CA89-123

0 5.8 CASING

5.8 47.4 HANGINGWALL ANDESITE

5.8-27.0 Andesite-Massive
- massive to vesiculated fine grained andesite
- rare interbedded cm scale length argillites
- metre scale block core with strong oxidation
- trace pyrite along carbonate veining
- local pillow brecciation
- 5.8-12.6 broken, rubble
- limonitic fault gouge at 8.5
- 17.0-27.0 metre intervals of broken core, extremely oxidized
- possible fault gouge at 20.2 + 23.0
- 21.8 60cm length argillite, pyrite banded, crystalline
- 27.0 lower contact broken, possibly faulted

27.0-38.6 Mudstone-Laminated
- bedded argillite, pervasively altered down hole with intense dolomitization/carbonization, locally replacing original textures
- shearing increases down hole
- occasional cm to m scale sections of broken, crumbly core
- local cm length andesitic flow
- locally isolated, rare granular sphalerite
- 27.0-29.8 bedded unaltered argillite
- banded at 65° CA
- 29.8-38.6 pervasive dolomite?/carbonate altered
- intense replacement from 30.0-30.8
- 31.3-31.7 rubble, possible fault
- 32.3-33.0 rubble zone, fault
- 34.8-35.5 andesite
- 35.5-38.6 pervasive altered along CA
- partial dissolution
- disseminated pyrite, 2-3% locally along CA parallel to structure
- fault gouge at 37.2
- lower contact broken

38.6-43.1 Andesite-Massive
- fine grained, massive, weakly mineralized with pyrite in fractures
- carbonate/quartz veining, up to cm scale common, various orientation
- brecciated lower contact, chill margin

43.1-46.2 Mudstone-Undivided
- massive, commonly siliceous with quartz veinlets, cm scale, 30 to 40° CA
- locally debris flow
- sulfide mineralization in quartz veins/fractures, sphalerite (red/brown honey coloured) galena, pyrite rare pyrite
- 43.1-43.5 interval of semi-massive sulfide mineralization 30-

40% with dominant sphalerite, galena, 2-3% chalcopyrite
- two variables of sphalerite, honey coloured often rimmed with red brown (zoned) veining parallel to CA
- 43.5-44.0 sporadic mm scale veining of galena/sphalerite
- 44.5-44.7 debris flow, contact at 45° CA
- 44.7-45.2 concentration of fine grained disseminated sphalerite, 30%
- 45.9-46.2 disseminated pyrite, structure parallel to contact 15-20% fine grained pyrite
- 46.2 lower contact, sharp, 10-15% CA

46.2-47.4 Andesite-Pillow Breccia
- quartz/carbonate veining common, various attitude
- rare pyrite mineralization associated with veining
- lower contact sharp, 45° CA

47.4 62.0 CONTACT ZONE
- massive, weakly bedded at 50° CA veining, quartz +/- carbonate common
- locally crackle breccia
- sulfide mineralization associated with veining,
- two variables of sphalerite, galena, minor chalcopyrite, rare pyrite
- fine grained pyrite occasional in bands, cm scale, parallel to bedding
- 47.6-48.4 mm scale sulfide veining, dominant honey coloured sphalerite, chalcopyrite, rare galena
- 49.7-50.0 30-40% red brown sphalerite >> honey coloured sphalerite > galena
- crosscuts pyrite mineralization
50.4-51.0 veined red brown sphalerite, galena
- occasional honey coloured sphalerite
- lower contact arbitrary
- gradational to a brecciated argillite

53.9-59.3 Brecciated Argillite
- cm scale argillite clasts in siliceous matrix, crackle breccia
- secondary mm scale quartz veining, generally 70° CA crosscutting
- rare mineralization, dominated red brown sphalerite within siliceous matrix
- disseminated pyrite, trace 1% within matrix throughout
- lower contact gradational

62.0 69.8 TRANSITION ZONE

62.0-69.8 intensely altered rhyolite, spotted, mottled appearance
- altered dominant carbon/tourmaline?
- weakly mineralized with local occurrence of honey coloured sphalerite, disseminated, granular
- blocky core common, up to 1.0m sections

69.8 185.8 RHYOLITE UNIT

69.8-96.4 altered as above but less intense
- locally flow banded preserved
- mineralization common, general concentrated in cm scale sections
- colloidal pyrite, as veins, generally parallel to CA
- sphalerite, galena, tetrahedrite in aggregates at high CA
- tetrahedrite commonly associated with sphalerite
- 69.8-71.2 cm sections pyrite mineralization veined, colloform minor galena

72.5-72.9 colloform pyrite mineralized vein crosscutting sphalerite/galena/tetrahedrite mineralization
- 5% honey coloured sphalerite > galena/tetrahedrite
- minor red brown sphalerite

72.9-78.6 cm intervals of pyrite mineralization
- rare galena/sphalerite (red brown)
- pyrite generally colloform, 90° to CA, in bands

78.6-79.1 first appearance at 78.6 of vg
- fine grained specks, up to mm scale, associated with banded sphalerite, galena
- vg hosted in quartz, carbonate, + sphalerite aggregates
- 78.7-78.9 banded sphalerite/galena
- vg trace % (honey coloured)

81.0-82.0 rubble

82.5-85.5 cm intervals of sphalerite (honey coloured) galena, pyrite, tetrahedrite
- locally up te 40%
- shear/fault zone from 84.8-85.3, intense chlorite alteration, 35° CA - 50° CA

87.0-89.5 shear zone, medium grained chlorite alteration intense
- 40° CA sphalerite mineralization at 89.1
- band of massive sphalerite/galena, minor pyrite, 2 tetrahedrite, 75° CA

90.3-92.5 fine grained vg interval, trace 1% vg at 90.3 within 2cm sphalerite band (honey coloured variable) 75° CA
- 90.5-91.0 disseminated pyrite, 30-40%
- 92.3-92.5 15% sphalerite, pyrite, >> galena
- fine grained vg associated with sphalerite, various host

93.0-108.0 relic flow structure, variable 5 to 25° Ca
- veined pyrite mineralization common, generally along CA
- locally pervasive chloritic alteration along shears/faults
- sporadic mineralization with abundance increasing down hole: sphalerite, pyrite, galena

- 97.5 fault slip/shear 55° CA
- 106.5-106.6 concentrated sphalerite, galena, pyrite veined
- 107.1-107.3 massive galena/sphalerite (2 xxx) pyrite +/- chalcopyrite

185.8 189.5 UPPER ARGILLITE
- local cm scale mineralized sections
- mineralization increases down hole into sphalerite (honey coloured) rich zone
- upper/lower contact gradational + somewhat arbitrary
- minor faulting
- medium grained chlorite alteration common, moderate
- barren 112.0-121.7
- 108.0-111.0 trace 1% sphalerite, isolated/sporadic concentration
- honey coloured variable with lesser galena
- 112.0 fault gouge, no orientation
- 121.7-124.2 cm scale concentration of disseminated pyrite, sphalerite + galena
- 126.0-135.2 mineralized zone, honey coloured sphalerite dominant 5% overall
- concentration in sections cm to m scale
- barren from 129.0-131.0
- gradational lower contact

135.2-149.8 Rhyolite-Breccia?
- argillite/feltic fragments in siliceous matrix variable size from angular mm clasts to subrounded cm scale
- locally altered feldspar laths to gypsum
- strongly xxxx wit honey coloured sphalerite dominant
- 15-30% with sphalerite ? galena/tetrahedrite >> pyrite
- locally trace 1% chalcopyrite at 136.0
- where brecciation well defined, sulfides make up matrix

149.8-185.5 Rhyolite-Lapilli
- locally cm scale ash tuff
- moderately mineralized from 149.8-178.0 up to 10% combined pyrite, sphalerite (honey coloured) + galena
- botryoidal pyrite common in veins, generally along CA
- occasional barren sections, up to m scale
- 152.5-157.5 5-10% pyrite > sphalerite >> galena

158.5-165.5 10% pyrite dominant
- locally semi-massive
- minor sphalerite/galena

165.5-168.0 10-15% sphalerite + pyrite >> galena

168.0-175.2 5% pyrite dominant, concentration of galena from 169.5-169.4
- 1% sphalerite

175.2-178.0 1-2% pyrite/sphalerite, minor galena as mm shale

veins, 45 to 90° CA
- lower contact sharp, irregular

185.5-189.5 Datum Unit-Upper Argillite
- blue grey sedimentary unit with clasts, mm size, of black argillite
- gradational into a rhyolite breccia/tuff
- pervasive silicification as veins + locally as matrix infilling
- sphalerite, galena, tetrahedrite + pyrite mineralization associated with silicification
- 185.8-186.5 2-3% pyrite > sphalerite >> galena
- 187.0-188.2 10-15% pyrite >> sphalerite > galena/tetrahedrite
- 188.6-189.5 20-30% pyrite > sphalerite >> tetrahedrite/galena
- lower contact gradational into rhyolite breccia

189.5-208.3 Rhyolite-Breccia/Rhyolite-Lapilli
- silicified, possible alteration dacitic tuff
- pyrite mineralization common throughout, veined (5%) botryoidal
- sporadic pockets of sphalerite (honey coloured) galena + tetrahedrite mineralization, generally of cm to m scale associated with pyrite
- 189.3-191.8 2-3% sphalerite > tetrahedrite >> galena
- 194.2-195.3 5% sphalerite > tetrahedrite >> galena
- 197.6-197.7 semi-Massive sphalerite, tetrahedrite, galena
- 198.6-198.5 1-2% sphalerite + galena, tetrahedrite
- 202.4-202.6 1-2% tetrahedrite, 1% galena
- 208.6 lower contact, marked by 10cm band of pyrite, 80° CA

208.3 251.8 DACITE DATUM
- massive to vesicular, crackle brecciated on m scale
- pyrite mineralization common, generally disseminated within matrix
- second generation of mineralization seen in quartz veins, sphalerite, galena, tetrahedrite, up to 5% pyrite
- minor broken core
- 209.8 10cm band 90° CA, sphalerite/galena/tetrahedrite
- 217.6-217.8 broken core
- 220.0 disseminated sphalerite, 1cm vein
- 227.3 vein of sphalerite/galena/tetrahedrite
- disseminated tetrahedrite trace 1% from 40cm
- 228.4-229.1 2-3% sphalerite/galena/tetrahedrite
- 233.4-233.5 1-2% sphalerite
- 235.8-237.6 1-2% sphalerite, galena
- 237.4 tetrahedrite with sphalerite
- 238.8-239.1 20-30% sphalerite >> tetrahedrite/galena
- 246.0-250.5 brecciation common, crackle, quartz matrix
- 250.5-251.0 trace sphalerite/galena

251.8 EOH

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0 6.1 CASING

6.1 51.6 HANGINGWALL ANDESITE

6.1-14.1 Mudstone-Debris Flow
- mm scale fragments in argillite matrix
- blocky core
- cm scale locally
- ext oxidized
- lower contact broken, rubbly, possibly faulted

14.1-19.9 Andesite-Undivided
- ext broken, weakly altered
- very poor recovery between 14.0-18.0
- ext oxidized, limonitic
- lower contact broken

19.9-22.4 Mudstone-Crystallites
- up to 40% mm scale crystallites
- bedding at 80 to 90° CA
- locally broken segments, 10cm in length

22.4-31.6 Andesite-Undivided
- as above, rubbly/broken core
- ext oxidized
- broken lower contact

31.6-42.7 Mudstone-Undivided
- massive, bedded, gradational into a debris flow
- int carbon altered in metre long segments
- locally talc altered
- pyrite mineralization common in unaltered, bedded argillite
- disseminated fine grained mineralization common in altered sections

31.6-34.5 very poor recovery up to 34.0, broken, weakly oxidized

34.5-35.2 bedded argillite, 60° CA
- pyrite mineralization in bands, 1%

35.2-36.5 broken, friable

36.7-36.9 pervasive carbonate altered, wispy blotches
- fine grained disseminated sulfides, pyrite 2%

36.9-37.3 rubble, possible fault

37.5-38.6 debris flow, cm scale fragments of andesite

38.7-39.0 cut vein, white, barren, 25° CA

40.2 clay gouge, no orientation

40.4-42.3 carbon/talc altered
- moderately sheared 10 to 35° CA
- increase of disseminated pyrite, 3-5%

42.5-42.7 sphalerite/galena/pyrite mineralization in isolated bands
- two variables of sphalerite, dominant honey coloured but also red-brown pxxx 1-2%
- lower contact, irregular at high CA 80 to 90° CA

42.7-44.9 Andesite-Pillow Breccia
- cm scale intervals of argillite
- lower contact sharp at 35° CA

44.9-47.0 Mudstone-Undivided
- increase shearing down hole
- fine to medium grained disseminated sphalerite towards lower contact, 1%
-47.0 lower contact at 10° Ca

47.0-51.6 Andesite-Massive
- bleached, vesicular
- gradational into a brecciated/debris flow, last 10cm

51.6 72.8 CONTACT ZONE
- generally massive with local metre scale altered zones
- variable mineralization with local concentration of sphalerite/galena/pyrite
- moderately broken core
- local andesite flow
- lower contact arbitrary
- 52.0-52.8 disseminated aggregates of pyrite, sphalerite, galena, with semi-massive mineralization at 52.7-52.8
- increase of sphalerite (red-brown) towards lower interval
- 53.5-54.0 massive andesitic flow
- 55.0-63.5 sporadic local concentration of red-brown sphalerite/pyrite, minor galena
- generally in vein infilling
- calcite veining common
- 65.4-66.1 fault/shear zone
- microfaults
- clay gouge at 25 to 35° CA
- 66.2-67.6 massive pyrite, very fine grained replacement
- 67.6-68.5 isolated occurrence of honey coloured sphalerite/galena in mm scale veining
- 69.5-69.7 disseminated pyrite, sphalerite (honey-coloured) 30-40%
- 69.7-70.3 pervasive silicification
- 70.3-72.8 disseminated pyrite/honey coloured sphalerite/galena with local concentration over cm lengths
- up to 50% mineralization with pyrite > sphalerite >>> galena
- 72.8 lower contact gradational, arbitrary

72.8 78.2 TRANSITION ZONE
- argillaceous component from 72.8-76.8
- disseminated pyrite/sphalerite/galena common, occasionally in bands 55° CA
- generally mineralization in disseminated aggregates
- locally massive with sphalerite/pyrits dominant
- lesser galena, tetrahedrite +/- chalcopyrite up to 40%
- 76.8-78.3 locally pervasive sericitic alteration
- foliation common 55° CA
- coal absent to core
- sphalerite is red-brown variety
- lower contact arbitrary

78.3 151.0 RHYOLITE LAPILLI
- cm scale fragments in ash matrix
- locally flow banded rhyolite
- pervasive black alteration (carbon?) common up to 101.0
- sulfide mineralization common, dominated pyrite, locally
- semi-massive, generally within matrix, fractures
- pyrobitumen noted in calcite veining
- 78.3-101.0 black altered rhyolite
- 78.6-84.0 dominate pyrite up to 40% minor sphalerite (red-brown) galena, pyrite 2cm wide, 75° CA
- 86.9-88.0 60-70% pyrite >>> sphalerite/galena
- 90.0-95.0 concentration of pyrite, locally infilling rare sphalerite, galena
- 95.0-100.5 pyrite mineralization still common
- local concentration of sphalerite (honey coloured) + galena
- 101.8-107.0 cm scale segments of semi-massive massive pyrite mineralization
- 111.5-116.5 as above
- local galena/sphalerite concentration at 116.0-116.3
- 120.6-120.9 disseminated pyrite 10%
- 128.4-129.2 int sericitic alteration, possibly interbedded mudstone
- 130.5-130.9 interbedded mudstone, lower contact at 70° CA
- 132.5-145.5 intervals of pyrite mineralization, semi-massive up to 10cm
- rare isolated concentrated sphalerite
- 151.0 lower contact, sharp at 75° CA
- increase concentrated sulfides of last 20cm
- 15-20% pyrite>sphalerite

151.0 154.3 UPPER ARGILLITE
- bedding at 75° CA
- common carbonate veining, generally mm scale, crosscutting structure with no preferred orientation
- trace 1% pyrite associated with veining
- lower contact brecciated over 20cm
- marked by 5cm band of pyrite, 90° CA

154.3 240.2 DACITE UNIT
- strongly altered, silicified in part resembling rhyolite lapilli tuff
- locally banded
- strongly mineralized with local concentration of pyrite, sphalerite, galena, with pyrite dominant
- disseminated pyrite common throughout
- sphalerite honey coloured xxx
- 154.8 2cm band pyrite, sphelerite (honey coloured) galena
- 157.0-158.0 3-5% pyrite, locally concentrated
- 158.6 sphalerite, galena associated with quartz vein
- 160.5-187.5 intervals of sulfide mineralization, up to 1.0m in length
- pyrite dominant, locally semi-massive
- mineralization generally in veins, often with quartz + as matrix supporting clasts
- intervals of sphalerite/galena mineralization
- 163.5-163.8 2-3% cembined
- 165.5 1% galena
- 167.0 1% galena
- 170.6-170.8 1-2% sphalerite, 1% galena
- 173.5-173.8 1% sphalerite
- 187.5-212.0 sporadic concentration sulfides, generally on cm scale, commonly veined
- sphalerite/galena mineralization 175.5-176.0 1-2% sphalerite, locally oncentrated, 1% galena
- 182.8-186.0 intervals, up to 30cm of sphalerite/galena concentrated
- 188.4-190.8 bands of sphalerite/galena mineralization up to cm scale, 65° CA
- possibly tetrahedrite present
- 191.5 sphalerite/galena band/veinlet 45° CA, mm scale
- 193.9-194.2 disseminated sphalerite associated with pyrite, 2-3% sphalerite
- 200.1 quartz vein, 80° CA with sphalerite/galena concentrated
- 204.0-212.0 sporadic sphalerite/galena veining, generally mm scale, high Ca 70 to 80°
- 211.4-214.2 rhythmic banded 80° CA
- lower contact sharp but irregular, slumped

214.2-215.6 Debris Flow
- subrounded felsic clasts, cm scale, in argillaceous matrix
- pyrite veining common
- 5cm band of sphalerite with lesser pyrite, minor galena at 214.4, 60° CA
- lower contact broken

215.6-240.2 Dacitic Tuff
- similar in appearance to rhyolite lapilli, cm clasts in ash matrix
- silicified disseminated pyrite (1%) common with local concentration of pyrite, sphalerite, and galena

- sphalerite is honey coloured xx
- 219.3-223.4 sections of semi-massive pyrite up to 40cm in length, generally as veins
- rare sphalerite mineralization associated with pyrite
- 225.2 concentration of sphalerite with sericitic/carbonate altered 4cm wide bad in 10cm altered zone vein
- lower contact at 50° CA
- minor galena
- 225.6 concentration of sphalerite/galena in chloritic vein, 5cm wide, 50° CA
- 233.8-234.4 intervals of sphalerite/galena mineralization
- massive galena >> sphalerite in 10cm band
- 234.5-240.2 trace 1% sphalerite/galena a isolated disseminated aggregates
- 240.2 lower contact, sharp at 75° CA

240.2 241.9 DEBRIS FLOW
- feltic clasts dominant
- locally cm scale, up to 40% abundance, subrounded
- minor argillaceous clasts
- mud matrix
- disseminated pyrite common
- scattered/sporadic granular sphalerite
- 1-2% pyrite, trace 1% sphalerite
- lower contact broken, abrupt

241.9 302.1 ARGILLITE
- massive black argillite, weakly mineralized
- locally brecciated carbonate veining, occasionally with pyrobitumen within the carbonate veining
- minor broken core
- dolomitic alteration pervasive towards EOH
- spotted texture
- carbonate/graphitic smears common on broken core surfaces
- 246.0-254.0 cm sections of carbonate breccia (crackle breccia)
- disseminated pyrite, 3-5% from 253.5-254.0
- 266.4 20cm broken core, fault?
- 278.5 fault gouge, cemented, 55° CA
- 279.0-286.0 50cm intervals of broken core, 1 per 1.0m
- 286.5 bedding at 80° CA
- sheared foliation at 65° CA
- 287.4-297.0 pervasive dolomitic alteration
- spotted with spherical crystal growth of mm scale, up to 30% in abundance
- rare veining
- 297.0-298.5 bedded argillite, 65° CA
- 298.5-302.1 cm intervals of broken core, graphitic/carbon shear on broken surfaces

302.1 EOH

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0 4.3 CASING

4.3 11.3 OVERBURDEN
- dominantly argillite clasts cemented
- possibly glacial origin

11.3 45.2 HANGINGWALL ANDESITE

11.3-39.0 Mudstone-Undivided/Andesite-Massive
- dominantly argillite with minor andesitic flows
- andesite above present is generally pillowed/brecciated
- argillites commonly pervasive altered with carbonate altered dominantly in m scale
- andesite tend to be silicified with white quartz veining
- minxx restricted to argillites, variable concentration is by generally low
- single occurrence of cinnabar, realgar, orpiment
- disseminated pyrite common in andesite associated with veining
- sharing/faulting commonly observed with in argillites

