 4C in 4E.

99.49 – 4C – S_0 // S_1 // S_2 = 40° – No Pb - Zn

80.56 – 4E.4

81.21 – 4C

81.44 – 4E

81.94 – 4E8 ± 4 – S_0//S_1 = 25° ; S_0//S_1 = 25°
- bands of sphalerite + magnetite + quartz.
- very carbonate-rich

83.93 – 4D6 ± 8 – S_0 = 25° ; S_0 = 15°
- 1-5 mm thick bands of sphalerite + mag + qtz + carbonate in a massive sulphide.
- very sphalerite-rich near the top.
- no folding evident but S_0 steepen towards the bottom of the interval.

86.56 – fold hinge 4G4 – Z asymmetry ; S_0 = 20°
- very sphalerite-rich in top half of interval (≈ 20-30%), decreasing in grade towards bottom.
- modal abundance of magnetite increases towards bottom.

89 – 4D8 ± – S_0 = 34 – DB-90-49
- wispy bands of sphalerite + mag + qtz + carb and thick (1-5 cm) of the same in a dominantly pyrite + quartz matrix
- banding is inhomogeneous and quartz + carbonate has a brecciated appearance.
- band is poorly developed towards the bottom.

94 – 40° sharp

4E8 – massive sulphide

94.75 – 4D8 – S_0 = 52 – patchy and irregular banding of sphalerite + magnetite + quartz and pyrite + quartz

97.35 – 4E4 – Massive sulphide – variably sphalerite-bearing.

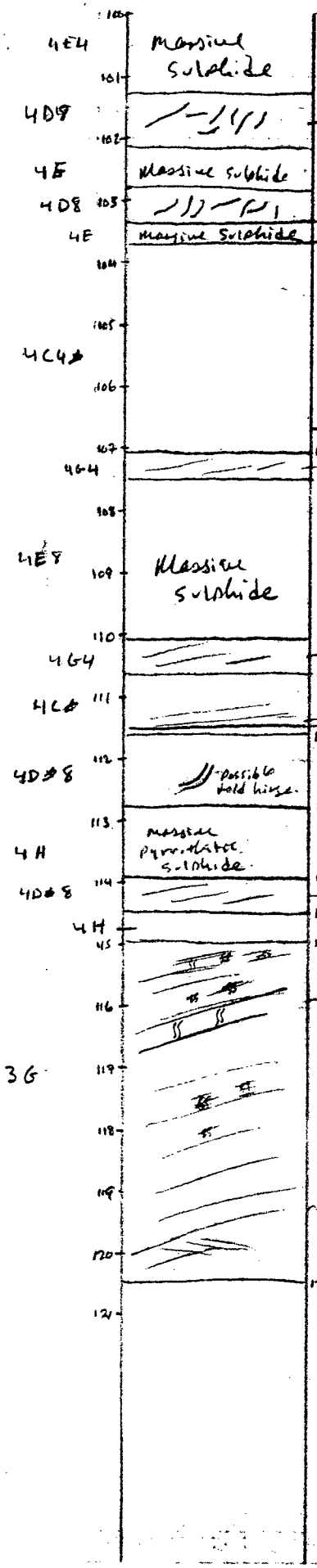
100

4+00E

DDH V90-116 (LK)

S:15

scale 1:100



106.25

S_0 ≈60° patchy and discontinuous sphalerite + mag + qtz bands

102.19

102.98

banding is patchy and irregular.

103.36

117.19

mottled appearance — no foliation present towards the top. last ½ metre has a weak Si banding

- large patches and blebs of quartz and carbonate.

S_0 = 70°

107.07 — contact is sharp ≈65°

S_0 = 65°

107.49

110.09

S_0 = 70° thin bands of pyrite. very sphalerite-rich.

110.64

- weakly banded.

S_0 = 55° — thin quartz + sphalerite band near base

111.61 contact ~ 50°

possible fold hinge.

very patchy and brecciated looking.

112.94

massive pyrrhotite sulphide.

113.80

S_0 = 70°

114.48

114.9 ~ contact is sharp = 40°

S_2 = 60° L_2 pitches 40°

- somewhat bleached 2 metres but then regains its normal light grey color.

- asymmetry in dominance of M_1 becoming 2 in the last metre of the interval

S_2 = 50° — L_2 pitches 40°

120.43 EOH

vertical
V90-118 (cm)

1064
Scale 1:100

Casing

10
11
12
13 Till and granitic boulders
14
15
16 Overburden
17
18
19 — 19.01
20 4G(?) — S₁//S₀ 25° — variably sulphide-bearing, possibly baritic facies — difficult to tell because of the oxidized sulphides.
fold hinge(?)
21 — 21.30 — sharp contact
4J4?8#3 Flow breccia — contains clasts of qtz, carb, phyllite, very sphalerite-rich
22 4Z — 21.88
22.28 fold hinge — carbonate-rich. Maybe a clast in a breccia.
4J4?? Flow breccia — coarse-grain sphalerite
22.88 contact sharp
23 4G4 — S₀//S₂ = 60° — discontinuous, inhomogeneously banded
— contains 5cm clast of pyrite which itself contains a lense of coarse-grain sphalerite.
23.74 gradational contact
24 4E6 — lenses of baritic sulphides → no banding!
25 — 25.08 gradational contact
4G48# — S₀//S₂ — foliated clast
— S₂ = 65° — finely defined banding — S₂ defined by sphalerite and may ?
25.66 gradational contact
26 4E648# — massive pyrite with lenses of baritic facies sulphides.
— no banding
27 — 27.28 gradational contact
S₀//S₂ = 55 — weakly banded with pyrite (S₀) and sphalerite (S₂)
27.86 gradational contact
28 — variably baritic lenses in massive pyrite
— weak pyrite banding
29 4E — S₀//S₂ = 40° — patches of coarse-grained sphalerite, magnetite, and carbonate.
30 4G4
4E
30.78 gradational contact
31 4G4# — S₀//S₂ = 58° — quartz clasts
— finely banded (mm-scale)
S₀//S₂ = 67° — weakly banded
32 gradational contact — typically banded and patches of baritic facies
33 S₀//S₂ = 57° — regularly banded in top half of interval
4G4
fold hinge
34 K-Z — S₂ = 68° — S₂ defined by sphalerite with magnetite bands on each side