11.3-17.4 black argillite, mxd carbon altered
- shear/fault zone, low angles 10 to 30° CA

17.4-24.6 pervasive altered argillite, dominate carbonate as veins, felted aggregates
- silicified from 20.2-21.8
- disseminated pyrite sheared along CA

24.6-25.3 andesite massive, contact at 35° CA

27.4-28.7 andesite massive. lower contact 65° CA

28.7-32.4 pervasive carbon altered, veins at 55° CA
- locally total carbon replacement
- isolated occurrence of oinnabar, realgar, orpiment at 27.2-29.4

32.0-32.5 amber disseminated sphalerite 3-5% lesser galena

32.6-39.0 up to m intervals of broken core
- blue hue common or broken surfaces, hydras zinc?
- rare bedding at 45° CA
- lower contact broken

39.0-45.2 Andesite-Massive
- chill margin bleached
- lower contact faulted no orientation

45.2 97.5 CONTACT ZONE
- massive, locally altered

- sulfide mineral towards lower contact
- amber sphalerite
- galena generally in veins
- mm scale
- 45.2-55.5 broken core, m intervals
- 55.9 fault gouge, clay, 40° CA
- 57.5 bedding 30° CA
- 62.8 red brown sphalerite, pyrite, galena in quartz vein, mm scale 15° CA
- 64.5-71.0 blocky core
- 75.8 fault gouge, caly 35° CA
- 76.3-78.0 sporadie sulfides, vein concentration, mm scale
- 50 to 75° CA sphalerite, galena, pyrite trace % over interval
- 81.3-82.0 rubble
- 83.5-83.8 up to 1.0m interval broken core
- 89.0-91.7 pervasive silicification a veins, patches
- 93.8-94.2 20-30% sphalerite (s xx), galena, pyrite, tetrahedrite, matrix filling
- lower contact marked by shear zone + mineralization

97.5 126.6 TRANSITION ZONE
- zone of intense chlorite alteration
- relic flow banding locally
- local concentration of sphalerite, galena, tetrahedrite, pyrite, in sections up to 1.0m
- amber sphalerite dominant
- 97.5-98.5 massive sphalerite, galena, tetrahedrite 25% strongly sheared, 30° CA
- 98.6 fault gouge 20° CA
- 100.4-101.1 semi-massive sphalerite, galena, tetrahedrite 30-40%
- 100.5 fault, broken friable core, no orientation
- 103.1-103.9 2-3% sphalerite, pyrite +/- galena
- 105.4-105.6 massive sphalerite, galena, tetrahedrite
- 109.9 1% disseminated galena, fracture filled
- 111.3-111.6 3-5% sphalerite, disseminated granular
- 112.0-113.4 foliation at 55° CA
- 114.9-115.2 5% disseminated sphalerite
- 119.1-122.1 10-20% disseminated pyrite
- 125.3-126.6 interbedded argillite
- xxxx at 30° CA
- lowest 40cm strongly mineralized 30-40%
- red sphalerite.amber sphalerite, pyrite + galena

126.6 191.1 RHYOLITE UNITE

126.6-143.1 Rhyolite-Lapilli/Rhyolite-Breccia
- weakly mineralized
- rare cm scale concentrated
- generally veined/fracture filled
- lower contact gradational to flow banding
- 131.5 2cm band massive galena, minor pyrite

- 136.3-136.4 15-20% disseminated sphalerite/tetrahedrite >> galena/pyrite
- 137.0 1% disseminated sphalerite, galena over 20cm
- 142.1-142.6 breccia, argillaceous clasts, 2-3% pyrite in matrix
- 143.1 lower contact, gradational over 40cm

143.1-151.5 Rhyolite-Flow Banded
- flow banding at 60 to 70° CA
- isolated, sporadic concentration of sphalerite, galena, tetrahedrite, pyrite
- pervasive chloritic alteration down hole, locally on m scale
- 143.3+143.4 massive band of red brown sphalerite, galena, pyrite, chalcopyrite
- 144.1-144.2 40% sphalerite >> tetrahedrite > galena, banded
- 145.5-147.5 sporadic mm veinlets of sphalerite, tetrahedrite <1% over interval
- 148.4-150.0 up to 30% sphalerite, galena over 40cm
- 5% over interval
- 150.5-151.2 pervasive chlorite alteration
- disseminated sphalerite at lower interval
- 151.2-151.5 2-3% sphalerite, tetrahedrite, pyrite
- 151.5 lower contact, arbitrary

151.5-191.1 Rhyolite-Lapilli/Rhyolite-Breccia
- locally pervasive chlorite alteration, m scale
- silicification common below chlorite alteration
- 151.7-153.7 disseminated pyrite in vein/matrix 2-3%
- 160.0-164.6 pervasive chlorite alteration
- fine grained disseminated pyrite common, variable concentration trace to 10%
- 150.0-191.1 silicified white quartz veins, parches
- concentrated pyrite common, as veins matrix infilling 2-3% overall, locally 30%, botryoidal
- moderate chlorite alteration down hole
- lower contact sheared/faulted at 45° CA

191.1 214.6 DACITE UNIT
- fine grained, grey blue in colour, mm scale angular glass shards
- towards lower contact cm scale
- datum unit datum dacite clasts
- pyrite mineralization is common with concentration up to 50cm core length, up to 25%
- isolated occurrences of sphalerite (amber + galena as follows:
- 191.8 trace 1% sphalerite >> galena associated with silicification
- 195.6 strgr of sphalerite, galena, 10° CA
- 195.9 trace sphalerite, galena associated with increase pyrite concentrations
- 196.3 isolated concentration of galena, associated with quartz bleb
- lower contact gradational over 20cm

196.5-214.6 Datum Unit-Datum Dacite
- vesicular; moderate to weakly alteration
- silicification increases down hole
- pockets of mineralization with highest concentration at lower contact
- pyrite common with lesser sphalerite, galena
- shear structure (wormy appearance), possibly flow banding or sheared vesicles, low angle at 30° CA
- 119.9 veined sphalerite 25° CA, 2mm
- 207.5 veined sphalerite, galena, 1cm, 25° Ca
- 213.8-214.5 50% pyrite >> sphalerite>> galena

214.6 250.9 LITHIC TUFF
- trace 1% disseminated pyrite
- minor broken core at EOH

250.9 EOH

CA89-120

0 10.7 CASING
- till - trace altered fragments of argillite vol fragments

10.7 133.2 HANGINGWALL ANDESITE

10.7-12.8 Till

12.8-160.0 Mudstone-Laminated/Mudstone-Contorted
- dark grey argillite
- calcite veining - quartz veining 30° to CA
- disseminated laminations very fine grained pyrite
- 16.0 disseminated sphalerite
- 13.0 trace arsenopyrite
- 14.4 trace galena
- irregular vein breccia quartz + calcite

16.0-29.6 Andesite-Pillow Breccia
- greenish andesite pillow breccia
- calcite veined
- 20.4 2cm
- irregular gypsum dolomite
- some argillaceous material
- dark green chlorite slips

29.6-31.0 Andesite-Pillow Breccia?
- rubbly fault

31.0-35.3 Andesite-Pillow Breccia
- pale green andesite pillow breccia
- some argillaceous matrix
- white calcite veins
- dark grey chlorite breccia - pyrite disseminated (31.5)
- andesite fine feldspathic crystals
- grey to dark grey fine calcite breccia cement
- breccia base with argillaceous matrix

35.3-35.8 HMMS
- massive dark grey argillite - calcareous
- similar to cement in pillow breccia above as above

35.8-37.0 Andesite-Pillow Breccia
- 36.0-37.0 fault gouge
- crushed andesite + argillite, pyrite

37.0-69.8 HMMS
- mottled grey - black-white altered argillites
- 36.0 gougy black argillite with angular chips of broken vein material pyrobitumen, pyrite
- 37.0-38.0 veined and calcite flooded argillite irregular xxxxxxx like alteration flooding some spotted texture
- 38.0-38.7 mud and gouge fault black argillite gouge pyrite

- 38.7-55.0 strongly calcite (grey/white) spotted and irregular veined
- disseminated amber sphalerite
- 42.0-43.0 pyrite blotches fine disseminated metallic "blush" cast to alteration and mineralization
- angular chips and fragments bluxxxx cherty material
- 45.5-47.0 massive mineralization
- sulfosalts, sphalerite, tetrahedrite, galena
- 48.0 amber sphalerite black argillite matrix
- fine grained tetrahedrite

37.0-69.8 HMMS
- greyish calcareous alteration decreases in intensely by 56.0
- still have disseminated areas of amber sphalerite
- 58.0-68.8 black crushed argillite/shale xxxxxxxxxx
- gouge zones of 0.5m core loss
- strongly tectonized
- 65.8 white calcite vein late?
- 68.8-69.8 grey calcite spotting and flooding

69.8-72.5 Andesite-Pillow Breccia
- greyish carbonate altered
- andesite volcanic
- calcite veining two generations 30° to CA
- irregular vein breccia
- could possibly be limy sediment which as strongly altered, chips of argillite
- based contact has mud chips

72.5-82.8 HMMS
- black xxxxxxxxxxx argillite gouge mud
- blocky thick bedded?
- polished ships, sulfides at bases - calcite, trace xx xxxxx
- 80.2 pyrite lamination 5° CA
- 73.5-74.9 black gouge mud - fault
- 74.9 grey andesite fragment
- 75.3 black sand fault
- 76.5 gypsum andesite in black mud gouge
- 79.0 end of gouge zone
- 77.5 calcite vein with shally parting 10o ↑ CA

82.8-101.1 Andesite-Pillow Breccia
- tan fine crystalline andesite pillow breccia with grey calcite matrix - chlorite - irregular
- strongly veined calcite with quartz 30° CA
- trace pyrite cubic, also fine grained disseminated vesiculated fragments calcite-chlorite also chlorite calcite
- possible third generation sperry calcite infill
- upper + lower portions speckled with very fine grained baff yellow chilled upper + lower contacts veined

101.1-106.9 Mudstone-Laminated
- black argillite - gouge zone at top 101.4

- pyrite laminations - slumping 45° CA
- altered and veined carbonate dolomite greyish + bamxx?- bedded? 75° CA
- pyrite, sphalerite, tetrahedrite, sulfosalts pale sphalerite
- gash veins of mineral 10 to 30° CA
- angular chips of argillite floating in matrix of carbonate
- late quartz - carbonate veins crosscutting 30° CA
- 106.5 gouge

106.9-111.3 Andesite-Pillow Breccia
- pale tan andesite with pale green specks of mafic accessory- dark pyrite graphitic slips 30 to 25° CA
- quartz veins
- chlorite pyrite, very fine slips
- silicified cherty matrix to brecciated and chilled base

111.3-130.6 Mudstone-Laminated
- black argillite with pyrite laminations 65° CA
- quartz calcite vein breccia at top along graphic chip
- 162.0 quartz vein - sp amber
- blocky black argillite quartz vein brecciated angular fragments crackle like
- 115.5 become lighter grey - silty component
- pyrite laminations 70° CA
- liney sections
- 116.0 trace disseminated gxx or sulfosalt - styolitic like xx
- 118.0 sphalerite vein 70° CA, possible along
- 121.0-124.0 several small zones of crushing
- 126.5 quartz veins 40° CA
- 127.6 graphitic polished slip
- 128.0 slump breccia
- 128.0-129.0 strong veins calcite + quartz
- contact with andesite veined

130.6-132.5 Andesite-Pillow Breccia
- tan andesite grey calcite - chalcopyrite pyrite
- broken from base

132.5-133.2 Mudstone-Undivided
- black argillite
- broken chips

133.2-134.1 Transition Zone
- strong sheared and altered chlorite-sericite altered rhyolite disseminated sphalerite-tetrahedrite

134.1-135.4 Mudstone-Undivided
- black silty mudstone grey to black
- blebs of pyrite with rims of calcite speck of amber sphalerite caxxxxxxxxm

135.4-140.5 Andesite-Pillow Breccia
- tan pillow breccia andesite with fine specks of buff sericite alteration calcite chalcopyrite-pyrite vein

- 140.5 gouge crush zone

140.5-141.3 Mudstone-Undivided
- broken black argillite
- calcite tension fractures
- abrupt contact with andesite 70° CA

141.3-147.8 Andesite-Pillow Breccia
- pale brown green andesite pillow breccia with grey carbonate matrix with disseminated trace pyrite
- wispy chlorite - chlorite from coatings
- caloite veins + fractures - trace pyrite minor argillite
- strong disseminated pyrite

147.8 148.5 CONTACT ZONE
- grey to black argillite - mudstone tension fractures calcite 10 to 20° CA

148.5 150.0 TRANSITION ZONE
- altered transition zone
- sericitic pale to dark green wispy fabric with fine disseminated tetrahedrite-sphalerite
- blotchy grey carbonate alteration

150.0 155.3 RHYOLITE
- rhyolite altered irregular sericite
- wispy fractures
- grey calcite alteration
- blotchy and from breccia filling - carbonate
- 154.4-155.5 increasing fabric 60° CA
- strong alteration sericite
- crush and gouge zone
- with graphitic slips 30° CA
- slip plane

153.3-156.2 CTMS
- grey/black brittle from argillite mudstone
- stylolite from with betumeous coating
- patchy grey alteration carbonate
- wispy black alteration and breccia
- with fine wispy disseminated tetrahedrite-sphalerite

156.2-157.5 Massive Mineralization
- sphalerite-tetrahedrite
- 5% blotchy grey/white carbonate with blebs of fragments occasional argillite fragment
- planes 90° CA ship sericite gouge

157.5-210.4 Rhyolite
- strongly altered rhyolite lapilli tuff + xxxx
- greenish sericitic soft spotted with circular to patchy to pervasive zone of greyish carbonate alteration

157.5-159.8 fabric - sericite alteration 80° CA
- patchy carbonate alteration soft fine disseminated sulfides pyrite, trace arsenopyrite

159.8-162.6 patchy alteration - silicified rhyolite lapilli
- 162.6 altered sericite fabric 50 to 60° CA
- fine disseminated pyrite - trace arsenopyrite
- lacy, spotted, blotchy
- nodular carbonate alteration over prxxing sericite alteration
- 167.1 ghosty fragments in carbonated matrix
- 168.7-168.9 crush zcne
- 172.2 large fragment - dominantly lapilli
- 173.8 10cm bleached brecciated + chilled andesite
- 185.6 disseminated pyrite
- 179.0 + 182.0 spotted greyish carbonate
- 183.5 gouge 30° CA

183.8-186.5 Dyke
- tan chilled brecciated andesite chlorite calcite veins 40° CA-45
- 187.3-187.7 Dyke

191.2-191.4 Dyke
- greenish tan andesite chilled and breccia

157.5-210.4 Rhyolite
- 186.5-191.2 intensely altered rhyolite sericite overprinted by spotted greyish carbonate unit xxx obliterated by alteration
- 192.4 alteration rhyolite lapilli and has tuff
- greenish sericitic fragments in greyish matrix
- 197.5 rounded fragments of argillite increasing content of rounded fragments various lithic types
- vesicular fragment in serciting greenish ash angular in grey ash detxtal matrix
- spotted grey carbonate alteration
- 206.0 various rounded fragments
- 209.0 fabric 30° CA - slips and crush zone
- some laminations of argillite

210.5-216.1 Datum Unit-Upper Argillite
- black laminated argillite with wispy sericite altered felsic wisp
- top slumped and brecciated
- disseminated pyrite
- b 10 to 15° CA, along CA
- lower part b - 50° CA

210.5-216.1 Datum Unit-Upper Argillite
- light grey silty lehses interbedded with black argillite

216.1-217.5 Rhyolite?
- strong sericitic altered soft felsic? with proneneed fabric 45° CA

- upper + lower contacts - sericitic gouge

217.5-219.2 Datum Unit-Upper Argillite
- black argillite with sip sericitic zones - strong fractured
- b 20° CA
- drag folds? dislocation surface
- graphitic polished slips

219.2-222.0 Rhyolite?
- greenish sericite altered rhyolite?
- lapilli atuff - strongly overprinted by quartz
- calcite vein, fractures + breccia filling
- several sericitic gouge xxxxxxx 35° CA

222.0-228.3 Datum Unit-Upper Argillite
- black argillite massive
- veins and breccia fillings quartz and mine carbonate
- irregular sericitic wispy alteration with pyrite
- 225.0 graphitic slip + to cora along vein margin
- late quartz-calcite xxxxxxxxxxx from cut sericite alteration
- irregular wispy pyrite laminations 70 to 80° CA
- slumping on transposition fabric weak fabric 50° CA

228.3-232.7 Datum Unit-Tuff
- pale green weak sericite altered dacite tuff soft (quartz-calcite veins)
- tectonic fabric at contacts

232.7-247.5 Datum Unit-Datum Dacite
- grey black vesiculated dacite
- irregular gas xxxxx fill
- brecciated base interbedded with laminated argillite below has a fine bed brecciated top with argillite tuff above
- fragments of argillite

247.5-282.6 Datum Unit-Upper Argillite
- black laminated argillite
- tuffaceous beds
- pyritic laminations 70 to 80° CA
- fabric 50 to 60° CA from 30° Ca
- white ash fragments?

247.5-282.6 Datum Unit-Upper Argillite
- black massive to laminated argillite with tuffaceous interbeds to 20cm pyrite
- shelly fossil debris 259.0
- 260.0-262.3 feldspathic sandstone some coarser debris
- graded up sequences fxxxxxx up, pyritic fragments
- fractures with quartz/calcite vein

271.0-272.0 pyrite very fine grained 10-20% blotches + xxxx

272.0-272.5 crush zone

274.2-275.2

272.5 slickensides g4aphitic xxxxxxxx to 247.0 strong fabric zone - silty grey sections in argillite some fine white debris b 66° CA

282.6 EOH

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0 3.0 CASING

3.0 147.2 HANGINGWALL ANDESITE

3.0-22.4 Andesite-Pillow Breccia
- maroon andesite pillows with pale green selvages
- minor hyaloclastite
- weakly brecciated (5-10% grey calcite - sequential infill with chlorite, prehnite, pyrobitumen and quartz)
- 1-3% pyrite, trace pyrrhotite also infilling - lining fractures

22.4-24.8 Mudstone-Laminated
- layers at 55° to CA
- 1-3% pyrite
- 90% lime mud layers
- 23.2-24.8 oxidized rubble zone
- 1% cw fracture filling

24.8-32.5 Andesite-debris Flow
- 90% clasts - 80% altered andesite fragments + 10% altered argillite fragments and pyritized fragments
- grey calcite matrix
- 6-8% pyrite, very fine grained

32.5-53.4 Mudstone-Laminated
- 20% lime mud layers
- layering (laminations at 65° to CA)
- 3-5% pyrite
- 1% cw fracture filling - crosscutting layers
- trace pyrite in occasional calcite fracture fill
- occasional oxidized fracture throughout
- 44.7-44.8, 45.9-46.7, 50.8-52.0 bleached, aphanitic, brecciated andesite fragments (crackle breccias)

53.4-140.1 Andesite-Massive
- pseudo ophitic chlorite altered cores to aphanitic brecciated chill margins
- prophyllitically altered (wide) and weakly argillically altered
- trace pyrite
- ~~fist~~ first 20 feet (6.0m) are crackle breccia
- trace pyrrhotite in occasional breccia infill
- 96.0-117.9 slickensided, calcite + chlorite fractures become more abundant
- intense chlorite alteration in this zone
- 123.9-140.1 40% fine grained maroon pillows or dykes - or both
- chill margins in the maroon andesites with no chill margins in the surrounding "sub ophitic" andesite indicates later dyking however, there are occasional chilled margins in the host andesite to indicate possible pillows as well as minor crackle breccias and hyaloclastite

140.1-146.1 Mudstone-Laminated

- layers at 40° to CA
- 80% lime mud layers
- 3-5% pyrite
- 1% cw fracture filling
- 141.7 microscopic drag fold in pyrite layers

146.1-147.2 Andesite-Breccia
- 20% argillite layers
- intensely altered, bleached to pale beige
- pervasive black dendritic alteration (carbon alteration?)
- 1-3% pyrite along edges of clasts and as coarse euhedral clusters throughout

147.2 151.5 CONTACT ZONE
- fault zone - rubble
- layers at 70° to CA
- 1-3% cw fracture filling
1-3% pyrite
- graphite + pyrite films along shear planes
- trace arsenopyrite [(?) oissubke]

151.5 157.4 TRANSITION ZONE
- altered ash, fine grained with increasing amount of relict, talc altered lapilli fragments by bottom of unit
- decrease from 80% ash to 20%
- 153.0-153.3 tension gashes
- quartz filled, subparallel to CA
- 153.8 trace stibnite

157.4 203.3 RHYOLITE UNIT

157.4-168.2 Rhyolite-Lapilli
- shears at 40° to CA 165.8
- moderately intense talc/chlorite alteration of clasts and matrix
- 1-3% pyrite very fine grained
- 158.7-159.5 70% black "carbon" alteration of clasts
- 168.2 quartz fracture filling with 1% realgar