DB-90-56

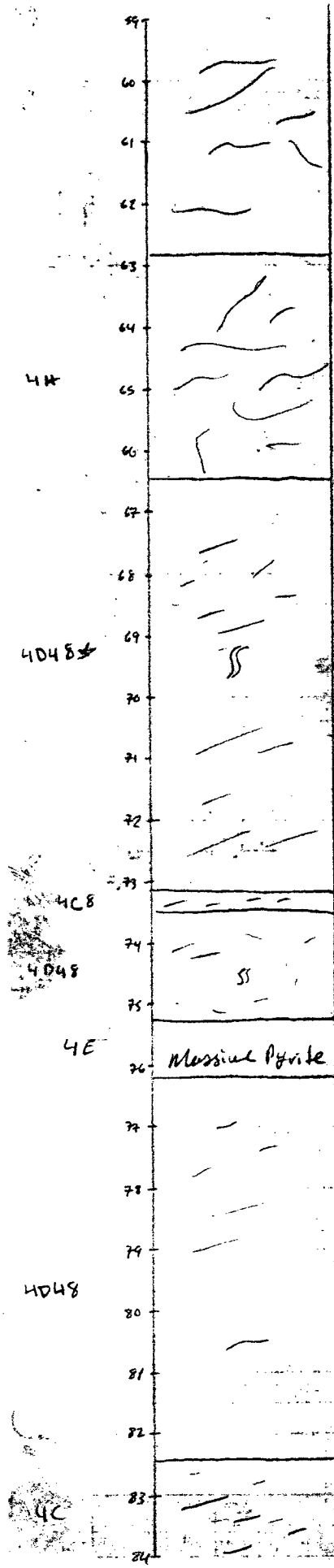
DB-90-57

barite + St
no
pyrite
no

V-90-117

fold hinge 34 — S_2 = ?? ?? inclined
34.94
35 — S_2 = 62° L_2 pitches 130°
— well developed schistose texture
36 — $S_1 \| S_0$ is typically at a high angle to S_2 giving the material a dominant M asymmetry overall.
pyrite + graphite
4A4# 37 — S_2 is defined by graphite
— sphalerite is also aligned parallel to S_2
— pyrite is more disseminated, though fine-grained pyrite is locally $\| S_2$.
38 — S_2 = 64° L_2 pitches 150°
39 — contact is sharp and $\| S_2$
4G4 39.35
39.54
4E# 40 massive pyrite — (4A) ≈ 4-5 cm thick — vertical fractures infilled with quartz
4G4 massive pyrite 40.27 — sharp contact 80° $\| S_2$
4E4#4 massive pyrite 40.77
38? 41
4E massive pyrite 41.29 calcareous massive pyrite
4G4 41.70
38 41.75
4A 42
4E massive pyrite
42.46
43 — $S_1 \| S_0$ 66° — thin phyllite layer near top
massive pyrite — folded pyrite-rich band, suggesting these are S_1/S_0 noted earlier!
fold hinge 44 — $S_0 \| S_1$ = 36° — discontinuous pyrite-rich bands.
— magnetite occurs either as disseminated grains in
4G48 — folds pitch 0° & slightly inclined; magnetite-quartz bands or, more interestingly, as thin, very magnetite-rich bands intergrown with, and rimming pyrite bands.
45
46 — $S_1 \| S_2$(?) = 35°
pyrite
pyrite
DB-90-58 — large clast of chloritic phyllite in barite [illegible] massive sulphide. Banding in barite one wraps around clast
4T48 Flow breccia 46.48
46.65 — magnetite (galena?)-rich near bottom.
47 — folded pyrite-rich bands.
— $S_1 \| S_0$ & S_2 — it is difficult to distinguish S_1/S_2 in barite layers. Some appear
S_2 = 55 to be folded, others appear to be S_2 — possibly both.
4G48 48 — folds pitch 0° & slightly inclined.
— magnetite-rich bands, again typically associated with pyrite-rich bands
49 — becoming more pyritic
49.89
4J834 50 — S_2 = 58° — dark grey, very magnetite-rich with possible galena
DB-90-59
50.44
4G48 50.93 — S_2 = 67° sharp contact magnetite bands.
4J478 51 Flow breccia
51.26 sharp contact 80° $\| S_2$
4G48 — magnetite and pyrite bands near top are folded
52 — S_2 = 55°
52.30 — sharp contact
4D8 — very sphalerite-rich. — minor carbonate. — fabric wraps around broken quartz-carbonate clasts.
— S_2 = 55. — discontinuous pyrite bands with associated magnetite.
4G4 53 53.45 sharp contact
— fold at top is truncated by the breccia above
53.55
breccia 53.70
54
4E8±4 — weakly magnetite + quartz, and quartz banding
55 — $S_1 \| S_2$ = 65°
4D 55.47 — sharp contact
55.61 — very sphalerite-rich
56
57 — inhomogeneously banded if banded at all
4E4#8 — S_2 = 50° — strongly deformed (brecciated I would say!)
— carbonate clasts
58
— fractures infilled with chalcopyrite
59

V-90-118 (cm)



- glass might be discrete, early banding.
- interval has a mottled appearance to it.

- Dominantly pyrrhotite with quartz and lesser carbonate clasts and patches
- very little pyrite and local coarse patches of sphalerite.
- mottled appearance
- no banding.

DB-90-60

- discontinuous and inhomogeneous banding
- bands consist of massive pyrite, sphalerite ±galena? + magnetite
- pyrite is commonly porphyroblastic (i.e. buckshot)
- magnetite-rich
- pyrrhotite locally
- generally a mottled texture
- fold hinges locally in S2 (≥ 20°)

— gradational contact

- discontinuous and inhomogeneous banding defined by massive pyrite ± magnetite and by sphalerite ±galena ± magnetite
- fold hinges locally.

- sphalerite and galena occur both as coarse-grained, thin bands and as irregular patches.

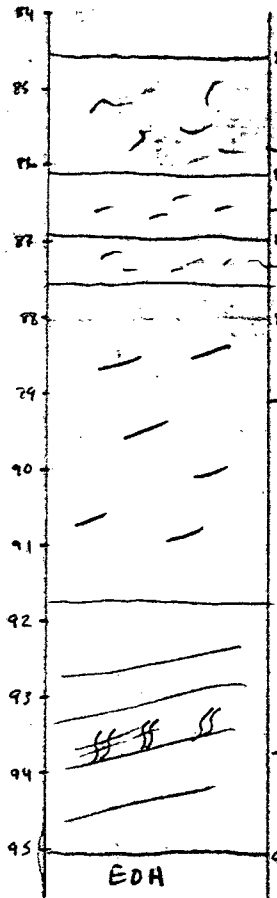
- banding is weak and discontinuous typically defined by pyrite.

± quartz-rich patches

82.41 gradational contact

- chlorite and/or carbon defining S2 suggest some sedimentary influx into the ore body
- S2 is weak and wispy

V-90-118 (cm)



- Sulphides seem a bit oxidized (minor sphalerite ± galena)

84.61 gradational contact

- coarse-grained patches of sphalerite and galena.
- $S_2(?) = 60°$
- no regular banding.

86.13

- $S_2 = 55°$ weak S_2 defined by chlorite + carbon

86.92

87.66

- $S_0 | S_2 = 65°$
- well banded typically bowen quartzite with local patches of sphalerite ± galena
- banding is defined by pyrite, but a wispy chlorite ± graphite S_2 is also present and becomes more pronounced toward the base of unit, grading gradually in 4L.

91.74 very gradational contact

- Pyrite becomes less and less abundant towards base of unit.
- $S_2 = 80$ L_2 pitches 145° cw in S_2
- asymmetry in S.

95.09

RDH 1/-90-122 (CS)

casing, no return

10

– interval consists of what could be a number of different units that have been variably altered. Units are likely 3C and 4A. The altered 4A is moderately hard and contains bands of pyrite and bands of sphalerite. Pyrite is slightly oxidized

– S_2 = 72°, L_2 pitches 90° in S_2

DB-90-85

11

12

– centimetre-scale fractures infilled with pyrrhotite

13

4L

– asymmetry is Z

14

15

– S_2 = 56° L_2 pitches 90° in S_2

16

17

– 17.34 lower contact is sharp and parallel to S_2

18

– S_2 = 65° – L_2 pitches 132° in S_2

– S_2 is defined by alternating bands of chlorite–muscovite ± graphite and quartz + porphyroblastic pyrite

19

– the proportion of sphalerite increases towards the bottom of the interval

20 gouge

21

– S_2 = 46°

4A9

– asymmetry is M

22

– S_2 = 48° – L_2 pitches in S_2

DB-90-86 Porphyroblastic pyrite in S_1, sphalerite in both S_1 and S_2

23

breccia – Pyrite-rich breccia that has been silicified

24

25

4L – 25.11 sharp contact parallel S_2

– S_2 = 64° – muscovite phyllite

4C – 25.6 – sharp contact parallel S_2

S_2 = 64° L_2 pitches 110° in S_2 – locally muscovite defines S_2

– 26.0

4L 26 – 26.2 F

– S_2 = 58°

– well-banded, possibly folded sulphide bands

27 – coarse-grained magnetite, sometimes forming bands parallel to S_2, fabric wraps around larger clasts.

4648 DB-90-87

– high Pb-Zn grade

28 – 28.1 sharp lower contact

– coarse-grained sphalerite + galena + magnetite ± pyrrhotite + pyrite breccia → DB-90-88

4548 breccia – weak, inhomogeneous boundary

– 28.9 sharp

– S_2 = 92° – S_2 bands defined by sphalerite

464 29 – this looks a lot like a fine-grained breccia with a fabric that wraps around quartz clasts. DB-90-89

– 29.5 – sharp lower contact

4748 breccia – 29.83

4A 30 – this interval is located in a fold hinge

4EG – 5-8 cm of very sphalerite-rich, ductile-looking (shear zone) forms boundary between the 4EG and lower 4G4 DB-90-89

– 30.7

31 – 31.15 – 2 to 3 cm wide bands of 4E

4H48 massive – 31.15 – possibly brecciated + relatively coarse-grained

– 31.43

32 – S = 40° – fold pyrrhotite bands in a quartz matrix DB-90-90

4874 – thin bands of 4L

also containing sphalerite and galena

– 32.67 sharp

4H4 33 – S_1/S_2 = 38° – coarse-grained galena and fine-grained sphalerite. Quite high grade. DB-90-91

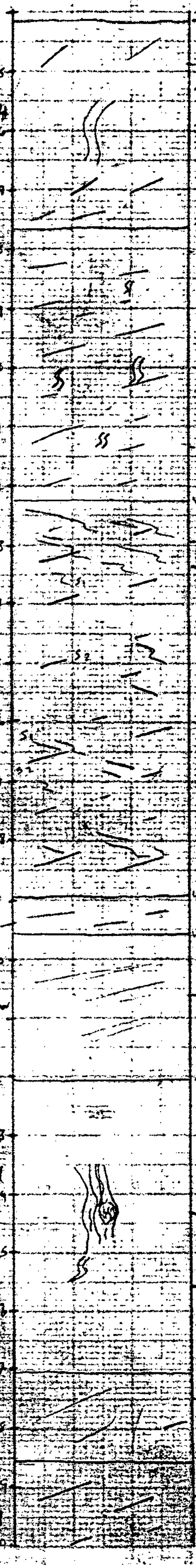
– poorly and inhomogeneously banded – galena and sphalerite are coarser-grained near clasts of carbonate!