168.2-179.2
-intense talc alteration
- shears at 80° to CA
- occasional relict clasts from 168.2-168.9 then clasts become completely obliterated
- 3-5% very fine gained feltic pyrite
- 170.8-176.0 dendritic blebs of white, milky gypsum (10%) in intensely sheared (80°) gypsum + talc + chlorite altered matrix
- shears from 60 to 80° to CA

179.2-181.3
- 1% realgar, 1% orpiment associated with quartz fracture filling

(3-5%)
- possible trace tennantite

181.3-203.3
- flow banded rhyolite - massive to weakly brecciated
- 1-3% quartz fracture filling
- flow banding is contorted - sucrosic texture
- 1-3% very fine grained pyrite
- 183.1-183.4 1% honey coloured sphalerite, trace galena/tetrahedrite?
- 194.0-203.3 rubbly
- moderately poor recovery
- 199.1-202.6 dark green, translucent chlorite + minor muscovite + talc
- 1% euhedral pyrite
- 45° to CA - shears (foliations)

202.6-203.3 Rhyolite
- chlorite + talc altered, minor
- sucrosic texture
- rubble

203.3 EOH

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0	6.7	CASING
6.7	75.0	HANGINGWALL ANDESITE

6.7-27.7 Andesite-Tuff
- very rubbly core
- poor recovery, oxidized heavily
- argillite remnants at beginning fault rubble

27.7-28.3 Mudstone-Undivided
- fault rubble
- poor recovery
- banding at 50° CA

28.3-34.6 Andesite-Tuff
- banding at 45° to CA
- minor crystallites
- oxidization on fracture surface
- sediment debris flow at 37.0-37.1
- fault gouge between 39.0-40.0
- coarse grained pyrite in siliceous framework where matrix has been somewhat dissolved, 5% pyrite at 39.0-40.0
- white veined in gouge zone ??gypsum?? brecciation with calcite gash fracture at lower contact

43.0-43.8 Andesite
- fine grained chill margin tuff, slight chlorite alteration

43.8-46.0 Massive Sulphides
- 90% (10% chalcopyrite, 30% pyrite, 10% tetrahedrite, 40% very fine grained sphalerite mixed with tetrahedrite, fine grained pyrite)
- dissolution cavities giving core surface pitted appearance
- high specific quartz

46.0-49.0 Andesite-Tuff
- dark grey Fine grained argillaceous contamination of the tuff calcareous near lower contact

49.0-62.3 Mudstone-Undivided
- upper portion to 56.0 quite brecciated with hairline gash fractures conjugate set 50° and parallel CA filled with quartz carbonate
- fault gouge at 50.0, 53.0, 54.9
- 56.0 to lower contact laminated argillite banding at 65° to CA
- 56.5-61.3 bluish film coating fracture + shear planes
- hydrozincite?? lower portion has tuffaceous bands significant less hearing + gash fracturing
- mineralization 54.0-54.3 5% pyrite, 1% sphalerite, trace galena, trace tetrahedrite
- sediment deformation at this point
- occurs as coarse rounded grained + blebs

- some are elongated with shear 50° CA
- some pyrite occurs as replacement alteration spheres
- 53.0 1cm thick stringer of massive fine grained pyrite parallel shearing 45° CA
- 57.3 rounded disseminated blebs sphalerite + pyrite
- 58.8-59.0 bands 60° CA sphalerite + pyrite
- 59.0-60.0 then 1mm bands fine grained pyrite banding 70° to CA (5% sulfides) and 2 coarse grained stringers lower part of interval
- 60.0-61.0 very dense argillite no mineralization except apardy disseminated pyrite
- 61.0-62.3 argillite becomes more tuffaceous with fine grained disseminated pyrite throughout with wavy fine grained bands with several bands of medium grained sphalerite 2-3% sulfides

62.3-66.0 Andesite-Tuff
- vesicular, vesicles filled with quartz brecciation at 63.0
- disseminated pyrite in matrix as blebs + stringers
- several altered veinlets with zoned alteration
- carbon alteration infringes
- quartz in centre fault gouge at 65.4
- more shearing as approach lower contact
- more criss-crossing hairline fracture trace disseminated pyrite throughout

66.0-68.5Mudstone-Laminated
- laminations 50° CA
- heavy gouge at 68.3
- shear graphitic upper contact 40° CA with bleb of pyrite
- pyrite + sphalerite blebs + band + minor galena
- granular stringers of sphalerite, pyrite, galena at 67.2, <1% sulfide

68.5-69.8 Andesite-Tuff
- fine grained tuff with hairline gash fracture brecciation at middle of intervals
- trace sulfide (sphalerite, pyrite, galena, tetrahedrite) in argillite fragments with a brecciated zone of this andesite

69.8-74.6 Mudstone-Laminated
- lamination 55° CA, sediment brecciation + slump
- 69.8-70.5 massive sulfide mineralization 75% sulfides (50% pyrite, 20% sphalerite, 2% galena, 3% tetrahedrite) eccur as coarse granular blebs, discrete disseminated fine grained masses
- pitted dissolutions cavities
- graphitic fracture planes
- 73.4-73.6 stringers + disseminated blebs of chalcopyrite + lesser galena, sphalerite, tetrahedrite, (5% chalcopyrite, 2% pyrite, 1% sphalerite, trace tetrahedrite) lamination caused by tuffaceous coarser layers

74.6-75.0 Andesite-Tuff
- very fine grained tuff, grey 1% pyrite chloritized, gypsum?? on fracture surface

75.0 91.0 CONTACT ZONE
- several cm bleb of massive fine grained pyrite in very altered argillite rubbly core from 75.4-76.5 fairly siliceous
- 76.5-88.5 banded argillite 80° CA
- discoloration bands and coarser tuffaceous beds frequently containing very fine grained bedded pyrite grained
- are several crosscutting pyrite stringers in breccia matrix at 85.5
- hairline fractures of quartz parallel to subparallel CA
- 88.5-89.9 rubbly core, locally brecciated
- 89.9-91.2 massive argillite
- mineralization 88.8 - 1 stringer of coarse galena, sphalerite in breccia matrix 1cm wide
- fine grained banded pyrite in adjacent rubble
- 90.0-90.8 medium grained bed of pyrite conformable with argillite at 60° CA with massive blebs of fine grained massive pyrite
- stringers + blebs of sphalerite, galena + chalcopyrite in breccia matrix
- 20% sulfide (15% pyrite, 4% sphalerite, 1% galena, trace chalcopyrite)

91.0 94.5 TRANSITION ZONE
- very strongly sericitically altered
- has strong shear fabric with sericite foliations 55° CA
- rock is very argillaceous
- mineralization very strongly mineralization for most of this interval
- 10% sulfides (7% sphalerite, 2% pyrite, 1% galena + chalcopyrite + trace tetrahedrite)
- occurs as rounded disseminated grained and stringers in a mud matrix
- pyrite usually more euhedral grained
- fault gouge at 94.0 rounded siliceous rhyolite fragments near middles of intervals
- core becomes slightly more felsic toward lower contact

94.5 153.1 RHYOLITE UNIT

94.5-124.6 Rhyolite-Breacia
- cave rubble of andesite between 94.0 + 95.0 from higher in the hole
- lapilli size fragments, strong brecciation, strong alteration to sericite, chlorite + some clay alteration
- chalcedonic quartz veining associated with black alteration (sulphosalts??)
- 95.3-95.8 massive sulfides
- 80% sulfides (60% sphalerite, 5% tetrahedrite, 5% galena, 10% pyrite)
- sphalerite occurs as rounded grains forming a granular mass

- abundant interstitial tetrahedrite, galena, pyrite in a chloritic matrix
- visible gold occurring as fine grained dissemination at 94.5

95.8-100.3 strong crackle breccia with 5% pyrite as stringers in matrix and as fine dissemination
- prominent chalcedonic quartz + black(sulfosalt??) alteration (possible tourmaline??)

100.3-102.3 massive sulfides, heavily altered matrix, chlorite, sericite, clay alteration
- mineralization occurs as a massive of coarse granular to fine grained
- pyrite 35%, sphalerite 20%, chalcopyrite 5%, tetrahedrite 5%, galena 5%

102.3-113.0 very altered original texture oblitemited well mineralized with sulfides
- 1% tetrahedrite, 5% pyrite, occasional bands 1-2cm of galena + sphalerite
- abundant chalcopyrite quartz with pyrite stringers

113.0-116.7 rhyolite debris, angular fragments strong alteration
- some fragments to clayish appearance
- abundant sulphosalts in matrix approximately 5%

116.7-122.8 mottled, grains rhyolite breccia
- shear gouge at 119.8
- strong sphalerite + tetrahedrite mineralization at 117.0
- abundant pyrite 5% in fracture, breccia + dissemination abundant sulfosalt??
- black patchy alteration local core of pyrite + sphalerite + tetrahedrite + galena prominent chlorite, come sericite alteration

122.8-123.7 shear zone with fault gouge strong chlorite + talc? 50° CA 5% pyrite, trace galena/sphalerite
- marked increase in chlorite alteration distinct circular alteration phenomenon siliceous

124.6-125.9 Andesite Dyke??
- dark fine grained has lot of siliceous + rhyolitic fragments abundant chalcedonic quartz veining
- contact not sharp
- quite brecciated, 10% pyrite in matrix
- very fine grained debris breccia??

125.9-135.5 Rhyolite Breccia
- alteration becoming less chloritic, mottled grey rhyolite abundant black sulfosalt alteration
- chlorite shear at 130.0
- 133.0 argillite fragments with abundant fine grained disseminated pyrite overall 2-3% pyrite, trace galena/sphalerite

135.5-137.3 Rhyolite-Ash
- argillite fragments in dark grey fine grained rhyolite ash altered
- lapilli fragments occasional
- chalcopyrite quartz replacement
- very coarse grains sphalerite with comp zonation 2-3% sphalerite, 3% pyrite, trace galena

137.3-145.0 Rhyolite-Breccia
- abundance (5%) black sulfosalt?? alteration
- strong lapilli breccia, bands of stringer + disseminated pyrite along fracture, 2-3% overall
- flow banding 40° CA
- argillite fragments at lower contact with massive coarse pyrite string

145.0-148.3 Rhyolite Breccia
- chlorite schist
- dark green
- very strong shear fabric 75% CA
- nearly totally altered to chlorite + sericite with strain elongations 75° CA
- trace very fine grained pyrite more rhyolitic down hole
- alteration spheres with chlorite core, siliceous rims, gouge fracture planes

148.3-150.2 Rhyolite Breccia
- chalky granular core appearances 3-5% black sulphosalts(??) alteration in matrix
- sparsely mineralized with very fine grained disseminated pyrite occasional green chlorite fragments

150.2-153.1 Argillite
- laminated tuffaceous bands 55° CA
- bands of tuff often lined with pyrite + occasionally galena (trace) 1% pyrite bit more concentrated at lower contact
- trace sphalerite stringers

153.1-168.7 DATUM DACITE
- fine grained light green/grey calcitic tuff, strongly silicified
- local bands of stringers + disseminated pyrite throughout
- mineralization 152.6-152.7 massive sulfide
- 75% pyrite, 5% sphalerite, 3% galena, 2% tetrahedrite
- occur as a mass of fine granular pyrite + stringers, coarser grained sphalerite, fine stringers of galena + tetrahedrite
- 153.0-153.2 60% coarse mass of fine grained pyrite
- local stringers + core of sphalerite, galena, pyrite at 156.7, 157.0, 157.5, 159.0, 168.5, 161.5, 162.1, 162.8, 163.2-163.4, 164.1
- 165.4-167.0 10% pyrite, trace sphalerite + galena
- 167.9-170.2 5% sphalerite, 10% pyrite, 1% galena
- fault gouge at 170.0

- lapilli size fragments
- 168.7-169.6 foliations flow banding 60° CA
- rhyolitic?? lapilli 169.0-170.0

170.2-238.6 Dacite-Lithic?? Tuff
- tuffaceous, mm size fragments
- quite siliceous ubignitions fine grained disseminated pyrite angular uniform size fragments
- local small zones of brecciation
- wispy patchy tourmaline?? prominent from 176.5-193.0
- 1cm galena stringer 60° with lesser sphalerite + pyrite
- 175.5 5cm pyrite whit lesser sphalerite 40° CA in small breccia zone
- 179.0 blast of pyrite fine grained + stringer
- 187.5 minor disseminated pyrite
- 193.5-194.3 brecciated zone with 10% sphalerite, 5% pyrite as medium coarse grained bands + disseminated in breccia matrix
- 197.0 5cm coarse stringer of pyrite in tuff matrix
- 197.6 isolated grains of sphalerite
- 198.0 10cm coarse grained sphalerite + fine greined disseminated pyrite breccia zone
- 198.6 coarse to fine grained pyrite in matrix of angular fragments debris
- 204.8-205.1 5% tetrahedrite, 3% sphalerite, 30% pyrite abundant chlorite in small shear
- 214.3 1cm shear stringer predominately tetrahedrite with lesser sphalerite some gouge 50° CA
- 215.9 small fracture shear whit minor sphalerite + abundant pyrite
- 216.1-216.2 10Cm breccia zone whit matrix fill whit tetrahedrite 5%, sphalerite 2%
- honey coloured + brown sphalerite in equal xxxxxxx
- 216.5 small 3cm brecciated fracture zone with sphalerite + pyrite
- 219.7 3cm stringer of pyrite + tetrahedrite + sphalerite brecciated
- 220.5 dark fine grained overprinted with fine grained disseminated pyrite
- entire unit is somewhat chloritized with ubiquitous disseminated pyrite
- also is somewhat silicified lapilli + lithic fragments are chloritized
- 222.5 cm shear with gouge with fine grained pyrite + medium coarse sphalerite as rounded grains also fracture fill pyrite + sphalerite at 222.1
- 222.6-222.9 chloritized breccia zone with 2% sphalerite, 3-4% pyrite trace galena
- concentrated disseminated pyrite
- 224.3-224.4 10cm galena stringer, disseminated pyrite, coarse blebs sphalerite
- chalcedonic quartz fracture fill chloritized
- 225.1 2cm band 50° CA
- fine grained mass pyrite + coarse sphalerite local breccia zone angular chloritized debris fragments

- 226.7 10cm of 20% fine grained pyrite as disseminated, stringers granular mass
- 227.0 1cm tetrahedrite stringers with pyrite + sphalerite 45° CA breccia zone
- 228.1-228.4 patches of fine grained pyrite, sphalerite + galena in small breccia zone
- 237.4-238.6 band of mass sulfide 50% pyrite, 2-3% sphalerite, 1% galena
- pyrite occurs as a mass of fine grained crystals, galena as small stringers, sphalerite as coarse blebs rounded
- fairly strongly altered
- dark coloured rock
- probably due to fine grained sulfides
- sharp lower contact shear plane 40° CA

238.6-265.2 White Ash Tuff
- fine grain with to greyish strongly altered
- very siliceous over printing sections of chlorite alteration
- local chlorite shears
- occasional ghosts of lapilli fragments made indistinguishable by alteration
- local isolated patches of mineralization
- 249.1 blebs of coarse grained, galena, sphalerite, pyrite
- greenish sericita alteration along fracture + shears
- 243.0 ten coloured altered carbonate, patchy

265.2 EOH

CA89-117

0 3.0 CASING

3.0 131.8 HANGINGWALL ANDESITE

3.0-11.3 Andesite-Pillow Breccia
- 20% grey calcareous matrix (+ chlorite + pyrrhotite + pyrobitumen + minor quartz)
- minor hyaloclastite - chlorite altered
- trace pyrrhotite, trace pyrite

11.3-18.2 Andesite-Massive
- weakly propylitically altered, weakly brecciated olive green andesite flow
- t trace pyrite

18.2-21.4 Mudstone-Laminated
- layers at 80° to CA
- 20% lime mud layers
- 5% pale grey silty layers
- 1-3% pyrite- trace crystallites
- 17.5 belemnite fossil

21.4-29.7 HADB
- 20% grey calcite matrix
- 5% argillite fragments
- 75% altered andesite fragments
- clasts subrounded
- average of 0.5cm across up to 2cm
- trace pyrite, trace pyrrhotite

29.7-36.5 Mudstone-Laminated
- layers at 60° to CA
- 5% lime mud layers
- 3-5% crystallites
- 1-3% pyrite
- occasional penecontemporaneous deformation structures xx/slumping, loding
- 0.5 to <2% cw fracture filling

36.5-40.8 Andesite-Breccia
- 10% grey calcareous matrix (+ acoessories)
- aphanitic bleached, weakly vesicular
- trace pyrite
- 0.5 to <2% cw fracture filling

40.8-48.6 Mudstone-Laminated
- layers at 50° to CA
- 1-3% pyrite
- 1-3% crystallites
- 5% lime mud layers
- weakly brecciated - 2-5% cw fracture filling

41.6-53.7 Andesite-Massive
- weakly brecciated
- 0.5 to <2% cw fracture filling
- aphanitic, vesicular chill margins to sub porphyritic cores
- trace pyrite
- minor argillite units 49.0-49.2, 49.9-50.2
- layers at 35° to CA
- 1-3% pyrite

53.7-54.4 Mudstone-Laminated
- layers at 35° to CA
- 1-3% pyrite, 1% crystallites
- 0.5 to <2% cw fracture filling

54.4-55.2 Andesite-Breccia
- as in 36.5-40.8

55.2-57.7 Mudstone-Laminated
- layers at 50° to CA
- 1-3% pyrite, trace crystallites
- layers weakly contorted

57.7-84.9 Andesite-Massive
- sub porphyritic cores to aphanitic bleached chill margins-vesicular
- weakly brecciated
- 3-5% cw fracture filling
- 1-2% quartz fracture filling from 76.4-84.9
- trace pyrite

84.9-85.7 Mudstone-Laminated
- laminations (layers) subparallel to CA
- 1-3% pyrite
- 0.5 to <2% cw fracture filling

85.4-90.9 Andesite-Breccia
- 20% grey calcareous matrix
- vesicular, weakly argillically altered clasts
- 1% CW fracture filling

90.9-95.0 Mudstone-Laminated
- layers at 50° to Ca
- 1-3% pyrite
- 5% lime mud layers
- 1% crystallites - calcareous
- 1% cw fracture filling

95.0-111.0 Andesite-Massive
- olive green sub porphyritic core to aphanitic, vesicular, pale grey chill margins
- weakly brecciated
- 0.5 to 2% cw fracture filling
- minor crackle breccia zone
- trace pyrite

111.0-123.1 Mudstone-Laminated
- layers at 50° to CA
- 3-5% pyrite
- 5% lime mud layers
- 10% pale grey silty layers
- occasional penecontemporaneous deformation structures
- brecciated bleached andesite from 113.8-114.1

123.1-131.8 Andesite-Massive
- sub porphyrite, olive green core grading to aphanitic, vesicular, bleached chill margins
- chlorite alteration
- calcite + chlorite fracture fill, slickensided
- 1-3% calcite, 1-3% chlorite

131.8 135.7 CONTACT ZONE
- layers at 50° to CA
- 3-5% pyrite, ?trace arsenopyrite
- pyrite + graphitic occur as very fine grained coatings along shear planes
- moderately well sheared, shears subparallel to laminations
- 1-3% white calcite fracture filling with trace quartz- subparallel to layering
- minor pyrite in crosscutting fracture fills

135.7 137.9 TRANSITION ZONE
- black - carbons - alteration + chlorite alteration of relict clasts
- 35% black alteration, 40% chlorite alteration
- siliceous altered matrix - 10% - pale grey
- 1% pyrite
- 3% quartz, 1% calcite as fracture fill
- 137.9 sheared zone - gougy contact at 60° to CA

CA89-116

0 3.0 CASING

3.0 130.1 HANGINGWALL ANDESITE

3.0-15.0 Andesite-Pillow Breccia
- pillowed andesite
- minor hyaloclastite
- 10% matrix of grey calcite + trace chlorite, trace pyrobitumen, trace white calcite + trace pyrhnite (sequential infill)
- trace pyrrhotite, trace pyrite

15.0+18.6 Mudstone-Laminated
layers at 70° to CA
- 5% lime mud layers
- 1-3% pyrite in layers
- 1% crystallites

18.6-25.2 Mudstone-Debris FLow
- altered andesite clasts in grey calcareous matrix (20% matrix)
- 5% argillite clasts
- clasts up to 1cm across
- trace pyrite, trace pyrrhotite, very fine grained

25.5-42.7 Mudstone-Laminated
- layers at 60° to CA
- 20% lime mud layers
- 3-5% pyrite in laminations
- weakly silicified
- 0.5 to 4.2% white calcite fracture filling
-1-3% crystallites
- 36.9-37.3, 40.0-41.1 andesite altered andesite clasts beige aphanitic

42.7-46.8 Andesite-Massive
- weakly brecciated
- vesicular, aphanitic chill margins to sub porphyritic cores
- trace pyrite

46.8-50.5 HALM
- layers at 70° to CA
- 5% crystallites
- 40% lime mud layers
- 10% andesite clasts
- 1-3% pyrite

50.5-52.1 Andesite-Massive
- weakly brecciated, olive green
- aphanitic to sub porphyritic cores
- vesicular chill margins

52.1-53.3 Mudstone-Breccia
- 20% andesite clasts

- 20% black argillite clasts in muddy grey calcareous matrix
- 1% pyrite, trace pyrrhotite

53.3-69 Andesite-Pillow Breccia
- aphanitic maroon cores and pale green, occasional vesicular, chill margins
- grey calcite infill between pillows (+chlorite + pyrobitumen + quartz, as sequential infill)

63.9-128.0 Andesite-Massive
- aphanitic, vesicular chill margins to sub porphyritic or porphyritic cores
- olive green
- 1% CW fracture filling
- trace pyrite
- weak argillic alteration
- sub ophitic texture towards lower 20m of unit

128.0-129.0 Mudstone-Laminated
- layers at 60° to Ca
- 90% lime mud
- 3-5% pyrite in layers

129.0-130.1 Andesite-Breccia
- intensely bleached - to beige and cream
- probable argillic alteration
- 20% grey calcareous matrix
- 1-3% pyrite along fractures

130.1 136.7 CONTACT ZONE
- layers at 60° to CA
- 3-5% pyrite in layers
- 0.5 to <2% CW fracture filling
- <1% QW fracture filling from 135.5-136.7
- trace arsenopyrite from 135.0-136.7
- trace stibnite at 135.7-136.7

136.7 139.6 TRANSITION ZONE
- 136.7-137.0 muddy gouge zone (fault)
- talc altered (chlorite + muscovite) rhyolite fragments in dark similarly altered matrix
- 137.8-138.2 honey coloured sphalerite
- 5.8% QW fracture filling associated with 5-8% adularia
- 8-10% pyrite as feltic blebs and disseminated throughout

139.6 180.1 RHYOLITE UNIT
- weakly altered - chlorite + muscovite
- sucrosic texture
- 5-10% matrix
- occasional banded fragments
- 139.6-139.7 gouge zone

- 156.8-158.4 gouge - rubble zone
- 144.8-146.0 rubble zone
- 0.5 to <2% quartz fracture filling
- occasional zones (10 to 20cm wide) of flow banded intensely chlorite altered ash tuff 147.7-147.6, 154.0-154.2
- 165.6-171.4 rhat
- coarse grained ash tuff grading to flow banded siliceous rhyolite at 171.4
- sucrosic texture
- 171.4-180.1 flow banded siliceous rhyolite
- contorted flow banding
- rubbly
- trace sphalerite, trace galena
- 1-3% pyrite

180.1 EOH

CA89-115

0 3.0 CASING

3.0 132.3 HANGINGWALL ANDESITE

3.0-14.3 Andesite-Pillow Breccia
- rubble, oxidized from 3.0-4.0
- maroon to dark green cores, aphanitic to aphanitic, vesicular bleached pale green selvages
- grey calcite a matrix
- trace pyrite, trace pyrrhotite

14.3-16.8 Mudstone-Laminated
- rubble, oxidized
- ~50% recovery
- layering at 70° to CA
- 3-5% pyrite

16.9-20.2 Mudstone-Debris Flow
- andesite clasts in 20% grey calcareous matrix
- clasts up to 1cm across
- subrounded - indicating abrasion

20.2-38.1 Mudstone-Laminated
- layers at 75° to CA
- 10% paler grey silty layers
- 60% lime mud layers
- 1% crystallites
- 1% quartz flooded fractures
- at 38 layers xx at 45° to CA
- 33.8 belemnite fossil
- 37.4-38.1 silty grey layers - weakly brecciated
- 50% andesite clasts
- 10% grey calcareous matrix associated with emplacement of andesite fragments
- sequential infill - grey calcite + chlorite + pyrobitumen (trace) + minor quartz

38.1-42.1 Andesite-Massive
- weakly brecciated andesite flow
- vesicular chill margin - aphanitic, bleached to sub porphyritic, olive green core
- trace pyrite
- 0.5 to <2% quartz fracture filling

42.1-43.4 Mudstone-Laminated
- layers at 60° to CA
- 1-3% pyrite
- trace crystallites
- 20% limestone (lime mud) layers

43.4-45.0 Andesite-Breccia
- 60% andesite fragments

- 10 to 40cm across - with argillite as matrix
- no laminations in argillite

45.0-57.3 Andesite-Crackle Breccia
- 20% grey calcite matrix
- sequential infill of grey calcite, trace chlorite, trace pyrobitumen, 1% quartz
- chill margin, aphanitic, bleached, pale green, vesicular
- sub porphyritic, olive green core
- trace pyrite
- weak argillite alteration

57.3-62.4 Andesite-Pillow Breccia
- pillows andesite
- maroon to olive green cores grading to pale green bleached selvages frequently vesicular
- occasional zones of pillow breccia with hyaloclastite debris
- looks like pillow flow overlain by sub porphyritic andesite flow

62.4-90.5 Andesite-Massive
- porphyrite andesite
- pxxxxxxtically altered - strong
- 1% pyrite, trace pyrrhotite
- weak argillite alteratien

90.5-93.5 Andesite-Crackle Breccia
- 20% grey calcareous matrix
- minor lithic fragments
- trace pyrrhotite

93.5-128.2 Andesite-Massive
- sub ophitic andesite (marker)
- intense chlorite alteration
- slickensided fractures lined with calcite + chlorite
- trace pyrite/trace pyrrhotite (prospglitically altered)

128.2-130.9 Mudstone-Laminated
- layers at 60° to CA
- 1-3% pyrite
- 129.0 fossil belemnite
- 90% lime mud layers

130.9-132.3 Andesite-Breccia
- intensely altered beige aphanitic
- black - dendritic alteration (40%)
- 10% quartz flooding
- 1% pyrite concentrated along quartz fractures

132.3 138.1 CONTACT ZONE
- layers at 50° to CA at 132.4
- layers at 90° to CA by 135.0
- 3-5% primary pyrite in layers

- 1-3% recovery pyrite in fracture filling
- 0.5 to <2% quartz fracture filling
- graphitic along shear planes subparallel to layering
- 136.5-138.1 trace stibnite needles and trace tetrahedrite (as fine grained blebs) at 136.5
- 136.2-138.1 intensely sheared zone - gouge/rubble

138.1 139.7 TRANSITION ZONE
- 0.5 to <2% quartz flooding
- intensely sheared/talc + chlorite altered from 138.1-139.0 at 70° to CA
- trace arsenopyrite
- 139.6 trace sphalerite
- 138.6-139.0 trace stibnite needles
- 139.0-139.7 silicified transition zone
- ash matrix
- argillite clasts crossing to rhyolite clasts at lower portion of contact zone

139.7 204.4 RHYOLITE UNIT

- lapilli tuff - sucrosic texture 3-5% pyrite
- 10% matrix
- banded clasts - 40%
- weakly altered/sheared
- shears at 60° to Ca
- occasional gouge zone - 5% up to 2cm across 155.0-155.2, 156.0-156.2
- 141.7 trace sphalerite
- 157.0-170.3 occasional stylolitic fractures
- chlorite alteration of clasts and matrix xxxxxxx xxx xxxxxxxxx tinge to unit
- 170.3-170.8 gouge/rubble zone area 176.0-176.7
- 181.2-181.9 5% pyrite, 1% sphalerite, 1% galena
- 176.8 foliations at 60° to CA
- 181.9-199.8 massive chlorite
- flow banded, brecciated
- contorted flow banding
- no rotation of clasts
- 5% matrix - grey quartz
- 190.1-190.3 trace sphalerite, trace galena
- associated with green chlorite alteration
- also slightly rubbly
- 10% gouge
- shears at 40° to CA
- 199.8-204.4 rhyolite
- as before
- shears weak at 50° to CA
- 200.0-204.4 rubbly, broken fault
- 5% disseminated pyrite

204.4 210.6 DACITE UNIT

204.4-210.6 Datum Unit-Upper Argillite
- gougy rubble zone
- layering at 75° to CA
- poor recovery - 50%
- weakly siliceous
- 1-3% pyrite
- 0.05 to <0.5% quartz fracture filling

210.6 EOH

CA89-114

0 3.0 CASING

3.0 121.3 HANGINGWALL ANDESITE

3.0-8.2 Andesite-Crackle Breccia
- aphanitic, vesicular
- pale olive green
- 3.0-4.0 pillows - andesite
- 10% crackle breccia matrix - grey calcite + chlorite
- trace pyrits
- rubbly, oxidized

8.2-9.6 HMMS
- weak layering at 50° to CA
- 80% calcareous
- rubble, gougy
- 1% pyrite

9.6-11.9 Andesite-Crackle Breccia
- 10% crackle breccia matrix
- bleached, aphanitic clasts
- 1% white calcite, 1-3% quartz as fracture filling

11.9-18.6 Mudstone-Breccia
- laminated mudstone
- 40% limestone layers
- layers at 55° to CA
- quartz flooded from 13.0-18.6, 40% quartz fracture filling

18.6-23.4 Andesite-Massive
- olive green, oxidized
- argillically altered - weak
- 18.6-22.1 60% quartz flooding + 1-3% calcite +5% argillite fragments brought in with the quartz
- andesite fragments in here are pale green, bleached

23.4-26.0 Mudstone-Laminated
- layers at 40° to CA
- 20% calcareous layers
- 1-3% pyrite
- 1% QW fracture filling

26.0-27.9 Andesite-Breccia
- 30% matrix of argillite clasts up to 2cm wide and grey calcite
- oxidized fractures
- 1-3% quartz flooding
- 1% pyrite

27.7-29.7 Mudstone-Breccia
- brecciated argillite with 70% grey calcite as matrix
- fragments are angular
- occasional andesite fragments (5%)

- 3-5% pyrrhotite - as bladed clusters and disseminations
- trace quartz flooding - fine fractures

29.7-35.0 Andesite-Breccia
- olive green
- bleached, vesicular chill margins
- weak argillic alteration
- 25% grey calcite matrix + trace chlorite
- 1% quartz fracture filling
- 346-35.0 gouge zone - oxidized rubble

35.0-41.0 Mudstone-Laminated
- layers at 55° to CA
- 10% lime mud layers
- 1-3% pyrite
- trace quartz fracture filling
- 3-5% crystallites - calcareous

41.0-52.1 Andesite-Massive
- occasional zones of crackle brecciation - 5% matrix
- 1-3% quartz fracture filling

52.1-55.6 Mudstone-Laminated
- layers at 50° to CA
- 1-3% pyrite
- 10% limestone layers
- 3-5% fine crystallites
- 54.9-55.1 andesite dyke

55.6-69.1 Andesite-Breccia
- 55.6-69.1 andesite crackle breccia
- 15-20% grey calcite matrix + trace chlorite + trace pyrobitumen + trace quartz - sequential infilling
- aphanitic vesicular
- occasional pillow breccia zones (dykes)
- trace pyrite

69.1-84.2 Andesite-Massive
- 75.2-76.4 pillowed andesite
- andesite flows weakly brecciated
- aphanitic chill margins to sub porphyritic core
- trace quartz fracture filling

84.2-88.2 Mudstone-Laminated
- layers at 60° to CA
- 10% cherty layers
- 1-3% pyrite
- 1-3% calcite - white - as fracture filling

88.2-100.6 Andesite-Massive
- aphanitic vesicular, chill margins to sub porphyritic areas
- 5% calcite + 1% chlorite as fracture filling - slickensided-weakly

100.6-103.8 Mudstone-Laminated
- also 104.4-104.7, 105.2-105.7 (rubble)
- layers at 45° to CA
- 1-3% pyrite
- 1% quartz fractures filling

103.8-104.4 Andesite-Massive
- 104.7-105.2 xxxxxxx
- bleached aphanitic, vesicular andesite

104.4-104.7 Mudstone-Laminated

104.7-105.2 Andesite-Massive

105.2-105.7 Mudstone-Laminated

105.7-106.1 Andesite-Crackle Breccia
- 30% grey calcite + chlorite matrix
- 1% pyrite

106.1-111.6 Mudstone-Laminated
- layers at 50° to CA (laminations)
- 1-3% pyrite
- 5% calcareous (lime mud) layers
- graphitic along shears planes
- subparallel to laminations

111.6-117.2 Andesite-Massive
- marker andesite
- sub ophitic texture
- aphanitic chill margins
- 5% calcite + 1-3% chlorite as fracture filling
- slickensides on fracture surfaces
- 1% pyrite

117.2-119.9 Mudstone-Laminated
- layers at 50° to CA
- very distinct layers
- 3-5% pyrite
-= 0.5 to <2% quartz fracture filling
- subparallel to laminations

119.9-121.3 Andesite-Massive
- weakly brecciated
- bleached to beige
- fine grained
- 3-5% pyrite concentrated along chill margins

121.3 129.9 CONTACT ZONE
- layers at 55° to CA
- 3-5% pyrite
- graphite along shear planes
- 123.7-125.9 sheared zone - fault gouge

- shears subparallel to xxxxing
- 126.7-127.4 greywacke layers

129.9 132.5 TRANSITION ZONE
- ash matrix, intense talc alteration
- relict fragments evident - lapilli size - ghosted
- occasional gouge zones
- 3-5% fine grained feltic pyrite

132.5 175.9 RHYOLITE UNIT
- 137.5-135.2 intense talc alteration
- fragments have more distinct outlines
- shears at 45° to CA
- 135.2-147.4 moderate to weak TA
- sucrosic texture
- 136.4-138.0 1% sphalerite, trace galena (honey yellow sphalerite)
- 147.4-162.4 intensely siliceous rhyolite
- stylolitic fractures throughout
- carbon/pyrite lined
- 1-3% pyrite
- 162.4-175.9 sucrosic texture
- 20% matrix - talc (chlorite) altered
- occasional siliceous rhyolite fragments
- sericite lined shears at 30° to CA
- occasional quartz filled fractures
- 5-8% quartz fracture filling
- 167.3-168.5 blotchy alterations
- white blebish rims on clasts in sheared chloritic matrix
- shears at 20° to CA
- 172.8-175.9 rubbly - possibly beginning of fault

175.9 EOH

CA89-113

0	7.9	CASING
7.9	112.8	HANGINGWALL ANDESITE

5.0-7.9 Andesite-Breccia
- rubble - oxidized
- bleached fragments
- aphanitic, vesicular

7.9-8.5 Andesite-Massive
- rubble - oxidized
- no xxxxable bedding
- 1% pyrite

8.5-11.4 Andesite-Breccia
- bleached, vesicular
- aphanitic, xxxx grey green
- 1-3% cw in fracture filling
- trace pyrite

11.4-22.5 Mudstone-Laminated
- layers at 65° to CA
- 1-3% pyrite
- 5-8% very fine crystallites
- 70% calcareous layers
- gougy, 1-3% quartz fracture filling

22.5-25.3 Andesite-Massive
- weakly brecciated
- rubble - oxidized
- pale green, bleached, aphanitic andesite

25.3-32.7 Andesite-Breccia
- 50-60% quartz flooding
- 5% ?barite/adularia? associated with quartz flooding
- argillite + andesite clasts, angular
- exhibit lack of movement
- andesite clasts are very pale green
- probably argillically altered

32.7-38.3 Mudstone-Laminated
- quartz flooded, 5-8% quartz fracture filling
- layers at 60° to CA
- 1-3% pyrite- 37.1-37.5 HADB coarse grained debris flow
- andesite clasts in dark grey calcareous matrix - 20%
- andesite clasts between 0.2 and 1.5cn
- subrounded

38.3-45.5 Andesite-Crackle Breccia
- 15-20% grey calcareous matrix + chlorite +/- pyrobitumen + quartz as sequential infilling for breccia matrix
- vesicular upper chill margin

- 1% pyrite

45.5--52.3 Mudstone-Laminated
- layers at 55° to CA
- 40% calcareous layers
- 5% coarser grained greywacke layers
- 1-3% pyrite
- occasional soft sediment deformation structures

52.3-71.4 Andesite-Pillow Breccia
- 60% andesite pillow (possibly dykes)
- 40% andesite flows (a wide pillows)
- chill margins 3cm across
- bleached, pale emerald green
- locally vesicular
- 5% grey calcite matrix between "flows" (or pillows)
- 1% calcite fracture filling
- 1% pyrite

71.4-75.2 Mudstone-Laminated
- 10% limestone layers
- layers at 60° to CA
- 1-3% pyrite
- occasional penecontemporaneous deformation structures
- 5% crystallites

86.2-91.0 Mudstone-Laminated
- layers at 65° to CA
- 2% calcareous layers as light grey brecciated zone
- 1% cw fracture filling
- 1% pyrite
- 1% crystallites

91.0-97.0 Andesite-Breccia
- bleached, argillic alteration?,aphanitic
- small zone of subporphyritic, altered material
- 10% matrix of chlorite + grey calcite
- greater amount of chlorite in smaller (narrower) fractures
- trace pyrite

97.0-98.6 HALM
- 40% calcareous layers
- trace calcite rhombs
- 1% cw + 1-3% quartz as fracture filling
- layers at 55° to CA

98.6-103.4 Andesite-Massive
- weakly brecciated
- poikilitic texture, argillically altered
- disseminated pyrite
- aphanitic, weakly vesicular chill margins

130.4-106.9 Mudstone-Laminated
- layers at 50° to CA

- 1-0% pyrite
- 1-3% crystallites
- siliceous layers in upper 40cm of unit
- rubbly

106.9-109.2 Andesite-Massive
- bleached
- weakly brecciated, calcite + chlorite fracture filling
- aphanitic vesicular
- trace pyrite

109.2-110.4 Mudstone-Laminated
- layers at 55° to CA
- 1-3% pyrite
- 110.1 belemnite
- 1-3% calcite fracture filling

110.4-112.1 Andesite-Massive
- as in 106.9-109.2

112.8 118.8 CONTACT ZONE
- layers at 70° to CA
- 1-3% pyrite
- 5% light grey siliceous layers
- rubbly
- graphite along shear planes
- 118.1-118.4 1% sphalerite, 1-3% tennantite layers parallel to pyrite layers
- faulted - gougy contact

118.8 126.5 TRANSITION ZONE
- shears at 45° to CA
- mottled texture
- 8-10% pyrite - fine grained feltic
- 123.5 trace realgar
- intensely altered/sheared
- muscovite + chlorite (talc altered)

126.5 190.4 RHYOLITE UNIT

126.5-146.4 Rhyolite-Lapilli
- moderately altered (talc to muscovite + chlorite)
- clasts weakly calcite altered
- occasional ptygmatically folded quartz veinlets
- weak sericite alteration of clasts
- shears at 30° to CA
- textually confused
- occasional zones (from 1 to 20cm wide) of clasts up to 0.7cm across of pale blue chlorite or clay mineral (hardness of 3) 130.1-141.1
- 1-3% tennantite, trace sphalerite as blebs and dissemination

throughout
- lapilli with 50% matrix
- intensely altered 50% talc altered, pale grey, wispy fragments
- 50% medium grained "greywacke" type debris flow dark grey
- 1% argillite looking black fragments
- shears at 45° to CA - intense
- 3-5% pyrite - disseminated in dark grey greywacke
- 146.7-147.3 trace realgar in mottled wispy, talc altered fragments

150.2-190.4 Rhyolite-Lapilli
- 15% matrix - altered ash
- sucrosic texture
- subrounded to subangular fragments
- occasional quartz flooded fractures
- 5-8% pyrite

158.2-170.8 trace sphalerite, trace galena

170.8-175.5 10% matrix
- banded clasts
- sucrosic texture
- altered
- 3-5% pyrite

175.5-177.3 intense talc alteration
- sheared at 25° to CA

177.3-190.4 shears at 30° to CA
- 1-3% pyrite feltic blebs
- quartz fracture filling 3%
- sheared lower contact (30° to CA)
- carbon blotches from 188.2-190.4

190.4 252.8 DACITE UNIT

190.4-191.5 Datum Unit-Upper Argillite
- layers at 50° to CA
- 1% quartz fracture filling
- 3-5% pyrite
- sheared subparallel to layering

191.5-201.9 Datum Unite-Undivided
- dacite datum type unit
- vesicular
- weakly brecciated, minor grey ash fragments
- weak aphanitic
- 5-8% pyrite
- 1% sphalerite, 1% galena as secondary fracture filling with quartz
- 196.4-198.2 #3 brecciated ash tuff layer
- shears at 25° to CA- sericite lined
- 5% quartz as fracture filling

201.9-223.1 Datum Unit-Upper Argillite
- layers at 55° to CA
- 3-5% pyrite
- 30% pale grey siliceous layers
- trace galena, trace sphalerite associated with quartz fracture filling
- 1-3% quartz

223.1-239.5 FDAT
- medium grey beige ash tuff
- 5% fine glassy fragments
- occasional lithic fragments up to 2cm across

239.5-252.8 Datum Unit-Undivided
- beige bleaching to pale grey by 246.1
- aphanitic - argillically altered breccia zone from 145.0-145.3
- 246.1 xxxx - pale grey, siliceous, quartz flooded mineralized zone
- 5.10% pyrite, 2% galena, 3-5% sphalerite, trace chalcopyrite
- 247.1-248.1 2% pyrite, 10% sphalerite, 5% galena, 1% chalcopyrite + chlorite + quartz
- semi-massive
- 248.7-249.8 mineralization as above