– 33.4 sharp

4L – 33.65 – minor sphalerite

34 – 33.85 sharp contact

4H4?



34 — 34.13

35 — S_2(?) = 76° L_2 pitches ≈ 110°

4E74

DB-90-92

36 — Fold hinge — bands of coarse-grained pyrrhotite + sphalerite ± galena. Bands are folded and may be either S_1 or S_2
— the main fabric is defined by muscovite + chlorite and it to is folded

37

37.69 — Sharp lower contact

38 — S_2 = 76° — L_2 pitches 52° in S_2

39 — contains minor, typically oxidized pyrite in both patches and bands parallel to S_2
F_2 is nearly realized.

— M asymmetry

40

4L6

41 — lower contact is sharp and has a very intensely developed fabric that may be the result of boundary shearing.

— S_2 = 74° — L_2 pitches 110°

42

42.33 — Sharp lower contact

43 — S_1 = 45° / 180 — well developed S_1 with a spaced (up to 1 cm) S_2
— S_2 = 72° — L_2 pitches [illegible] — Pyrite and sphalerite are dominantly associated with S_1 but have been remobilized (?) into S_2

44

4A4

— Pyrite is typically porphyroblastic and overgrows the S_1 fabric and, locally, S_2 as well.

45 — coarse-grained patches of sphalerite and galena in quartz-rich zones

— asymmetry in Z — modal abundance of pyrite increases over the last [illegible] of the interval

46

DB-90-93

47

48

48.95 — gradational contact

49 — S_2 = 60° — S_2 is defined by porphyroblastic pyrite bands and by thin bands of coarse-grained sphalerite DB-90-94

4C4

49.59 - gradational

50 — up to 1 cm-wide bands of pyrite with thinner bands of sphalerite + galena there DB-90-95

4E6
+ 4H minor

— S_2 = 65° — locally, coarse-grained sphalerite defines S_2

51 — high grade

52

52.19 gradational lower contact

53 — Not sure if this should be called a 4G! It is very rich in sphalerite, magnetite, pyrite, has clasts of phyllite(?) and is folded.

DB-90-96

4G4

54 — This has more the appearance of a breccia. Phyllite clasts have a reaction rim around them and the fabric wraps around. Reaction rim may also be a pressure shadow. Can't determine if reaction rim truncates layering.

— S_1(?) vertical

55

— S_1(?) 50° — 10 cm wide pyrrhotite-rich layer.

56

57

57.02 — [illegible] contact

— S_1/S_2 = 70° — Poorly and inhomogeneously banded

4E1

58 — contact is strongly deformed and contains coarse-grained sphalerite and (?) galena.
— coarse-grained sphalerite is concentrated along boundary!

58.59 gradational contact

59 — S_1/S_2 = 86° — well banded, typical 4G4

4G4

60

60 — 60.11 gradational contact

61 — $S_1 \| S_2$ = 60°

62 — - 20-30 cm band of buckshot ore with complexly folded thin bands of fine-grained pyrite rimmed by sphalerite + magnetite. [DB-90-97] + pyrrhotite

63 — porphyroblastic bands of pyrite are folded

64 — - texture is mottled, with thin discrete bands of fine-grained pyrite and thicker, lumpy bands of porphyroblastic pyrite.

4D8

- sphalerite occurs in 0.1 to 0.5 cm-wide bands along with magnetite and typically interbanded with pyrite bands, sphalerite also occurs in coarse-grained patches by itself and rarely with galena.

65

66 — - clasts of carbonate

- chalcopyrite

67 — $S_1 \| S_2$ = 65°

68 — - lower contact sphalerite largely disappears with the appearance of pyrrhotite and pyrite!
- chalcopyrite appears or rather persists

69 — 68.97 lower contact is sharp.

70 — - banding is poorly developed
- texture is typically mottled.

$S_1 \| S_2$ = 55°

71

4H9

72 — - local patches of coarse-grained sphalerite associated with patches of quartz and dolomite [DB-90-98]

- possible folding

73 — - in pyrrhotite-rich zones core looks like it might be brecciated.

74

75 — 74.69 sharp contact
75.2 - sharp folded pyrite-rich chloritic phyllite

3C? — S_2 = 65° - poorly developed to non-existent S_2 [DB-90-99]
- containing sphalerite locally.

76

77 — 76.93 sharp contact parallel to S_2
4E? — 77.10

4H49 — $S_1 \| S_2$ = 8?° - massive pyrrhotite with isolated, coarse-grained patches of sphalerite and galena
- clasts(?) of quartz and carbonate
- very weak fabric locally.

78

4O4 — 78.33 gradational
3C? — 78.53 sharp
S_2 = 55°
79 — 78.98

4H49 — - texture is mottled.

3C? — 79.55 sharp
80 — 79.88 sharp

81 — - textural quartzite with variable amounts of muscovite + chlorite.
- weak to moderately developed S_2 defined by muscovite + chlorite.
- thin bands of 3C?
- vertical fractures infilled with chalcopyrite.