252.8 EOH

CA89-112

0	3.1	CASING
3.1	100.3	HANGINGWALL ANDESITE

3.1-15.9 Andesite-Pillow Breccia
- local flows (<2m wide)
- grey calcite matrix - 10%
- trace pyrrhotite, trace pyrite

15.9-16.9 Mudstone-Debris Flow
- coarse clastic debris flow
- andesite fragments (<1cm across)
- subrounded
- 30% calcareous grey matrix
- 1% pyrite

16.9-20.4 Mudstone-Laminated
- layers at 60° to CA
- 1-3% pyrite
- 20% calcareous layers (lime mud)
- 5% coarse grained "greywacke" layers
- 20.1-20.4 calcite flooded - 50%

20.4-22.1 Andesite-Breccia
- brecciated bleached andesite
- calcite flooded - 20%
- 10% argillite (mudstone)

22.1-23.4 Andesite-Breccia
- vesicular, aphanitic, bleached
- 10% calcite as matrix
- 1% pyrite

23.4-24.3 Mudstone-Laminated
- 70% lime mud layers
- layers at 70° to CA
- 1% CW fracture filling
- 1-3% pyrite

24.3-47.9 Andesite-Massive
- layered flows
- badly vesicular - chill margins
- 1% pyrite
- 1-3% CW fracture filling
- local crackle breccia zones
- occasional pillow or sills 33.2-33.3
- subporphyritic texture from 43.3-47.4

47.9-48.8 Mudstone-Laminated
- 90% lime mud
- layers at 70° to CA
- 1% CW fracture filling

48.8-55.8 Andesite-Massive
- weakly brecciated, subporphyritic [to sub ophitic (?)]
- 52.4-52.5 fracture filled with 60% calcite, 35% black carbonaceous material, 5% pyrite
- 1% pyrite overall
- 3% calcite - white- fracture filling
- chlorite along fractures

55.6-73.0 Mudstone-Laminated
- layers at 70° to CA
- 1-3% pyrite
- 0.5 to <2% CW fracture filling
- 60% calcareous layers (lime mud)
- 64.2-65.1 bleached andesite breccia
- black dendritic alteration
- occasional fossils - belemnites

73.0-77.6 Andesite-Breccia
- aphanitic, bleached chill margins to subporphyritic, black dendritically altered cores
- 1-3% pyrite
- 10% grey calcareous matrix
- 1% white calcite fracture filling

77.6-84.8 HALM
- 40% lime mud layers
- 1-3% pyrite
- layers at 65° to CA
- rubbly
- upper contact 77.6-77.8 - gougy
- 1-3% white calcite fracture filling
- occasionally contorted
- brecciated, calcite-healed lower contact

84.8-89.8 Andesite-Massive
- weakly brecciated, sheared with calcite + chlorite along fractures - slickenslide
- 3% calcite (- white) as fracture filling
- possibly bleached marker horizon
- coarse grains-altered to light olive green
- 1% pyrite
- rubbly

89.8-97.3 Mudstone-Laminated
- layering at 65° to CA
- 3-5% pyrite
- 20% lime mud layers
- rubbly

97.8-100.3 Andesite-Massive
- weakly brecciated, 3-5% grey calcite
- altered (bleached)
- 1-2% CW fracture filling

- 1% pyrite

100.3 105.7 CONTACT ZONE
- layers at 40° to CA
- 3-5% pyrite
- trace arsenopyrite
- graphite along "shear" planes at 40° to CA
- increase in shearing and alteration towards the lower contact
- 1% CW fracture filling - 1% quartz also as fracture filling

105.7 134.6 TRANSITION ZONE
- intensely altered and sheared talc + chlorite + muscovite + gypsum
- relict textures or rock type obliterated
- dominant shear plane orientation is 30° to CA
- 108.3-108.5 trace quartz modules up to 3mm across
- 112.3-113.0 relict contorted bedding (?) (ptygmatic folds)
- 120.5-121.0 1% sphentitic blotches up to 3mm across of lighter, harder mineral (~3 in hardness)
- raring shades of green throughout from light clear white-green to dark translucent emerald green green-grey to grey
- 121.0-134.6 mottled, wispy texture
- possibly wispy rhyolite lapilli tuff
- lighter clastic type blotches are pale white green in pyrite enriched possibly carbonaceous matrix (10%)
- shear planes at 50° to CA

134.6 147.7 AT
- dark grey ash tuff
- 134.6-135.4 soft dark grey (3 in hardness)
- coarse grained
- flattened clasts at 65° to CA
- 5% pyrite
- intensely altered - chlorite
- 135.4 dark grey ash tuff to 146.5
- greywacke like
- looks more like a dacitic ash tuff than a rhyolite ash tuff
- 1% sphalerite, 1% galena overall in quartz veins (fracture fills) throughout
- trace realgar in quartz filled fracture at 136.8
- quartz veinlets and vein filling-drusy
- 3-5% pyrite
- occasional lighter quartz flooded zones
- 146.5-147.7 breccia zone
- altered rhyolite clasts to pale grey gypsiferous, wispy clasts (possibly talc)
- 50/50 clasts of altered rhyolite/clastic tuff with 10% matrix of quartz

147.7 259.9 RHYOLITE UNIT

147.7-133.8 Rhyolite-Undivided
- intense talc + muscovite + chlorite alfred, mottled zone
- wispy fragments

153.8-156.9 Rhyolite-Lapilli
- 40% ash matrix - granular
- sheared at 50° to CA
- quartz flooded, 10% as fracture fill
- sericite alfred clasts
- 1% sphalerite, trace galena

156.9-164.0 Rhyolite-Lapilli
- pale grey-green unite "contorted" weakly
- 10% matrix - chlorite altered
- occasional banded clasts - mottled clasts
- 10% altered glassy clasts
- 1-3% fine grained disseminated pyrite
- 157.0-157.3 mud zone
- weak sericitic alteration of clasts
- quartz flooded, 10% as fracture fill
- occasional carbon lined stylolite fractures
- 173.7-181.0 trace sphalerite, trace galena
- 184.4 nativo silver, xxxxxxx clusters and individual needles as filling and interstitial crystals in drusy quartz veins
- also as 190.8, 214.0 and 211.8
- probable trace native silver from 184.4-214.1
- 198.2-213.5 intense chlorite alteration, minor sericite
- shears at 40° to CA
- 10% clays - 40% unconsolidated gouge
- relict clasts ghosted, altered
- 213.8-259.9 chlorite + sericite + minor clay alteration of clasts + matrix
- sucrosic texture, 1-3% felted pyrite
- quartz flooded
- 5% quartz as fracture fill
- 217.3, 220.2 quartz filled fractures with 1% silver (as above)
- trace silver to 220.4
- foliations at 40° to CA - weak to moderate gouge zone 229.8-230.2
- 40% clay
- 243.0-253.0 occasional sheared gougy zones throughout up to 10cm wide at 40° to CA
- 243.0-243.1, 3% sphalerite, trace galena
- 244.6 trace galena
- more intense chlorite/sericite alteration to lower portion of unit
- gradational lower contact over 10cm

259.9 322.2 DATUM UNIT

259.9-280.3 Datum Unit-Upper Argillite
- bedding (laminations) at 55° to CA
- contorted

- 1-3% xxxxx pyrite
- 2608-261.4 sheared zone
- shears at 30° to CA
- 264.8-266.2 sheared zones - shear at 80° to CA
- 269.2-280.3 1% sphalerite, 1% galena, 5-8% secondary pyrite-associated with quartz flooded fractures
- appears to be 2 episodes of sulfide complacments, secondary marcasite/pyrite +/- sphtea then re-flooding with quartz + sulfides or perhaps a lull in sulfide implacemnet
- sphalerite is occasionally zones
- 276.3-277.1 semi-massive sulfide zone, 5% galena, 5% sphalerite, 30% pyrite- quartz flooded

280.3-287.0 FDAT
- trace sphalerite, 5-8% pyrite associated with quartz flooding
- very fine grained
- grey - medium
- 5% fine glassy fragments
- 285.8-285.9 15% sphalerite, 10% galena, 10% pyrite

287.0-310.2 - pale ~~being~~ beige
- 50% lithic fragments up to 2cm across
- 3-5% disseminated pyrite
- trace sphalerite, trace galena associated with quartz veins
- 5% fine glassy fragments
- 8-10% quartz as fracture filling

310.2-312.0
- dark grey gouge zones
- occasional relict fragments
- 80% clays + fine rock gouge
- preferred orientation of shears is between 15° and 30° to CA
- 3% quartz - relict fracture filling broken-up

312.0-313.2 FDAT
- as in 280.3-287.0

312.2-322.2 Datum Unit-Undivided
- beige, aphanitic, vesicular dacite unit
- not xx pyrite altered as the dacite datum unit
- 5-8% pyrite
- dendritic fracture
- colour change to bottom of unit
- goes from beige to pale grey given with occasional glassy fragments
- 317.1-317.2 trace sphalerite
- occasional gouge zones from 312.2-317.1
- fault termination () extremity of a fault zone probably lower

322.2 EOH

CA89-111

0 18.2 CASING
- collared in fault zone to 35.4m
- drilling subparallel to fault

18.2-20.0 Mudstone-Undivided
- very broken rubbly core
- minor pyrite on fracture surfaces
- poor core recovery in fault zone

20.0-32.0 Andesite-Tuff
- very broken rubbly core
- poor recovery
- vesicular andesite
- vein oxidized throughout
- periodic gouge (at 21.5, 22.5)
- in fault zone vuggy quartz vein at 31.0-32.0, non-mineralized

23.0-32.3 Mudstone-Undivided
- very broken rubbly core
- poor recovery not mineralized

32.3-35.4 Andesite-Tuff
- very broken rubbly core
- poor recovery fault zone gouge at 33.4-34.0
- other gouge zones likely washed away oxidized throughout

35.4-38.0 Andesite-Tuff
- excellent recovery
- massive vesiculated and tuff
- grey speckled appearance
- isolated calcite veinlets

38.0-40.8 Andesite-Tuff
- very broken rubbly core
- oxidized fracture
- evidence of abundant gouge
- lot of it washed away

40.8-42.2 Andesite-Tuff
- tuffaceous, vesiculation decreasing
- not mineralized

42.2-47.6 Andesite-Pillow Breccia
- pillow breccia
- increase in calcite veining
- stringers dark grey calcareous matrix
- calcite veining often parallel to subparallel CA
- minor pyrite in matrix
- fault gouge at 44.0

47.6-53.6 Andesite-Hyaloclastite

- dark calcareous argillitic matrix at 48.3 is 1cm calcite vein on shear and 50° CA, another on at 50.0
- increasing argillite debris gradational down hole
- minor pyrite mineralization in matrix

53.6-56.7 Mudstone-Undivided
- very broken rubbly core
- trace pyrite mineralization on fracture
- beginning of another very wide fault zone

56.7-57.3 Andesite-Tuff
- very fine grained grey tuff, not mineralized
- 3cm band of argillite 10cm from lower contact

57.3-57.6 Mudstone-Undivided
- shear contact at 50° CA, well mineralized with SL + pyrite with minor galena
- 5% sulfides over interval
- fault gouge

57.6-60.3 Andesite-Tuff
- abundant of calcite veinlets + hairline fracture 15° CA + 40 to 60° CA

60.3-66.0 Contact Zone
- very broken core
- upper contact well mineralized with pyrite + SL as disseminated blebs + stringers minor chalcopyrite
- numerous quartz/calcite veinlets at 50° CA
- large vug cxxt with quartz at 61.4
- not mineralized but log of pyrite
- chalcopyrite in the argillite in that area
- 60.3-64.8 5% sulfides, 5% SL, 1% chalcopyrite, 3.5% pyrite
- gouge at 62.0, 62.5, 65.4

66.0-67.2 Andesite-Tuff
- well mineralized with finely disseminated pyrite
- fine grained tuff brecciated at lower contact

67.2-68.0 calcite bands at contact 20° CA
- fault gouge at 67.7
- minor pyrite mineralization

68.0-69.1 Andesite-Tuff
- shear fabric subparallel CA in upper portion
- fault at 68.1
- calcite stringers abundant
- shear slickenslide lower contact

69.1-74.3 Mudstone-Undivided
- very broken + rubbly
- fault at upper contact
- strongly brecciated calcite vein at 69.6
- argillite after that becoming more siliceous often with

solution cavities where matrix has been dissolved
- interval has fragmented xxx
- dark muddy colour
- very silicified
- perhaps cherty fragments + chert bed minor stringers of pyrite

74.3-79.8 Andesite-Tuff
- vesicular andesite tuff
- brecciated contact 45° CA
- quartz veinlets up to 1cm cut cure at various angles up to 60° CA
- band of argillite
- gouge at 77.5-77.7 filled with brecciated fragments of massive pyrite

79.8-85.2 Mudstone-Undivided
- generally quite altered and not as black as the typical mineralization associated argillite
- distinct brownish tuffaceous bands or coarser banding at 53.0 30° CA
- some brittle defined with small scale offsets of quartz veinlets
- local zones of brecciation usually with pyrite stringers in matrix

85.2-85.6 Andesite-Pillow Breccia
- brecciated pillow fragments with argillite matrix
- some fragments have pyrite altered rims

85.6-86.0 Mudstone-Undivided
- very brecciated, silica matrix with stringers of pyrite

86.0-86.5 Andesite-Pillow Breccia
- breccia argillite fragments
- pyrite rimming both upper + lower contacts

86.5-114.5 Mudstone-Undivided
- quite silty argillite
- no as black as argillite from mineralized areas
- frequent banding of brown coarser matrix or tuffaceous bands 35° CA
- local zones of brecciation often associated with sulfide mineralization in matrix
- well bedded between 100.0-103.7 40° CA
- fault at 102.3, 103.8
- none of this argillite is calcareous
- lower few metres grades into lighter colour
- strong fault gouge at 113.5
- mineralization 87.6 5cm brecciated argillite disseminated pyrite in matrix
- 90.3-90.5 occasional stringers of pyrite in breccia matrix
- trace SL disseminated blebs
- 94.3-95.3 SL as disseminated andesite stringers in argillite + matrix along with pyrite + lesser galena

- 2-3% sulfides over this one metre interval
- 98.2 trace blebs of SL
- 99.2 xxxx of speckled disseminated SL coarser grained in breccia matrix with lesser pyrite very fine grained
- 111.0-111.5 30% SL, 2% galena, 5% pyrite over this 0.5m
- speckled honey colour coarse dissemination SL, pyrite, galena in recessive weathered matrix

114.5-122.5 Rhyolite-Breccia
- very badly broken + rubbly core
- fault zone
- rock is generally quite grey probably due to carbonaceous matrix
- strongly silicified quartz vein xx 119.5-120.0
- lower part of interval more carbonaceous and softer because of the sheared matrix where planes are slightly chloritic
- disseminated pyrite throughout

122.5-123.0 Massive Sulfide Mineralization
- fine grained dense black
- 75% sulfides (sl, pyrite, galena, tty??, chalcopyrite) in shear zone
- gouged + broken

123.0-132.9 Mudstone-Undivided
- silty argillite
- poorly bedded for the most part
- occasional brownish beds of coarser sediments 25° CA
- significant amount of stockwork style quartz veinlets throughout generally at a low angle CA
- mineralization sporadically scattered throughout sl, galena, pyrite mineralization as stringers in the fracture fill quartz veinlets at 124.8, 125.1, 126.6, 126.9, 127.0, 129.7, 129.1, 129.3, trace overxx
- 129.3 chalcopyrite + galena mineralization occurring no massive blebs
- 132.7 stringers + disseminated pyrite, arsenopyrite, galena, SL with argillite breccia

132.9-145.6 Rhyolite-Breccia
- grey silicified rhyolite breccia
- sparse sulfide mineralization occur sparsely throughout as disseminated blebs + stringers of pyrite, SL, galena mainly in the matrix
- trace amounts over intervals from 142.0-145.6
- the rhyolite has increasing shear fabric 25° CA culminating in a fault zone at the lower contact
- fault at 142.9
- 141.7 2cm wide quartz vein 25° CA
- shears fabric foliations smeared with light greenish white mineral clay?? chlorite?? some of the lapilli fragments are quite chloritized + altered

145.6-148.5 Mudstone-Breccia

- very brecciated + quite silicified
- lot of hairline quartz filled gash fractures + veinlets
- sparse sulfide mineralization occurs ae disseminated + limy stringers of SL, galena + pyrite

148.5-149.9 Argillite
- argillite forms the matrix for a very strange looking rock which contains rounded andesite lapilli fragments which have 1mm chill margin rims + often have concentric cooling rings? alteration rings?
- trace disseminated pyrite

149.9-150.9 Andesite
- lapilli tuff with fine grained ash matrix that is very silicified
- slightly chloritic sericite altered lapilli fragments

150.9-153.0 Andesite
- massive fairly coarse grained pitted surface texture of core
- slightly altered
- local brecciation
- shear upper contact 35° CA
- trace pyrite along shear foliations
- not silicified
- slightly calcite

153.0-153.9 Andesite
- lapilli tuff with fine grained andesitic ash matrix very silicified with slightly altered andesite lapilli fragments
- trace blebs of disseminated pyrite in matrix
- very angular fragments

153.9-157.6 Andesite
- tuff breccia with coarse disseminated blebs of pyrite in matrix siliceous at upper contact
- fault gouge at 154.5 60° CA
- coarse remnant fragment of argillite at fault
- 2-3% pyrite in breccia sections
- fault as 156.0 fragmented quartz filled gash fracture + veinlets throughout local quartz vein 3cm thick not mineralized

157.6-158.1 Argillite
- very siliceous brecciation with solution cavities
- gash fracture near lower contact
- upper contact 80° CA

158.1-162.7 Andesite-Tuff
- fine grained uniform texture
- local brecciation
- upper contact very silicified
- pillow brecciation 158.8-159.2 with dissolution cavities
- trace disseminated pyrite fracture

162.7-163.6 Argillite

- upper contact sharp 65° CA
- very silicified
- trace pyrite along fracture + matrix of breccia fragments

163.6-166.1 Andesite-Pillow Breccia
- brecciated near upper contact with dissolution cavities
- several 10cm thick bands of argillite at 164.3, 164.8
- ghost concentric alteration or coating rings in the pillow fragments
- pyrite usually rimming pillow fragments

166.1-172.0 Contact ARgillite
- very rubbly core
- fault gouge at upper contact
- no apparent bedding
- <1% pyrite as disseminated + stringers
- very silicified where no crushed by fault
- strong gouge throughout whole intervals

172.0-177.1 Rhyolite Breccia
- fault gouge to 172.8 xxxxx at 174.0
- fault shatter + gouge continuous to 177.1 very intensely sericite
- very siliceous breccia fragment
- sericite along fragments boundaries and replacement of some fragments
- fault gouge xxxx at 177.1 has 40° CA
- no visible sulfides

177.1-228.9 Rhyolite
- rhyolite lapilli breccia
- greenish alteration fragments due to talc, chlorite, sericite alteration quite siliceous throughout
- shear planes are generally 35° CA
- trace very fine grained pyrite disseminated throughout occasional quartz veins 1cm thick 50° CA
- small fault at 184.2
- 204.0-223.0 blackish grey blebs + stringers of a very fine grained metallic mineral (sulfosalt??)

228.9 EOH

CA89-110

0 3.0 CASING

3.0 131.4 HANGINGWALL ANDESITE

3.0-13.0 Mudstone-Undivided
- black argillite
- core very broken, very poor recover
- fault gouge at 10.0 + 13.0m
- not mineralized
- somewhat grainy perhaps tuffaceous
- occasional quartz/carbonate gash fracture

13.0-52.7 Andesite-Massive
- locally massive, periodically cut by calcite veinlets + gash fracture with various < CA
- 30.1-32.5 porphyritic andesite, dark green
- 35.5-47.0 andesite is more altered, talc alteration throughout especially evident on fracture surfaces
- oxidization fracture to about 30.0
- faults at 37.2, 41.0 (fault gouge)
- rock seems to be more sheared evidenced by slickenslide fracture surfaces some chlorite development
- 47.5-50.6 more tuffaceous, less altered, fairly chloritic
- occasional hairlins fracture of calcite 60° CA
- 50.6-52.7 altered andesite

52.7-54.5 Mudstone-Carbonate Rich
- graphitic speckled with crystallites with xcm thick vein of calcite 75° CA

54.5-55.0 Andesite-Massive
- finely siliceous xxxxx calcite hairline gash fracture
- veinlets at 70° CA + 55° CA

55.0-58.3 Mudstone-Carbonate Rich
- core very broken silty calcareous argillite
- 5cm andesite tuff at 57.3
- core crystallite alteration

58.3-64.2 Andesite-Massive
- very blocky core
- fine grained andesite ash tuff not mineralized
- fault rubble in a 40cm band of argillite
- local fine grained disseminated pyrite + stringers

64.2-66.5 Mudstone-Undivided
- very blocky core
- contact 65° Ca with band of calcite, no visible sulfides

66.5-68.0 Andesite-Tuff
- blocky core

- vesicular andesite tuff, calcareous throughout

68.0-69.5 Mudstone-Carbonate Rich
- very broken
- fairly calcareous, crystallite speckles
- 20cm of tuffaceous andesite

69.5-81.1 Andesite-Tuff
- broken core
- tuffaceous with frequent veinlets + gash fracture of calcite local brecciation with calcite matrix
- trace disseminated pyrite and lining tiny calcite veinlets

81.1-84.2 Mudstone-Carbonate Rich
- broken core
- several andesite pillow fragments near upper contact
- speckled crystallite alteration fragments 10cm xxx band at 83.2

84.2-99.2 Andesite-Tuff
- vesicular andesite tuff
- local calcite veins 60° CA
- trace pyrite
- fairly limy tuff for the most part
- local breccia zones that are more tufaceous
- some minor chlorite alteration exp noted along fracture
- occasional limy stringers conxxxxted "stylolitic" contact frequent black carbon alteration filling vesicular and occurring as remnant stringers
- periodic gash fractures + stringers of white calcite 50° CA
- lower contact chill margin

99.2-114.0 Mudstone-Carbonate Rich
- very broken for the most part
- crystallites noticeably absent, upper contact 45° CA
- very calcareous, periodic distinct bands of sandy material 40° Ca
- many of these laminae contains very fine grained pyrite
- trace pyrite overall
- very fine needles of gypsum occurring at 108.5
- white coating (gypsum??)(drilling xxx??) at 105.0 and at lower contact

114.0-115.6 Andesite-Tuff
- tuffaceous, vesicular
- several large (1-2cm) veins of quart/calcite 45° CA

115.6-121.0 Mudstone-Undivided
- very broken core
- 115.6-117.0 is white alteration coating (gypsum) bands of pyrite 2-3mm 119.2-120.0 45° CA
- fault gouge at 116.7
- 20% calcite layers

121.0-123.0 Andesite-Massive? Dyke-Latite?