82

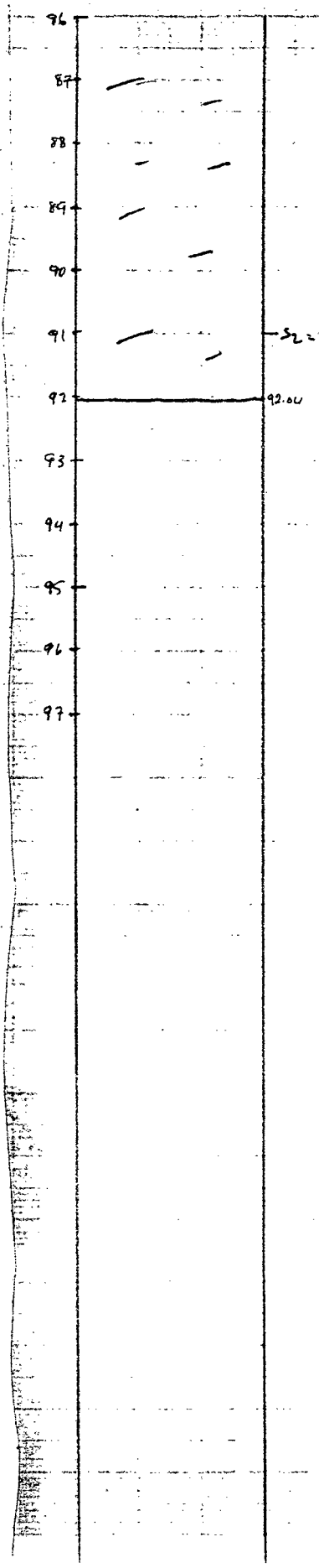
4E 83

(4L) — [DB-90-100]

84 — S_2 = 60° L_2 pitches ≈ 100° photo

85

86



Photos 90-S - 31 - Footwall alterations
32
33

- possible M asymmetry
- looks brecciated DB-90-101
- Mrk-rich bands parallel to S_2

S_2 = 70 L_2 is 90° (Inclined).

92.0U

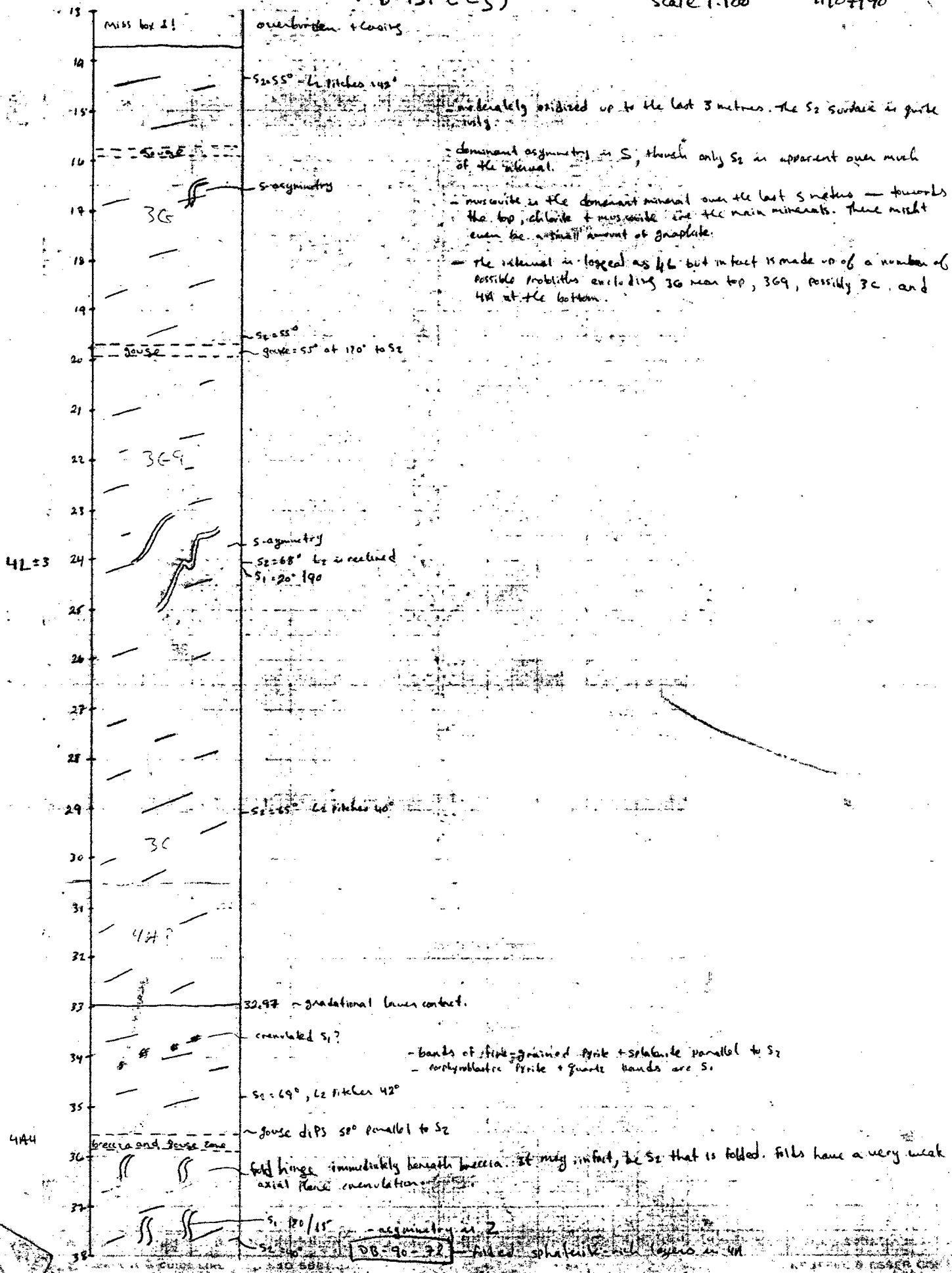
EOH

Section 1400E vertical.

V-90-131 (CS)

Scale 1:100

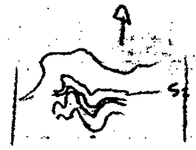
11/07/90



U-90-131

Scale 1:100

40 — minor, tight F3 ? folding.
— S_2 = 74° L_2 pitches 100° — asymmetry is dominantly Z to M



42 — S_1
— S_2 — F_2 asymmetry is S — S_2 penetrative, with a 2-5mm spacing. S1 is also penetrative, but has a 1mm spacing.
— Post-S_2 Porphyroblastic pyrite locally overgrows S_2.

45–46 Gouge

47 asymmetry is M.

48 — porphyroblastic pyrite and sphalerite appear predominantly in areas where $S_1 \parallel S_2$ (i.e. limb areas).

49 DB-90-73 porphyroblastic pyrite and sphalerite parallel S_2.

50.59 — Sharp contact parallel S_2

4L (3C?)
- Penetrative S_1 (?) that has been folded.
- weakly developed S_2(?)
- Z asymmetry
- S_2 = 72°
- bottom 50cm has a greater percentage of chlorite (+ bio?)

52.80 Sharp lower contact

4A4
- fold hinge.
- S_2 = 75° - Porphyroblastic pyrite + quartz $\parallel S_1$
- Post-S_2 porphyroblastic pyrite

54.55 sharp contact // S_2
3C 54.70
4A4 54.97 S_2 = 75° L_2 is inclined
3C ? 55.29 massive
4G 55.57

~ 2 metres of core missing due to miss latch.

4E(?)
Sample DB-90-74
- Interval is a strongly brecciated 4E with a carbonate matrix.
- angular fragments with long axis parallel to core axis.

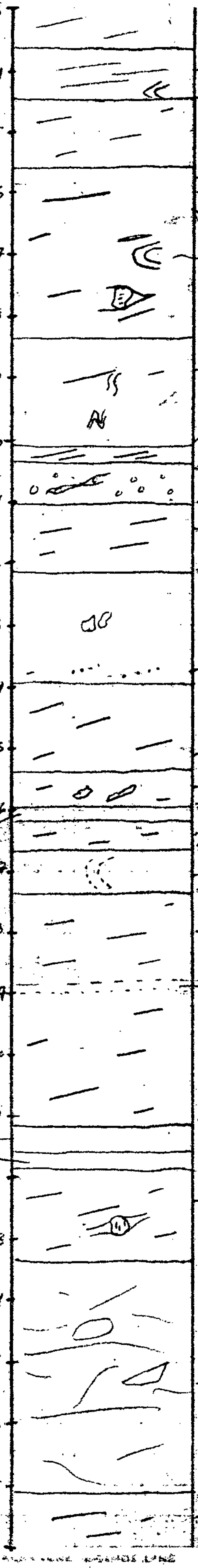
Photo 4-23, 4-24, 4-25 Brecciated 4E

59.34 - Sharp lower contact.

4L2
- S_2 = 75° L_2 pitches ~160° - Asymmetry is S
Sample DB-90-75 - the amount of pyrite in this interval and the hardness suggests it might be derived from 4A!
- Pyrite defines S_1
- Some weak vertical fracturing.

V-90-131 (cy)

scale 1:100



63 — porphyroblastic, post-D2 pyrite

63.67 sharp lower contact

4G48 — 64 — S_1/S_2 = 75° — 1-2 mm thick bands of pyrite + magnetite define S_1 — magnetite-rich patch with fabric wrapping around it. DB-90-76

64.48 sharp contact

3C(?) — 65 — idioblastic pyrite porphyroblasts — patches of coarse grained sphalerite, pyrite and galena DB-90-77

65.6 sharp contact

66 — top 30 cm is a sphalerite-rich breccia — porphyroblastic pyrite — rim of 4G

$S_1 \| S_2$ = 87° — well banded. Bands consist of pyrite ± sphalerite ± magnetite and bands of barite + quartz ± galena

4G4 — 67 — fold hinge — angular clasts of phyllite with fabric wrapping around them.

68

68.36 sharp contact

3C3 — 69 — S_2 = 75° S_2 pitches 100° — patches of coarse-grained sphalerite

— asymmetry in M

70 — sharp contact

70.1

4G4 — $S_1 \| S_2$ = 65° — very well banded

4J7* — 70.32 sharp contact. — pyrrhotite-rich flow breccia DB-90-78

71 — 71.04

4G4 — S_2 = 70 — well banded → banding is on the scale of millimetres — very sphalerite-rich DB-90-79

72 — 72.24 sharp contact parallel S_2

4E84* — 73 — blotchy, poorly developed planar fabric. Broken clasts of chloritic phyllite — High proportion of magnetite that occurs in patches and bands with carbonate — Possibly a breccia DB-90-80

S_2 = 55°

74 — 73.97 — sharp contact parallel to S_2 and brecciated

4G48 — well banded; bands consist of fine-grain sphalerite + barite + quartz ± galena ± carbonate and pyrite + magnetite + coarse-grained sphalerite DB-90-81

75 — S_1/S_2 = 70° — high grade ≈ 15% Pb-Zn

75.37 — sharp, brecciated lower contact

3C?84* — S_2 = 60° — fractured, with coarse-grained sphalerite + magnetite ± pyrite and pyrrhotite infilling fractures. photo 4-30 5-5

4J48* — 76 — 75.92 — breccia

76.19 — sharp contact

4G48* — S_2 = 70° — well banded → coarse-grained sphalerite + pyrite + magnetite.

76.65 — sharp, brecciated lower contact

4E49* [4G4] — 77 — S_2 = 55° — magnetite outlines S_1 which is folded DB-90-82 — sphalerite and pyrite define S_2. — thin bands of 4G4

77.36 — sharp

78 — S_1/S_2 = 75° — well banded — pyrite bands rimmed by magnetite in sphalerite-rich zones. DB-90-83 — possible isoclinal fold hinge.

4G48 — 79 — flow breccia (≈ 8 cm thick) — contains clasts of phyllite as well as clasts of what appears to be tailed magnetite + quartz — fabric flows around clasts.