- fine grained contact 90° CA
- periodic calcite stringers rimmed with pyrite with black carbon alteration 15 to 30° CA

123.0-126.5 Mudstone-Carbonate Rich
- fault gouge at 123.6, rest is fairly unaltered
- some slickensides on fracture surface not well banded
- not many of the usual calcite veinlets
- some andesite breccia fragments near lower contact
- lower portion is coarser argillite + quite calcareous
- no visible sulfides

126.5-128.3 Andesite-Undivided
- fine grained chill margin contacts
- very limy in the middle breccia contacts
- trace pyrite
- somewhat argillite in middle of interval

128.3-128.9 Mudstone-Undivided
- 5cm interlayer of andesite
- sharp lower contact 35° CA
- shear plane

128.9-129.9 Andesite-Undivided
- dark
- very limy + argillite
- numerous calcite stringers
- sharp lower contact 35° CA
- calcite band 1cm thick on contact

129.9-130.2 Mudstone-Undivided
- brecciated lower contact 50° CA

130.2-131.4 Andesite-Undivided
- chill margins at lower contact
- 2cm sheared argillite at lower contact and another interbed of argillite at 130.9

131.4 267.0 RHYOLITE UNIT

131.4-173.0 Rhyolite-Lapilli/Rhyolite-Breccia
- lapilli + ash tuff's - breccias
- shear contact
- greyish colour caused by ?carbon continuation? silicification? weak chlorite alteration
- very siliceous for the more part
- abundance of hairline ash fracture filled with quartz calcite especially where rhyolite is siliceous
- trace pyrite as fine disseminated + small stringers
- vein breccia at 152.2 as sulfides
- local silty sections that have been silicified

173.0-174.1 Rhyolite-Flow (General)

- heavily altered lapilli breccia silicified
- rock has a fairly dark appearance, probably due to chlorite alteration
- lapilli fragments become increasingly chloritic (talc alteration?) going down hole
- fault at 156.0 where the significant increase in chloritization begins
- more fault gouge up to 189.0
- 2cm thick quartz/carbonate vein and from 188.0-188.6
- possible talc alteration- no sulfide mineralization noted

197.6-206.0 Rhyolite-Lapilli
- fault zone
- abundance of gouge + rubble over entire interval
- rock has a grey gritty gravelly appearance
- no visible mineralization
- lapilli breccia fragments siliceous + chlorite altered

206.0-217.2 Rhyolite-Lapilli
- lapilli tuff
- grey, quite altered
- continuation of previous material
- quite sheared with an abundance of fault gouge sections
- not as bashed up as previous interval
- no visible sulfides
- quite siliceous

217.2-237.7 Rhyolite-Breccia
- abrupt change to strong lapilli breccia contact 20° CA
- rock is quire dark (chlorite alteration?? or argillite xxxx)
- silicified (several stages) of lapilli fragments angular fracture faces often sheared
- rock is overall visible
- 225.0-225.8 very argillaceous
- fault at 232.2 with associated foliation 60° CA

237.7-238.6 Dyke-Latite
- upper contact 70° CA lower contact brecciated
- 10cm chill margins
- hairline gash fracture calcite 45° CA

238.6-239.9 Rhyolite-Lapilli
- silicified lapilli tuff

239.9-240.9 Dyke-Latite
- no visible mineralization
- calcite gash fracture
- poor chill margins
- upper contact 55° CA
- lower contact 70° CA

240.9-245.1 Rhyolite-Lapilli/Rhyolite-Flow
- dark grey, silicified
- some flow banding 35° CA, minor chlorite alteration

- minor wispy quartz/calcite alteration
- upper contact has 10cm of quartz/calcite gash fracture + brecciation
- lower contact gradational
- 241.6 fault gouge, partially clay, 45° CA

245.1-257.5 Rhyolite-Breccia/Rhyolite-Lapilli
- dark grey with felsic clasts of cm scale
- occasional ash tuffs,generally 10cm in length
- ash tuffs commonly 70 to 90° CA
- lower contact gradational
- 248.3 fault gouge, clay, broken, no orientation

257.5-267.0 Rhyolite-Flow (General)
- massive to banded with foliation at 50° CA
- quartz carbonate veining, cm scale
- parallel to foliation over 20cm at 257.0
- local cm length interflow tuffs

267.0 EOH

CA89-109

0 5.2 CASING

5.2 38.7 HANGINGWALL ANDESITE

5.2-23.9 Vesicular Andesite
- core is very broken + block, limonite staining on fracture surface
- calcareous stringers occasional trace pyrite
- 16.0-19.0 rock becomes more grainy
- 19.0-23.9 oxidized some recessive weathering giving the rock an overall rusty tinge + pock-marked appearance

23.9-25.3 Black Argillite
- abundant crystallites, somewhat laminated with rock cleavage at 70° CA
- minor banded pyrite mineralization

25.3-26.2 Andesite
- core vein rubbly, ~~lime~~ lime stained

26.2-28.0 Argillite
- vein blocky, lime stained on fracture surface occasional gash fracturing filled with quartz

28.0-30.5 Andesite
- core vein broken + vain oxidized fragment at 29.0 showing contact with xllxxx fragments

30.5-35.6 Black Argillite
- not well cleared along bedding pl occasional crystallites
- at 35.2 is white soft powdery tract coating of unknown material bedding 65° CA
- occasional solution cavities three xxt
- contact contains andesite fragments
- core vein broken
- sheared slickenslide surface common fault

35.6-38.7 Andesite
- vein brecciated pillow andesite still limonite coated on fracture
- core vein broken + rubbly
- minor pyrite disseminated and on fracture

38.7-50.3 Contact Argillite
- 40.4 fault rubble
- tuffaceous bands nears contact
- 41.6-43.1 massive fine grained sulfide mineralization (stibnite?) too hard!, tetrahedrite?
- steely grey, occurring with blebs of pyrite + chalcopyrite
- vein dense, steely scratch hardness with 4.5 to 5
- 15% pyrite + chalcopyrite
- 44.3-47.5 rock become very grainy + calcareous giving whitish

colour, not laminated
- also some gypsum?? occurs with calcite
- disseminated pyrite increases
- 47.5-49.6 white mineral doesn't fizz to gypsum? argillite brecciated pyrite content 15-20% occasional rimmed with sl
- fault gouge at 50.0

50.3-52.3 Rhyolite
- absence of transition zone
- lapilli breccia matrix carrying abundant pyrite + argillaceous material
- lapilli fragments up to several CA's dia
- occasional stylolitic lapilli contact lines

52.3-60.6 Argillite
- occasional pillow fragments and abundant calcite fragments
- bands + stringers near upper contact
- argillite bedding at 65° CA
- blotchy white alteration crystallites at 58
- disseminated blebs pyrite + sl at 58.7
- occasional quartz carbonate gash fractures
- 15% sulfides 58.7-59.7
- 10% sulfides 59.7-60.6

60.6-64.1 Andesite
- fine grained chill marring with abundant hairline gash fracture filled with quartz carbonate
- abundant fins grained pyrite in hairline fracture + dissemination near lower contact
- occasional dark (chloritic) alteration envelopes along calcite fracture

64.1-91.0 Argillite

- 64.4-67.4 very fine grained dense non-laminated argillite with abundant (3-5%) sulfide vainlets, disseminated blebs + breccia matrix of sphalerite, chalcopyrite, come galena
- silicified breccia at 66.3
- some solution cavities + solution breccia
- abundant hairline gash fracture of quartz/calcite
- 67.4-74.6 dense fine grained weakly laminated argillite increase in quartz vein at various angles CA
- abundant hairline quartz filled gash fracture frequent xxx cavities
- 5% sulfide SL, galena, pyrite bedding 60° CA

74.6-85.0 Fault Zone
- poor recovery, core vein broken + rubbly
- occasional narrow bands (1mm) of pyrite in fine grained argillite

85.0-85.8 argillite flow material with onset of sulfide mineralization, mainly spherical (colliform??) areas of SL + pyrite, 50% over interval

85.8-87.0 silicified band, quartz vein??
- brecciated, altered with very fine disseminated pyrite
- argillite fragments at 86.5, 60% SL over 5cm

87.0-89.0 fine grained non-laminated argillite
- fault gouge at 87.0

89.0-91.0 30% sulfide mineralization mainly SL with minor galena + fine grained pyrite
- argillaceous debris flow with rounded grains of SL

91.0-113.5 Rhyolite-Flows + Breccias

91.0-93.6 argillaceous rhyolite lapilli breccia with disseminated coarse grained + stringers
- SL 2% and mainly fine grained disseminated pyrite, 2-3%
- strongly altered

93.6-113.5 rhyolite breccia, chalky white colour, grainy appearance marked with prominent graphitic black alteration remnants
- there is an abundance of SL mineralization with occasional blebs of visible gold associated with the SL
- lesser amounts of galena + chalcopyrite
- sl often rimmed with darker brown alteration rims or possibly second stage mineralization evident
- 98.3 25cm debris flow 25% sl, 25% galena, 2-3% pyrite
- very fine grained pyrite associated with black alteration
- VG identified between 104.0-119.0
- occasional dark brown fine grained stringers of pyrite
- 97.5-98.3 30% sulfide (sl, galena, pyrite)
- 103.0-104.0 10% sl + pyrite, trace VG
- 109.0-113.5 3% sl, 2% pyrite minor galena, trace VG

113.5-119.5 Rhyolite Breccia
- very heavily mineralized with very high concentrate of carbon alteration
- 10% sl, 2% galena, trace chalcopyrite, 1% pyrite over whole interval
- strong vg at 117.0
- occasional lapilli fragments altered to chloritic green colour
- sulfides occur as coarse rounded grains
- sl has dark rims, overall rhyolite has clastic breccia texture

119.5-147.0 Rhyolite Breccia
- core has altered mottled appearance, slight chloritic alteration near upper contact
- 124.3-124.8 40% sl, 5% galena, 5% pyrite coarse grained mineralization
- 5-7% sulfides over entire interval
- 132.8-135.0 15% sl, 5% galena + pyrite
- 133.3-133[illegible].7 debris breccia
- entire interval has stringer + grainy patches of coarse grained

sl
- breccia fragments often rimmed with sulfide (pyrite + sl) matrix
- black graphitic alteration present but sxxxxx
- sericite to chlorite alteration
- 141.5-142.2 vein argillite section with coarse felsic breccia fragments that have slight chlorite alteration

147.0-150.2 Argillite
- very brecciated, felsic breccia fragments, abundant pyrite in matrix, 3% sl, 5% pyrite
- debris flow texture??

150.2-152.8 Rhyolite Breccia
- altered breccia, coarse sl mineralization occurring as stringers + blebs rounded
- 20cm argillite
- band at 151.0 with 2cm band of fine grained pyrite
- brecciated strongly at upper + lower contacts

152.8-161.8 Argillite
- breccia debris flow contact zone with coarse grained sl + minor galena
- massive fine grained pyrite at 153.4-153.6 brecciated sediment pyrite
- 152.8-154.2 5% sl, 5% pyrite, 1% galena

154.6-155.7 15% sl, 5% pyrite
- coarse grained massive grained of sl
- very fine grained pyrite in stringers and breccia blebs in breccia matrix

155.7-161.2 argillite slump brecciated, no altered fracture fill

- very fine grained pyrite stringers, siliceous influx in places with fine grained pyrite
- quartz vein with strands of pyrite rims occasional silty bands 50° CA with fine grained rims of pyrite tuff bands??

161.2-161.8 strong massive high grade brecciated pyrite with lesser sl + galena
- 40% pyrite, 3% sl, 5% galena

161.8-172.2 Rhyolite Breccia
- upper contact dark argillaceous with frequent argillite breccia fragments
- heavy sl mineralization throughout
- rounded grained of coarse disseminated sl with local concentrations of galena
- entire interval quite dark from argillite + sulfide mineralization
- 20% sl, 3% galena, 1% pyrite

172.2-174.3 Argillite

- disseminated breccia dark interval, angular breccia fragments throughput matrix often felted with brecciated massive fine grained pyrite
- some silicification in matrix, 5% pyrite

174.3-241.2 Rhyolite-Flows + Breccia
- dominate massive silicified flows, local crackle brecciation
- occasional breccia with argillaceous clasts, cm scale in rhyolite matrix
- locally banded + sheared
- sporadic sulfide mineralization with local concentration of sphalerite, galena + pyrite
- late stage quartz feldspar veining crosscutting mineral

181.7-182.4 concentration of pyrite/galena in veins + disseminated aggregates
- veining 25° CA, 5% sulfides xx interval with pyrite >>> galena

190.4-197.0 intervals of sphalerite/galena mineral
- honey coloured sphalerite dominate, occasionally composition zoning
- intervals up to 20cm of semi-massive sl, 40-50% sl, >galena/pyrite
- brecciated from 196.0-198.0

200.0 shearing at 45° CA, intervals 1.0m

213.0-214.0 pyrite mineralization in low CA angles veins

215.8-230.4 intervals of sulfide mineralization, 5-50% sphalerite, galena + pyrite
- sphalerite dominate
- locally semi-massive over 20cm, with sphalerite dominant (honey coloured)

230.5-231.5 diaseminated sulfides, 40% with pyrite dominated, less sphalerite (honey coloured)

233.0-237.0 local concentration of pyrite, generally as veins and as stockwork veining a various angles occur to rare concentration of honey coloured sphalerite

241.2-243.3 Breccia/Debris Flow
- cm scale clasts of argillite in carbonate matrix
- lower contact gradational, arbitrary
- rubbly/blocky core from 241.6-242.6 (mismatch)

243.3-254.4 Dacitic Lapilli Tuff
- transitional zone between upper rhyolite + lower dacite
- gradational into massive dacite
- sulfide mineral concentration i upper segment from 243.3-248.9
- locally massive sl(honey coloured) chalcopyrite, galena
- massive minerals up to 1.0m in length
- from 248.9 to lower contact trace pyrite

254.4-299.0 Dacitic Ash Tuff
- 2-3% pyrite throughout
- rock fine grained greenish tint due to chlorite alteration
- locally vesicular
- gradational sections of increasing fragment size
- pyrite as disseminated + stringers + along fracture replacement blebs + as alteration rims
- moderately silicified throughout
- 278.9 minor fracture bleb of sl
- 278.0 stringer of sl, pyrite + minor galena at 15° CA
- sl dark brown (iron rich)
- 287.3 coarse grained stingers 1cm thick of sl, galena, chalcopyrite in fracture fill
- minor quartz veinlets + gash fracture throughout
- 296.6 25cm stringer of galena, sl, chalcopyrite + pyrite 10° CA
- xx general the sl, galena occurrences have not had other such mineralization occurring adjacent to the reported occurrences except for the usual pyrite content

299.0 EOH

CA89-108

0 1.5 CASING

1.5 38.7 HANGINGWALL ANDESITE

1.5-14.8 Andesite-Massive/Andesite-Breccia
- massive to brecciated with brecciation towards lower contact
- minor broken core
- white quartz veining common in lower section
- 7.5-10.0 fractures core, some rubble, oxidized
- 12.5 white quartz vein, barren, 15° CA
- 12.6-14.8 andesite breccia, bleached andesite with mud matrix
- common quartz veining at carious angles
- lower contact gradational to debris flow

14.8-17.8 Mudstone-Debris Flow
- andesitic clasts, cm scale, in mud matrix
- gradational to carbonaceous argillite, 17.0-17.8
- trace sulfides, local pyrite mineralization in hairline fractures
- lower contact sharp at 80° CA

17.8-25.1 Andesite-Crackle Breccia
- fine grained bleached andesite in carbonate matrix
- faulting/broken core present
- 18.6-19.6 broken rusty core
- faults at 18.9, rusty, gouge, 30° CA, 19.6, gravel/gouge, no orientation
- 22.8-24.2 intervals of broken core
- faults 23.0, clay oxidized gouge 35° Ca, 23.5, gravel/clay gouge, no orientation
- lower contact sharp at 85° CA

25.1-29.4 Mudstone-Carbonate Rich
- carbonate veining common in upper 2.0m
- cm scale
- white carbonate veining generally 90° CA
- hairline veinlets broken, various angles
- bedding at 90° CA, occasional pyrite bands parallel to structure
- unit is gradational into a wacke (debris flow)
- minor broken core
- 29.4 lower contact, broken for 10cm

29.4-34.8 Mudstone-Debris Flow
- rounded to subrounded mm scale clasts in mud matrix, carbonaceous
- xxxxxx up to 50% comp, andesite, mud, argillite
- compositions with argillite most abundant
- increase of clast size down hole
- 34.8 lower contact 70° CA

34.8-36.9 Mudstone-Pyritic

- disseminated fine grained pyrite in bands, 65 to 70° CA
- common slump structures
- bands up to cm scale
- 36.3-36.9 broken core, oxidized surfaces
- lower contact broken

36.9-38.7 Andesite-Massive
- broken, strongly oxidized
- lower contact broken
- broken/blocky core, cm scale, from 37.8-38.7

38.7 40.8 CONTACT ZONE
- lower metre gradational to a wacke (debris flow)
- hairline carbonate veinlets common, at 40° CA
- trace 1% disseminated pyrite

40.8 43.3 TRANSITION ZONE
- weak to moderate alteration
- fine grained dominant argillaceous, gradational to rhyolite
- locally strongly oxidized on broken surfaces
- trace 1% disseminated pyrite, trace sulfasalts

43.3 162.8 RHYOLITE UNIT

43.3-52.7 Rhyolite-Lapilli
- cm scale felsic clasts
- locally strongly sericitic
- trace sulfides
- 51.8-52.7 medium sericitic alteration
- fracture core at 52.3, along CA, oxidized
- lower contact broken

52.7-55.8 RHLM
- massive, lower 40cm gradational to debris flow? with 10% clasts, probably secondary
- graphitic smears on broken surfaces
- fine grained disseminated pyrite, 1-2%
- 54.1 fault gouge, 70 to 80° CA
- 54.4-54.8 secondary crystals, anhedral, cm scale, gypsum?
- similar in appearance to transition zone
- lower contact abrupt

55.8-162.8 Rhyolite-Lapilli
- typical, felsic clasts up to om scale
- locally ash tuff
- minor broken core, no oxidization
- weakly altered
- locally intense
- trace disseminated pyrite
- 65.7 fault gouge, gritty, no orientation
- 67.8 fault gouge, clay, quartz infilling 40° CA

- 75.3 fault gouge, gritty clay 70° CA
- 92.0 fault gouge, cemented, 30° CA
- 94.0-97.3 metre length intervals of broken core
- gouge material present
- 113.5 fault gouge, no orientation
- 115.2-115.5 broken core, cm scale
- 118.0-118.6 fault zone broken core, gouge at 118.0, 60° CA
- 125.9 fault gouge, cemented rubble, 80° CA
- 130.5-154.5 rhyolite lapilli
- matrix darker, black to dark grey
- per sericitization?
- greasy soft H<5
- commonly sheared at lower CA angles 20°
- locally pockets of disseminated pyrite, up to 5%
- hairline veinlets, often discontinuous, parallel to structure, possibly talc?
- gradational into more felsic, anxx rhyolitic tuff
- 146.5-148.8 cm intervals of broken core