80

81 — 81.22 — sharp contact

3C* — S_2 = 79° — contains biotite

4E — 81.59 — sharp — contain thin band of 4G4

81.94 sharp

82 — well banded

4G48 — S_1/S_2 = 75° — again, the association of pyrite, magnetite, sphalerite bands — 8-10 cm wide 3C band parallel S_2 — contains clasts of phyllite with an internal foliation ⊥ to S_2, S_2 wraps around the clast

83 — 83.36 — sharp contact

84 — poorly banded — coarse-grained sphalerite and pyrite DB-90-84 — fabric wraps around clasts of quartz and carbonate.

4D87* — 85 — S_2 : 60° — fabric is difficult to define and the texture is best defined as chaotic

86 — pyrite is commonly porphyroblastic.

87 — 87.11 — sharp

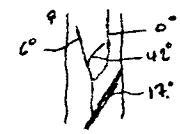
4G4 — S_2 = 70° — weakly banded with local sphalerite bands — bleached.

88

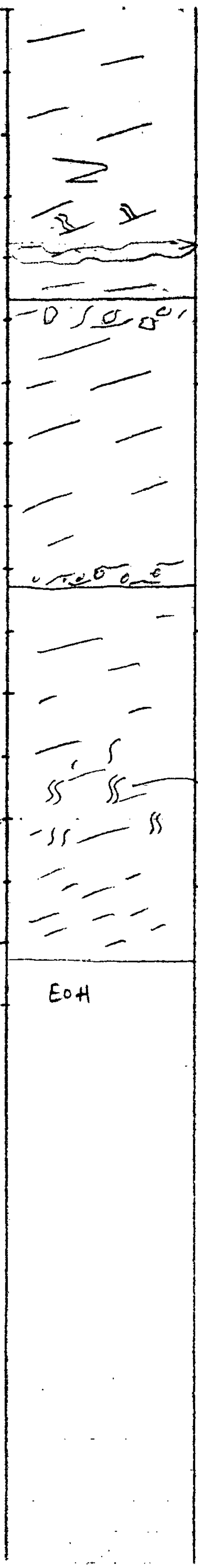
— 90.83 EOH

V90-134 (50-20) vertical Scale 1:100 Section 17+00E

Unit	Depth (m)	Log	Notes
		Casing	oxidized rubble
	5		5.18
		oxidized rubble	— oxidized phyllite; S2 = 80 L2 = 170°
3G09	6		— S2 = 81°
			6.7 — contact is rubble but appears sharp
	7	gouge?	— fracture 15°, 20°
			— extremely fractured and (leached?)
4E4#	8		3C
			— contains clasts or pods of quartz and carbonate
	9		9.2 — gradational contact
4G4			— again, fractured and broken
	10		9.96 — sharp contact marked by 5cm-wide gouge.
			— S2 = 72 L2 pitches 118 cw
4L			— S2 = 65° — very light greenish-grey
			10.88
	11		— quartz-rich rubble — possibly derived from phyllite (4H?)
4E4#			11.27
			11.44 sharp contact
3C			— S2 = 74 L2 = 190 pitch; Interbanded carbonate and chlorite/muscovite. Banding is on the scale of 2–5mm.
	12		12.04 sharp contact parallel S2
4E4#		Broken and fractured	12.31 — sharp contact parallel S2
	13		— interval is logged as 4L but is probably several different, altered units including 4H (hard, contains pyrite bands) and 3G (soft and contain chlorite).
	14		— S2 = 68° L2 pitches 140°
4L	15		— mostly rubble
	16		
	17		17.22 — sharp contact ∥ S2
			— moderately to well banded with folded pyrite bands
4G4#	18		— fold hinge; — fold axial surfaces are near parallel to core axis. DB-90-69
			18.62 sharp contact.
	19		— Pod of quartz and carbonate that looks highly fractured and contains jumbled phyllite with an S2 foliation; very likely a silicified phyllite
			19.23
4E			19.56 fractured and broken. — possibly folded. Sphalerite-rich!
	20		— S2 = 45°
3G0#1			— silicified phyllite with carbonate infilling fractures. Phyllite blocks "floating" in quartz.
			— very broken and fractured
	21		21.33 — sharp contact.
		carbonate	— massive pyrite with pinkish clasts of dolomite
4E4#	22		— quartz. — fractured and locally oxidized (weathered, leached)
	23		23.01 — bands of sphalerite = 40° — probably S2 DB-90-70
4D			23.3 — bands of pyrite = 8°
			— S2 = 58° L2 pitches 190°
4L1	24		— thin siliceous band ∥ S2
			24.68
	25		— S2 = 66 L2 pitches 12°
			— the dominant fabric by far is S2. There is a pressure lithon texture in one or two places. Here, asymmetry is M.
	26		
3G09	27		
	28		— S2 = 54° L2 pitches 42°
			28.52
4L6	29		



sketch of fractures in core



29 — S_2 = 65° L_2 is reclined

30

- bands of porphyroblastic pyrite parallel to S_2.
- Carbonate pods and bands locally. Unit is not calcareous on a whole.

4L62±# 31

— fold asymmetry is Z

32 — S_2 = 53°

— quartz pods

33

33.68 — sharp contact.

34 — Top 60 cm is intensely fractured; fractures are infilled by carbonate

- sphalerite-rich bands in a massive pyrite

35 — S_2 = 37° — sphalerite is typically coarse-grained and associated with carbonate

+E4 36

37

DB-90-71 — sphalerite + galena-rich bands in a massive sulphide.

38 — bottom 10 cm is a breccia

38.25 — sharp contact

39 — S_2 = 54 L_2 pitches 138°

40 — Top half has minor knots of pyrite

4L2 41 — the bottom half of the interval has 2 - 5mm-wide pyrite-rich bands parallel to S_2

- all pyrite is slightly oxidized

— fold hinge.