162.8 EOH

CA89-107

0	0.6	CASING
0.6	57.7	HANGINGWALL ANDESITE

0.6-28.5 Andesite-Pillow Breccia/Andesite-Breccia
- pillow fragments + andesite fragments commonly in mud + carbonate matrix
- locally vesicular andesite at top of hole
- towards lower contact occasional mud flow/debris flow, up to 60cm core length
- intervals of broken, rusty core common
- 1.0-5.2 vesicular andesite
- gradational into andesite pillow breccia
- 11.2-113.3 broken rubble - oxidized
- 19.4-20.1 broken crumbly core
- some gouge material, extremely oxidized
- 21.4-21.8 argillite, contact at 85 to 90° CA
- 22.8-22.9 argillite, 80° CA
- lower contact, sharp 65° CA

28.5-40.2 Mudstone-Carbonate Rich
- massive well bedded at 65 to 75° CA
- occasional pyrite mineralization, generally in banded (mm scale) parallel to structure
- lower contact gradational to a debris flow/silicified alteration argillite

40.2-57.7 Mudstone-Debris Flow
- felsic fragments up to cm scale in mud matrix
- locally pure argillite
- commonly silicified with white quartz veins mm to cm scale, 20 to 50° CA
- isolated fluorite mineralization, lime green in colour, associated with quartz veining
- unit is generally blocky, oxidized
- fault gouge noticed
- rare mineralization
- generally pyrite in aggregate masses
- lower contact gradational into transition zone
- 40.5-41.0 broken core, fragments broken at low angles to CA
- 43.7-44.8 broken oxidized core
- gouge material at 44.5
- 45.2- 46.3 broken oxidized core
- 47.9-49.0 broken core, strongly oxidized
- 50.0 white quartz vein, 3cm, fluorite mineralization present, 25° CA
- 51.1 fault gouge 35° CA
- 51.4-55.5 up to 1.0m intervals of broken core, strongly oxidized
- lower contact gradational, arbitrary

57.7 66.3 TRANSITION ZONE
- massive, contact gradational
- lower contact grad into rhyolite
- occasional white carbonate vein, 80 to 90° CA
- faulting/broken core present
- mineralization is weak, 2-3% disseminated pyrite
- generally euhedral cubes
- very fine grained up to 5% locally as aggregates
- trace 1% disseminated arsenopyrite, trace stibnite
- locally honey coloured sphalerite concentration in veinlets
- 62.0-62.8 fault zone, core less, gouge mxt.
- 64.0-65.0 occasional sphalerite concentration in veins, trace over 1.0m
- 66.3 lower contact gradational, arbitrary

66.3 162.2 RHYOLITE UNIT
- felsic clasts up to cm scale
- trace 1% disseminated pyrite
- intense alteration locally (sericitic) over 1.0m scale
- sporadic concentration of sphalerite/galena
- pyrite mineralization increasing down hole
- 70.1 fault, clay gouge, 20° CA
- 79.8 fault, brittle gouge 55° CA
- 82.8 flow banding 35° Ca
- 84.4-87.5 zone of intense sericitization, H <5, sheared, at low CA
- 89.1-90.7 alteration zone as above
- shearing at 40° CA
- 94.7 fault, clay, 65° CA
- 95.8 fault, clay/brittle definite
- 98.0-98.6 fault zone
- 101.4-101.8 disseminated sphalerite 2-3%
- 103.0-107.0 isolated occurrences of sphalerite, galena, tetrahedrite? within crosscutting fractures, mm scale
- 107.0-108.0 blocky core, cm scale
- 109.0-111.7 zone of intense sericite alteration
- fault gouge at 110.8 55° CA
- broken core 110.1-110.5, 111.2-111.4
- 111.4-118.0 zone of intense sericite alteration
- locally soft h <3
- 121.8 white quartz/carbonate (strontianite) vein along CA
- livations along broken surface 40°
- 123.6 sphalerite (honey coloured) in white quartz vein, 1cm, 50° CA
- 125.2-125.5 concentration of sphalerite associated with quartz veining 10%
- 128.2 whita quartz vein 35° CA, 10cm
- 131.2-131.7 quartz/carbonate (strontianite) vein, 25° CA
- vuggy cavities with euhedral quartz crystals
- 132.8 as above, 20cm
- xxxxxx mineralization at lower contact
- 133.6-133.8 white quartz/carbonate vein 70° CA
- pyrite mineralization at contacts

- 135.5-135.7 concentration pyrite, disseminated
- minor galena
- 145.4-157.0 local concentration of pyrite, sporadic
- disseminated aggregates concentrated in matrix along fractures
+ between fragments

162.2 EOH

CA89-106

0	6.1	CASING
6.1	134.3	HANGINGWALL ANDESITE

6.1-24.2 Andesite-Breccia
- bleached fragments
- aphanitic, bleached
- quartz-calcite xxxxxxx
- 20% quartz, 5% calcite
- 14.0 carbonized stylolites
- oxidized fractures throughout
- 1% disseminated pyrite

24.2-25.1 Mudstone-Laminated
- 90% limy mud layers
- 1-3% pyrite
- layers at 85° to CA
- 1-3% CW fracture filling

25.1-25.8 Andesite-Breccia
- as above

25.8-27.5 Mudstone-Laminated
- layers at 80° to CA
- 1-3% pyrite in fine laminations
- 40% limy layers
- 20% pale grey quartz rich (cherty layers)

27.5-32.3 Andesite-Massive
- pale, bleached, aphanitic
- vesicular
- local crackle breccia - grey calcite + pyrobitumen
- 1-3% calcite + minor quartz as fracture filling
- trace pyrite

32.3-33.4 Mudstone-Debris Flow
- coarse andesite clasts (up to 1cm across) in light grey calcareous matrix
- found higher up in laminated holes
- bleached, subangular to subrounded clasts
- 15% matrix - pale grey calcareous

33.4-38.1 mudstone-Laminated
- layers at 70° to CA
- 10% cherty - light grey layers
- 1-3% pyrite
- occasional soft sediment deformation structures
- rubbly, oxidized fractures
- 20% limy layers
- cherty layers are more concentrated near the lower contact

38.1-54.4 Andesite-Massive
- subporphyritic cores - olive green to pale olive green, bleached aphanitic, chill margins
- local crackle breccia with minor sequential infilling - white quartz as last infill
- locally vesicular - predominantly in chill margins
- 1-3% calcite + minor quartz as fracture filling

54.4-56.3 Mudstone-Laminated
- layers at 75° to CA
- 30% pale grey cherty layers
- 190% lime mud layers
- 1-3% pyrite

56.3-77.5 Andesite-Crackle Breccia
- 20% crackle breccia matrix - grey
- occasional sequential infilled gaps
- trace pyrrhotite
- local pillowed andesite to 20% of unit
- 1-2% white calcite fracture filling
- locally vesicular

77.5-78.5 Mudstone-Laminated
- 40% lime mud layers
- layers at 80° to CA
- 1% pyrite
- rubbly

78.5-79.4 Andesite-Breccia
- aphanitic bleached, vesicular andesite clasts - autobrecciated
- occasional rubbly layers in matrix

79.4-80.4 Mudstone-Laminated
- 3-% andesite fragments
- layers at 80° to CA
- weakly brecciated

80.4-98.7 Andesite-Massive
- marker andesite
- pseudo ophitic core to aphanitic chill margins
- calcite + chlorite along sheared fractures
- 3-5% calcite, 1-5% chlorite as fracture filling
- trace finely disseminated pyrite

98.7-114.6 Mudstone-Laminated
- 70% lime mud layers
- layering at 50° to CA at 99.0
- layering at 65° at 100.0
- rubble from 101.0-105.0
- layering at 70° at 107.7
- 112.3 layering at 75°
- 1-3% pyrite
- occasional crosscutting calcareous layers from 111.7-114.6
- 111.2-111.7 andesite-aphanitic bleached, black dendritic

alteration, vesicular, weakly brecciated

114.6-117.1 Andesite-Massive
- aphanitic, bleached chill margins with dendritic "black" (possible dark green) alteration of cores
- 1-3% calcite fracture filling
- 115.9-116.0 10% pyrite disseminated at chill margin
- 117.5-117.1 10% pyrite in brecciated chill margins associated with calcite

117.1-122.2 Mudstone-Laminated
- laminations at 40° to CA at 117.3
- pyrite replacement of calcite rhombs (up to 2mm across) at 117.2
- pyrite rimming fossil belemnite at 117.2
- 1-3% calcite (white crystalline) in layers throughout
- graphite along bedding planes
- 120.7 layers at 50° at CA
- 121.6-122.2 50% grey cherty layers
- 3% pyrite throughout

122.2-134.2 Andesite-Massive
- weakly brecciated, subporphyritic
- 3-5% calcite fracture filling
- occasional slickensided fractures
- rubbly
- black dendritic alteration from 132.5-133.6
- trace pyrite
- 125.6 pyrite bleb 2cm across

134.3 136.5 CONTACT ZONE
- layers at 65° to Ca
- 3-5% pyrite
- 1% white calcite fracture filling, trace sphalerite associated with calcite at 136.6
- 1% arsenopyrite
- 136.4-136.5 pseudo zone
- fault contact with rhyolite

136.5 138.5 TRANSITION ZONE
- 20-25% ash matrix - altered to chlorite + muscovite
- 5-8% pyrite as very fine disseminations in matrix
- lapilli size fragments - subrounded
- 136.7 trace sphalerite, trace tetrahedrite

138.5 216.5 RHYOLITE UNIT

138.5-14.8 Rhyolite-Lapilli
- intensely altered - chlorite + muscovite (talc alteration)
- fine grained almost ash in upper portion
- 3-5% very fine grained pyrite

- 146.6 bleb of pyrite
- intensely foliated at 50° to CA
- 146.8-148.4 silicified rhyolite-lapilli
- 1-3% pyrite throughout in silicified matrix
- 148.4-149.1 intensely altered - TA sheared (at 35° to CA) rhyolite lapilli

149.1-185.5 Rhyelite-Lapilli
- silicified 149.1-152.4
- 1-3% pyrite in matrix
- 152.4-154.7 chlorite/sericite alteration
- pale alive green
- foliated at 50° to CA
- trace pyrite
- 154.7-161.5 weakly contorted lapilli tuff
- moderately altered muscovite + chlorite (foliated at 50°)
- 5% matrix
- occasional banded fragments
- 1-3% pyrite
- 161.5-164.4 emerald green altered fragments (chlorite)
- 40% of unit
- 164.4-183.5 made rarely foliated at 50° CA - 1-3% fine grained pyrite
- chlorite altered matrix and minor chlorite alteration of clasts

- ash tuff from 170.1 to 171.0 preferred orientation of fragments at 50° to CA
- quartz flooding - 3-5% quartz filled fractures
- stylolitic fractures from 174.0-187.5
- 173.0-176.6 trace fine grained sphalerite
- minor sericite alteration throughout

183.5-210.1 Rhyolite-Flow (Massive)
- silicified
- contorted flow banding throughout
- 1% pyrite
- occasional autobreccia zone (occasional breccia zones)
- 10-12% quartz, 1% adularia as fracture filling

210.0-216.5 Rhyolite/Mudstone Rhythmite
- rhythmically banded ash flow
- pale grey - yellow sericitized, siliceous bands and darker grey chloritic banded - mottled/contorted banding
- intense xxxxxxx alteration in lower parting - begins to look more like a breccia (grades into a breccia with intense chlorite alteration of clasts and matrix)
- 1-3% disseminated pyrite

216.5 EOH

CA89-105

0 4.6 CASING

4.6 106.7 HANGINGWALL ANDESITE

4.6-28.0 Andesite-Pillow Breccia/Andesite-Massive
- core blocky, broken
- difficult to see textures
- in places very fine chlorite vesicles
- medium green
- medium grained
- generally darker areas may be pillow selvages
- at least locally calcareous
- limonitic fractures +/- quartz continue to 36.0
- sporadic quartz > calcite veins subparallel CA

12.1-19.6 extensive earlier calcite with later quartz veins
- very coarsely crystalline with pure vein material 16.8-19.4
- open centres with quartz euhedra
- crackle breccia in surrounding country rock
- limonite along inter crystalline crackle but no obvious sulfides

19.8-25.4 ?silicified debris flow
- subrounded heterogeneous fragments strongly silicified, with larger andesite fragments includes 23.1-23.8
- quartz + calcite vein as above

28.0-30.5 Mudstone-Debris Flow
- more like typical debris flow with subrounded close packed fragments, calcareous
- many altered felsic
- 27.9-28.3 quartz calcite vein as before

30.5-39.9 Andesite-Pillow Breccia
- medium green
- medium grained
- finely vesicular, vesicles filled with chlorite, calcite, calcareous
- finely seritic
- 1-2% pyrite as fine disseminations materials and along discontinuous veinlets
- sparse felted sub mm-mm clots
- increased along pillow selvages
- minor chert intervals
- 34.0-36.0 massive coarsely crystalline quartz + calcite veins
- + 36.2 hyalloclastic breccias
- andesite hyalloclastic
- more evident sericite
- finely disseminated in fragments and increased in matrix
- 38.0-38.7 10 to 20° CA
- quartz veins, silicified between

39.9-43.1 Mudstone-Laminated
- very dark to medium grey bands 80° Ca
- pyrite finely disseminated
- increased in specific bands
- minor felted clots
- irregular veinlets
- minor calcite veins
- generally calcareous
- local microfaults and often soft sediment deformation
- 40.0-43.5 badly broken
- strongly carbonaceous to graphitic
- 41.4 debris beds
- 42.0-44.0 intervals of very fine crystallites
- 43.0 bands 70° CA

43.1-77.9 Andesite-Pillow Breccia/Andesite-Massive
- upper portion brecciated with some admixed argillite fragments in argillaceous matrix to 47.2 (andesite pillow breccia)
- calcareous, fragments wispy in places

47.1-47.2 friable, clay

47.2-47.9 rubble breccia
- calcite cement
- homogeneous angular silicified argillite fragments
- andesite, medium green
- medium fine grained
- vesicular in places, vesicles filled with calcite and lesser chlorite
- calcareous in places
- some bleaching
- sericitized
- some intervals of rubble/pillow breccia with andesite fragments in chloritic and darker calcareous matrix
- minor calcite veins variable angles
- pyrite finely in matrix
- sparse felted clots
- minor veinlets
- increased in breccia matrix
- 50.0-50.4 core broken, brecciated
- 50.74-50 calcite, quartz vein 40° CA, 5cm wide
- 57.3 2cm wide 50° CA
- 57.3-57.6 silicified argillite
- + 55.0 sporadic vesicles larger, but mostly massive
- 70.5-73.0 dominantly chlorite filled
- 69.0-70.7 laminated (mudstone laminated) argillite bands 70° CA
- fine crystallites, silicified
- 77.5-77.9 chill zone
- brown grey
- very finely crystalline

77.9-94.2 Mudstone-Laminated
- dark grey bands with lesser lighter grey variable 80 to 90° CA
- some contorted areas with good soft sediment deformation as

microfaults, flames
- pyrite greater in somewhat coarser (1 to 5cm) bands
- finely disseminated throughout and in irregular veinlets to felted masses
- commonly calcareous with minor calcite veinlets
- minor nodular light grey chert
- belemnites at 78.8, 81.3 sparse fragments, in several places
- 77.9-78.1 quartz crackle near parallel CA
- 82.6-87.8 and 83.2-85.0 brecciation and minor very fine grained andesite also 85.2-85.7
- 84.2-844.5 yellow green
- very fine grained andesite
- bleached and brecciated
- 88.5-90.7 as above with massive coarse grained calcite/quartz veins
- subparallel CA
- crackle extends down to 91.0
- sparse blocky pyrite needles
- 92.4-92.5 andesite
- brown grey
- fine grained
- 93.1-93.2 calcite bands 90° CA

94.2-103.3 Andesite-Massive
- with some darker grey quench rinds
- andesite medium grained, subophitic textures
- very fine sericite, medium green
- upper chill zone distinctly finer brown grey, also lower chill zone
- similar marker seen in other holes
- faintly calcareous
- minor pyrite veinlets

103.3-114.1 Mudstone-Laminated
- broken, fragile, carbonaceous to graphitic
- 1 to 5mm contorted pyritic laminae, others 80° CA

104.1-106.7 Andesite-Breccia
- medium green
- medium fine grained andesite to andesite breccia
- darker grey pyritic calcareous chloritic matrix
- fine and medium crystalline pyrite generations
- contact with below sharp, brecciated

106.7 130.7 CONTACT ZONE
- last argillite after andesite
- laminated various dark grey bands 70 to 80° CA
- slightly wavy soft deformed in places
- locally calcareous
- pyrite rich bands tend to be coarser, lighter in colour (? >10%
- also sparse discrete mm crystals
- 107.8-110.2 intervals of white crystallite, often twinned or crossed

- bands 10-15% white (?) calcite crystals, comprise <10% of interval
- 110.9 belemnite debris
- 111.3-112.6 core badly broken
- 117.0-117.1 core broken, clay like
- 117.2-117.5, 118.7-118.9 pyrite rich needles to blotchy fragments surrounded by bleached rims

123.0-129.0 Mineralized Zone
- visible orange brown granular sphalerite bands
- sphalerite 5%, pyrite 20-40%, tetrahedrite 5-15% over interval
- mineralized bands slightly lighter in colour and coarser grained
- may be mm sized heterogeneous fragments (argillaceous ?gypsiferous talcose, rhyolitic) in debris flows
- sphalerite often zoned, subhedral, medium grained in finer matrix of anhedral pyrite, carbonaceous material with lesser ?grey metallic (tetrahedrite)
- argillites, very carbonaceous with very finely disseminated pyrite
- sphalerite bands 10mm to 33cm as at 123.0-123.2, 124.5, 125.2, 125.8-125.9, 126.3-126.6, 126.7-127.0 (intermittent), 127.1, 128.1-128.3
- slightly transgressive bands, may be slightly wavy with "flame" of argillite projecting upward into sphalerite rich bands
- bands perhaps 10-20% of sequence
- vary xxxx massive sphalerite to massive ?grey tetrahedrite to 5-15% of each
- pyrite abundance variable
- in places appears to be minor yellow grey metallic needles, probably arsenopyrite as at 124.5, 127.1-127.2, 127.3-127.4
- pyrite also very finely disseminated in host argillites and in slightly coarser mm size clots to fragments to subhedral cubes
- argillite light grey very soft patches which may be gypsum
- tetrahedrite rich bands as at 127.2-127.3, 126.1, 127.8-128.1
- 50% at most, lesser sphalerite, pyrite, trace arsenopyrite

126.3-126.6 debris flow with 5-10%sphalerite, 6-15% tetrahedrite, 10-15% pyrite
- sphalerite and pyrite rimmed by tetrahedrite subhedral to anhedral
- 127.6-127.7 very splotchy irregular tetrahedrite

128.3-130.7 core friable with clay but coherent
- last visible sphalerite 129.0
- 128.4 sharply contorted band
- + 129.0-130.7 soft grey, friable
- some fragments may be gypsiferous
- sparse fragments, carbonaceous, pyrite rich, may have sheared appearance
- sub mm pyritohedra
- 130.3-130.8 trace realgar in white gypsiferous fragment

130.7 135.3 TRANSITION ZONE
- carbonaceous mud matrix to tuffaceous matrix
- upper portion dark grey (?) stylolitic or sheared very soft (?gypsiferous) areas (?fragments) becoming harder downward and lighter grey as tuff content increases
- open fractures and ?feldspar veins 20° CA im places
- pyrite very finely disseminated and in medium crystalline mm patches 15%

135.3 222.9 RHYOLITE UNIT

135.3-160.3 Rhyolite-Breccia/Rhyolite-Lapilli
- variable light to dark grey
- silicified to sericitic
- fragmented to mottled, fragments variably visible
- in places stylolitic borders
- minor argillaceous partings
- to 132.5 patchily soft ?gypsiferous
- locally soft ?gypsiferous to 144.0
- in places minor quartz veins (pygmatically folded rarely) discontinuous, subparallel to 70° CA
- pyrite finely disseminated to 5% more in more carbon rich patches
- 133.0 minor granular orange sphalerite
- 144.1-144.4 white nodules amedst gypsiferous matrix
- nodules to/5mm, faintly/radiating, may coalesce
- also 155.2, 155.4, 159.3-160.3, 177.6-178.0
- 141.7, 142.2 trace orange brown to yellow subhedral sphalerite
- also 144.8, 145.3, 148.3
- 143.4-143.6 pyrite to 10% discrete, sub mm cubic crystals
- 144.8-145.1 friable clay
- 145.1-145.4 quartz veins 35° CA
- 145.4-147.7 strongly stylolitic fragments
- 149.4 irregular pyritic masses
- 155.7 irregular light brown sphalerite vein

160.3-175.7 Rhyoiite-Lapilli Tuff
- highly altered (sericitic?) strongly mottled with highly irregular lighter grey softer patches (?gypsiferous)(?more talcose) in darker harder matrix
- fragments (?) very irregular, may coalesce
- pyrite 5% very finely disseminated in darker patches
- 167.0 shears 10-15% CA
- mottles elongate parallel to shear
- gradational contact with below