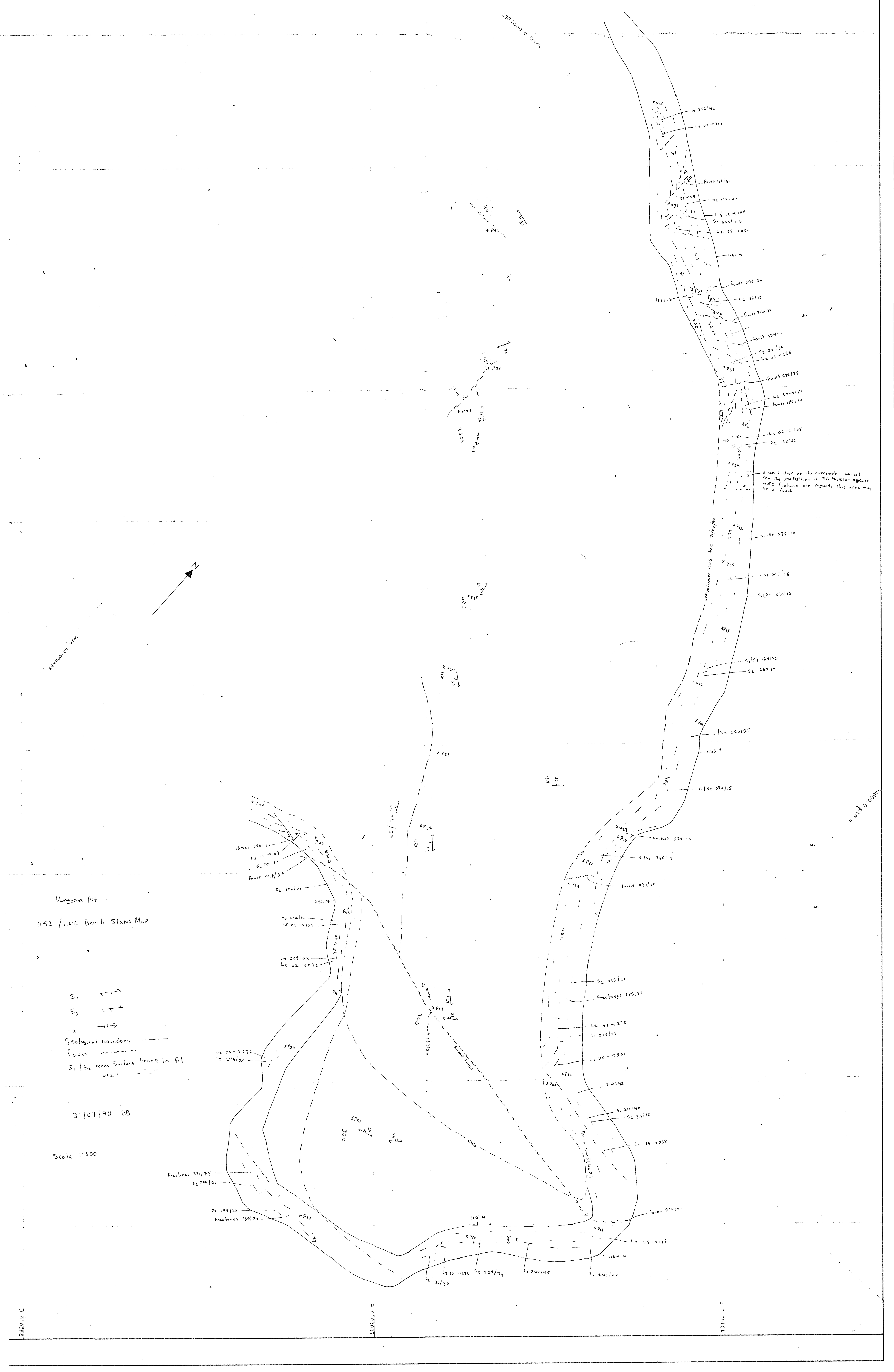
42 — gets more carbonaceous towards the bottom of the interval

43 — S_2 = 50 L pitches 137°

44

44.29

45 EOH



Vangorda Pit
1152 / 1146 Bench Status Map
S1
S2
L2
Geological boundary
fault
S1 | S2 form Surface trace in pit wall
31/07/90 DB
Scale 1:500
6903000.0 UTM
694400.00 UTM
N
9900.0 E
10000.0 E
10100.0 E
S1 256/46
L2 08 → 304
fault 166/40
S2 135/45
S1 063/46
L2 25 → 084
1161.4
fault 292/70
1145.6
L2 116/13
fault 340/30
fault 320/41
S2 261/10
L2 25 → 285
fault 282/85
L2 50 → 148
fault 118/30
L2 06 → 105
S2 158/20
A rapid drop of the overburden contact and the juxtaposition of 3G Phyllites against 4EC footwall are suggests this area may be a fault
approximate 1146 toe 31/07/90
S1/S2 078/10
S2 005/15
S1/S2 010/15
S2 260/12
S1/S2 020/25
1163.2
S1/S2 084/15
contact 220/15
S1/S2 248/15
fault 090/60
S2 015/60
Fractures 285,55
L2 03 → 275
S1 219/45
L2 20 → 261
S1 240/42
S1 210/40
S2 315/32
L2 34 → 258
Pyrite sand (4EP)
fault 210/41
L2 25 → 138
1164.4
S2 240/40
S2 260/45
S2 221/34
L2 10 → 232
S2 130/30
1151.4
SUMP FAULT
fault 132/85
1146
Thrust 220/34
L2 19 → 109
S2 176/17
fault 097/27
S2 186/36
1154.7
S2 040/10
L2 05 → 104
S2 208/03
L2 02 → 078
L2 20 → 276
S2 276/20
Fractures 330/75
S2 204/25
S2 198/20
fractures 050/70