175.7-208.2 Rhyolite-Lapilli Tuff/Rhyolite-Breccia
- very altered soft, fragments variably distinct
- in places commonly talcose to (?) gypsiferous to distinct chrome green areas as 176.0-176.5 (?magnesium chlorite)
- 178.6-178.7 pinkish quartz veins subparallel CA
- also 182.5, 182.7-183.2
- 183.8-184.3 70° CA

- 185.2-185.3 core broken with quartz veins subparallel CA
- 185.6-188.8 sheared green grey (?high magnesium chlorite) soft (?talcose) 30° CA
- 187.1 minor zone brown sphalerite subhedra
- 187.6-187.8 granular orange brown sphalerite with lesser galena
- 188.3-188.5 broken core
-190.3-190.6 greenish clay, friable
- 202.9-204.8 core badly broken, sandy, green grey

208.2-213.2 Rhyolite-Laminated Mudstone
- dark grey with pyrite rich bands 80° CA
- friable, blocky to clay to 209.0
- minor very fine sedimentary breccia to crackle breccias
- soft sediment deformation

213.2-222.9 Rhyolite-Ash
- medium dark grey, uniform with sparse somewhat flattened darker angular (?glass) fragment
- faintly banded 90° CA
- pyrite finely disseminated to 5% elongate felted patches (?clasts)
- sporadic folded quartz veins 20° to subparallel to CA
- major quartz + calcite vein 216.3-217.6 with trace ?blue grey metallic
- gradational contact with below by change to more brown grey (greater sericite) colour, overall increased pyrite content

222.9 242.9 DACITE UNIT

222.9-242.9 Datum Unit-Undivided
- subunits not very consistent
- upper contact vesicular to 223.0, then intervals of lithic tuff (FDLT) to breccia (FDBR)
- datum dendritic textures sporadic especially 233.0-235.0
- breccias, homogeneous, crackle
- paroslty mostly filled by pyrite lesser calcite and quartz
- pyrite also finely disseminated in matrix and fragments
- average 5-10% viable to 15-20% also as felted masses to several cm
- in places pinkish brown altered to bleached with darker grey irregular cremulated
- edges
- minor hematite staining as at 226.0-226.4

242.9 EOH

CA89-104

0 4.6 CASING

4.6 66.4 HANGINGWALL ANDESITE

4.6-17.4 Andesite-Massive
- core badly broken
- ground in places
- medium brown grey
- vesicular for most part with vesicles filled by dark-rimmed calcite
- lesser chlorite
- calcareous
- irregular quartz veins, minor crackle breccia
- pyrite finely disseminated <1% and in felted patches, lesser sub mm nodulos
- minor argillite intervals
- approximately 7.5 black shows "fault"
- 16.6-17.6 quartz vein subparallel to CA, sheared
- contact with below gradational by greener colour

17.4-27.2 Andesite-Pillow Breccia
- medium green to green grey
- finely vesicular with vesicles filled by chlorite
- bands of grey chert 40° CA with minor brecciation
- limonitic open fractures, core generally broken
- minor quartz veins
- pyrite <1%

27.2-63.1 Mudstone-Laminated
- core broken, blocky to 36.0, mushy in places
- dark grey
- bands poorly defined 60° CA
- 75° CA to 38.0 by increased pyrite in 1 to 10mm bands
- only minor quartz/calcite veins, crackle breccias
- variably calcareous, carbonaceous
- 33.2-33.4 lighter grey, coarser bands, slightly wavy 85° CA
- 36.2 slickensided graphitic partings
- 36.5-36.9 very soft broken clay
-36.0-37.0 well banded 80° CA
- 38.0-39.0 mudstone contorted, wavy almost nodular grey chert stylolitic borders
- pyrite 5% finely disseminated
- 39.2-42.3 andesite pillow breccia, andesite bleached
- light green grey
- finely vesicular with vesicles filled by chlorite, calcite
- darker interstitial or vein areas mineralized with quartz, calcite, pyrite, pyrite in wavy veins to 0.5cm, subparallel CA
- pyrite disseminated in matrix and vesicles fill
- also at 43.4-44.0 but more brecciated, bleached
- 44.0-44.8, 45.4-46.0, 49.8-50.0 very broken, carbonaceous to graphitic

- + 46.0-51.0 sparse bands, 60 to 70° CA
- show microfaults swirls
- 51.0-55.0 andesite massive
- core badly broken but appears massive homogeneous
- quartz veins 70° CA
- weakly sericitized
- 57.0-58.8 andesite-massive
- brown-grey
- very fine grained
- featureless bleached
- 58.9 belemnite
- + 58.8-63.1 bands 80° CA

63.1-66.4 Andesite-Massive
- major fault
- rubbly mush to clay
- greenish andesite colour

66.4 67.4 CONTACT ZONE
- less developed than typical
- well laminated 80° CA to contorted
- soft sediment
- pyrite 10-20%
- carbonaceous to graphitic
- 67.2 swirled calcite vein

67.4 69.1 TRANSITION ZONE
- transition between argillites above and stylolites below
- mixed lighter and dark grey, contorted (?sheared)
- 69.3 calcite influx, minor brecciation
- 67.8 trace orange sphalerite
- 68.0-68.3 rounded (?) finely crystalline pyrite fragments
- matrix talcose, gypsiferous
- brecciated pyrite with tuff fragments

69.1 194.0 RHYOLITE UNIT
- mottled grey to brown grey shades
- patchy strong silicification, perhaps atop sericitization
- original lapilli sized fragments in places appear re-brecciated
- fragment mm to +10cm size
- elsewhere pyritic discontinuous laminae appear contorted
- minor calcite veins to patches
- pyrite in felted clumps to bands 2-5%, variable
- mostly highly irregular
- thickened stylolites with clay rich pyrite
- orange sphalerite and tetrahedrite as at 69.8, 71.7-71.9, 73.0
- 76.2-77.2 massive to semi-massive finely crystalline pyrite
- irregular with quartz influx and stylolitic borders
- two pyrite generations visible, generally felted
- in places subrounded (?) fragments vaguely colloform
- also 77.5, 78.0-78.5, 79.5-79.8, 80.5-80.8 frequently

brecciated lesser calcite and 82.6-83.0
- 77.6-79.0 core broken ground
- 80.5 trace orange sphalerite
- 80.5 mushy clay, fractured also 80.9
- 83.0-83.5 semi-massive very irregular felted pyrite to 20%
- 82.8-89.0 pyrite 15-25% brecciated very irregular
- felted veinlike
- patchy to stylolitic to 1-5% orange brown sphalerite, erratic
- core recovery with grinding 86.2-86.8, 88.4-89.0

89.5-94.4 Rhyolite-Undivided
- contact with below gradational, difficult to place
- lighter grey than previous sericitized
- some sections vaguely laminated 70 to 80° CA but elsewhere brecciated
- stylolitic with carbon +/- pyrite patches and matrix

94.4-107.6 Rhyolite-Tuff/Rhyolite-Breccia
- mottled light to medium grey
- laminated 70 to 80° CA
- laminae corrugated to stylolitic with carbon and fine pyrite and split by local breccias
- matrix carbon with sericite
- for most part strongly silicified
- breccias dominate downward 94.5-94.7, 95.2-95.3
- broken, muddy
- 96.3-96.4 quartz veins 60° CA
- 97.2-97.4 stylolitic quartz, ?trace bright grey metallic
- 100.8 two generations quartz vein 90° CA

- + 101.0 strongly brecciated with subrounded to subangular light grey homogeneous fragments in darker grey carbon >> pyrite matrix
- sparse 1cm quartz veins 70 to 90° CA
- fragment borders often stylolitic
- minor quartz fragments
- gradational contact with below, by darker in colour and decreases in colour contact between matrix and fragments
- less silicified

107.6-115.7 Rhyolite-Breccia/Rhyolite-Lapilli
- upper portion longer fragments readily distinguishable
- fine downward and harder to distinguish from matrix
- may show swirls 70° CA
- appears granular
- very fine pyrite disseminated throughout
- may be very fine bright grey sulfide - too fine to be sure
- pyrite at most 2-3%
- 114.2 quartz vein 90° CA
- 113.2-113.6 angular quartz fragments
- irregular felted pyrite in matrix

115.7-134.2 Rhyolite-Lapilli
- gradational contact with above

- fragments smaller, more heterogeneous
- dark grey more homogeneous in colour and grain size
- very finely crystalline pyrite and trace bright silver metallic
- altered
- soft
- trace pale orange sphalerite
- some intervals felted pyrite
- very irregular in shape to 15%
- + 126.5 return to more brecciated altered rhyolite
- gradational to more silicified
- lighter grey material
- pyrite increases to 2-5%
- 133.9-134.2 core very veny soft, friable
- talcose or gypsiferous

134.2-151.7 Rhyolite-Breccia
- silicified light to dark grey with lighter breccias fragments against darker matrix
- fragments may show stylolitic borders
- local greenish sericitic patches
- pyrite variable in 1 to 10mm felted clots and fine dissemination in darker areas as euhedra to subhedra
- hard to estimate overall %
- 134.5 trace sphalerite and galena with pyrite along thickened stylolitic vein subparallel CA
- 137.5-137.8 broken to gougey, also 138.5-140.2
- characteristic close packed compressed light fragments in darker pyrite + carbon rich matrix
- + 145.4 breccia replaced by massive white stylolite with sparse block blebs to stylolite - like matrix above
- in part faintly banded 80° CA to contorted

151.7-194.0 Rhyolite-Breccia/Rhyolite-Lapilli
- contact with above gradational very altered
- mottled, patchy colour in shades of grey
- green grey soft sericitic in places
- elsewhere pervasive yellow grey sericite to darker grey silicified
- fragments well to wavy poorly defined
- 1-5% pyrite finely disseminated to 5% in some of the darkest areas
- coarser anhedral granular pyrite along stylolites, irregular veinlets
- pyritic clastics may appear cut off by areas of silicification
- crush zones/gouge as at 152.4, 154.1, 166.7, 174.6-174.9 (+/- quartz veins >5% CA)
- 160.8-161.2 green grey, soft
- 162.9 light grey
- vague crystals talcose along partings
- 163.1 quartz influx right angles CA
- 172.1-172.6 breccia with light green (soft) angular fragments showing apparent section rims within grey rhylolite matrix
- also 175.5, also 183.8-184.0
- 179.0-179.8 friable crush zone, may be sheared

- 178.2-178.3, 180.6-181.0 squared blocky crystals or fragments with translucent non-altered (?) cores
- 181.0 begins to look more crackled, fractured, tectonic
- 181.1-181.7 friable crush zone
- 186.5-187.5 fractured
- 190.8-191.1 fragile crush zone
- 187.6 zoned anhedral brown sphalerite veinlet, lesser pyrite
- 191.1-194.7 pyrite rich zone
- pyrite 15-20%, in part friable, brecciated
- granular subhedral pyrite in irregular clusters, often with patchy silicification
- zoned orange brown sphalertie and tetrahedrite <1% with coarsest pyrite
- sphalerite to 10% locally

194.0 279.5 DACITE UNIT
- footwall dacite
- pyrite rich unit above continues across contact
- contact place at first appearance quartz filled vesicles light to medium grey
- fine grained
- vesicular dacite
- 194.6-195.3 silicified and sericitized, quartz veined
- trace brown sphalerite and tetrahedrite
- 195.5-198.3 shattered, broken pyrite 10-15%
- granular, brecciated matrix could be part of rhylolite above or brecciated dacite at top of interval below
- brecciated to 199.6 than sporadic zones of vesicles
- minor black chert sometimes as breccia matrix
- pyrite finely disseminated in dacite, as irregular felted clots and veinlets vesicle fill
- open fractures to 202.5, 10% tp 208.5
- crackel breccia matrix to 5%
- 200.2 trace orange sphalerite
- also 202.4, 202.8, 203.7
- 204.4, 204.6-204.7 orange sphalerite subhedra with lesser tetrahedrite <1% surrounded by finer crystalline pyrite in irregular veinlets
- 208.1 brown sphalerite appears to infill longer than normal quartz filled vesicle
- 211.0-212.0 broken friable, clay
- + 212.0 fine light yellow sericite
- zones of brecciated felted pyrite, some with rounded shapes suggesting colloform textures
- pyrite can form matrix or fragments in breccia
- very irregular, pyrite 10-15% of interval with trace orange subhedral sphalerite associated with minor quartz influx
- trace tetrahedrite
- contact with below chxxx at end of last occurrence of vesicular dacite but interval to 219.9 is brecciated with pyrite cement
- fragments silicified featureless dark grey (?) dacite
- pyrite banded
- multi-generation and disseminated in ground mass 5-10%

217.0-219.0 Datum Unit-Upper Argillite
- see above
- black
- massive silicified
- may be argillite or dacite
- pyrite rich bands suggest argillite

219.0-262.2 Datum Unit-Lithic Tuff
- lithic tiff, heterogeneous
- generally well sorted fragments
- light to medium grey
- upper contact crackle brecciated with pyrite infill - well altered
- finely sericitic throughout
- minor quartz veins
- pyrite very finely disseminated 2-3%, plus along veinlets
- irregular fracture
- medium crystalline clots
- trace orange sphalerite throughout
- 223.0 granular orange patch/vein of sphalerite
- 229.7-230.1 brown coarsely crystalline sphalerite
- zoned with lesser coarsely crystalline galena and surrounded by pyrite
- appears to be irregular vein fill
- sphalerite 1-2% over interval
- 228.5-232.2 massive, light grey
- only sparse fragments visible
- 230.6 orange sphalerite + quartz vein
- 236.0 orange granular sphalerite with granular pyrite
- minor galena
- 235.3, 236.6-237.0 broken core
- 239.2 coarse orange brown subhedral sphalerite
- minor galena with granular pyrite
- 242.8 medium crystalline pyrite with galena, trace sphalerite
- 240.0 green tuff fragmants increase to 10%
- 245.5-245.7 very coarse
- two generation brown sphalerite with granular pyrite
- 246.5-247.5 friable, pyrite rich
- 257.4-257.6 banded colloform pyrite vein subparallel CA
- with minor zoned brown sphalerite
- pyrite continues disseminated into matrix

262.2-264.3 Dacite Laminated Mudstone
- gradational contact with above by darkening in colour
- core broken, blocky to 265.0
- banded shades to dark grey, with pyrite rich bands 70° CA slightly coarser
- pyrite 5-15%, generally finely disseminated

264.3-270.4 Datum Unit-Lithic Tuff
- as before, with 10% green tuff fragments, elightly purple in colour
- 268.2-268.6 broken

- greenish clay
- yellowish sericite alteration extends out from fractures forming subparallel rinds
- sericitic alteration extends downward in sheared foliated pattern

270.4-279.5 Datum Unit-Lithic Tuff
- contact with above broken from 269.5
- dacitic lapilli tuff to breccia, sericitic
- strongly clay altered
- white fragments more homogeneous
- may be more rounded in darker medium grey matrix
- appears/smells clay-like but hard
- may be bleached minor quartz veins 70° Ca to subparallel CA
- appears finely fractured, brecciated
- pyrite 2-5% very finely disseminated, lesser as felted masses to clots, along irregular veinlets
- in some places granular, brecciated
- 276.0 to end of hole badly broken
- very friable clay like

279.5 EOH

CA89-103

0	6.1	CASING
6.1	72.2	HANGINGWALL ANDESITE

6.1-6.3 Andesite-Undivided
- sequence begins in andesites
- broken ground
- medium grained
- medium grey

6.3-11.1 Mudstone-Laminated
- dark grey
- banded 60° CA with bands defined by slight differences in colour and pyrite content
- pyrite finely disseminated
- in irregular discontinuous veinlets less often as irregular felted masses
- intervals of crystallites throughout, minor andesites
- gradational contact alteration above

11.1-32.0 Andesite-Pillow Breccia
- medium green
- medium grained
- vesicular in places, vesicles filled by calcite
- lesser inter-pillow material
- minor open fractures, limonitic to 26.4
- quartz veins subparallel to >0°
- weakly sericitized
- minor areas chloritic alteration extend from fractures
- pyrite <1-2% finely disseminated and sparse mm to 10mm felted clots
- 18.5-18.8 quartz/calcite veins/influx and brecciation
- 23.1-23.2, 23.9-24.1 quartz/calcite veining
- 24.5-30.2 very complex banded veins
- some offset by later veins
- calcite, chlorite, quartz, some laddering
- irregular pyrite bands often stylolitic, brecciated, may be pillow interstics

32.0-43.9 Mudstone-Laminated
- shades of black to dark grey
- bands 75° CA
- very carbonaceous
- pyrite as before, minor soft sediment deformation
- 32.6-33.6 core badly broken, to clay-like
- mushy, graphitic in places, also 40.0-42.0
- 39.3-40.4 rubble breccia, calcite cement
- homogeneous argillite fragments partly rimmed by pyrite
- 42.8-43.9 areas of swirling/brecciation with felted pyrite edges
- calcite to quartz cement

43.9-49.7 Andesite-Pillow Breccia
- light medium green sericitic
- vesicular intervals with chlorite > calcite
- bleached areas confined to area 44.0-44.6 at contact
- 44.6-44.8 laminated argillite
- complex grey and white banded veins as described before
- show darker areas extending into andesite beyond

49.7-61.1 Mudstone-Laminated
- as before but bands variable 30° CA to parallel and only very poorly defined
- sparse calcite veins in part ptygmatic
- 55.6-56.6 coarser granular pyrite in light grey siltier bands
- bands 10% sequence, also 56.8
- 56.8 bands show needled crystals, some twinned
- look like pyrite replacement
- 57.5-60.0 very broken, carbenaceous to graphitic

61.1-65.4 Andesite-Pillow Breccia
- as before but more calcite veins and crackles
- 61.6 interval of silicified argillite
- 62.0-62.5 core broken
- 63.6-64.0, 64.4-69.0 broken and blocky core

65.4-72.2 Hangingwall Mudstone Under XXXX
- very blocky to friable so hard to divide
- carbonaceous, clay-like in places
- calcite +/- quartz veins to crackles to influx common, often with stylolitic borders
- tension fractures
- 66.8-67.2 light green, fine grained andesite
- + 69.0 to end of hole rubble to sand
- very dark carbon rich
- major fault

72.2 EOH

CA89-103

0	6.1	CASING
6.1	72.2	HANGINGWALL ANDESITE

6.1-6.3 Andesite-Undivided
- sequence begins in andesites
- broken ground
- medium grained
- medium grey

6.3-11.1 Mudstone-Laminated
- dark grey
- banded 60° CA with bands defined by slight differences in colour and pyrite content
- pyrite finely disseminated
- in irregular discontinuous veinlets less often as irregular felted masses
- intervals of crystallites throughout, minor andesites
- gradational contact alteration above

11.1-32.0 Andesite-Pillow Breccia
- medium green
- medium grained
- vesicular in places, vesicles filled by calcite
- lesser inter-pillow material
- minor open fractures, limonitic to 26.4
- quartz veins subparallel to >0°
- weakly sericitized
- minor areas chloritic alteration extend from fractures
- pyrite <1-2% finely disseminated and sparse mm to 10mm felted clots
- 18.5-18.8 quartz/calcite veins/influx and brecciation
- 23.1-23.2, 23.9-24.1 quartz/calcite veining
- 24.5-30.2 very complex banded veins
- some offset by later veins
- calcite, chlorite, quartz, some laddering
- irregular pyrite bands often stylolitic, brecciated, may be pillow interstics

32.0-43.9 Mudstone-Laminated
- shades of black to dark grey
- bands 75° CA
- very carbonaceous
- pyrite as before, minor soft sediment deformation
- 32.6-33.6 core badly broken, to clay-like
- mushy, graphitic in places, also 40.0-42.0
- 39.3-40.4 rubble breccia, calcite cement
- homogeneous argillite fragments partly rimmed by pyrite
- 42.8-43.9 areas of swirling/brecciation with felted pyrite edges
- calcite to quartz cement

43.9-49.7 Andesite-Pillow Breccia
- light medium green sericitic
- vesicular intervals with chlorite > calcite
- bleached areas confined to area 44.0-44.6 at contact
- 44.6-44.8 laminated argillite
- complex grey and white banded veins as described before
- show darker areas extending into andesite beyond

49.7-61.1 Mudstone-Laminated
- as before but bands variable 30° CA to parallel and only very poorly defined
- sparse calcite veins in part ptygmatic
- 55.6-56.6 coarser granular pyrite in light grey siltier bands
- bands 10% sequence, also 56.8
- 56.8 bands show needled crystals, some twinned
- look like pyrite replacement
- 57.5-60.0 very broken, carbenaceous to graphitic

61.1-65.4 Andesite-Pillow Breccia
- as before but more calcite veins and crackles
- 61.6 interval of silicified argillite
- 62.0-62.5 core broken
- 63.6-64.0, 64.4-69.0 broken and blocky core

65.4-72.2 Hangingwall Mudstone Under XXXX
- very blocky to friable so hard to divide
- carbonaceous, clay-like in places
- calcite +/- quartz veins to crackles to influx common, often with stylolitic borders
- tension fractures
- 66.8-67.2 light green, fine grained andesite
- + 69.0 to end of hole rubble to sand
- very dark carbon rich
- major fault

72.2 EOH

CA89-102

0	4.6	CASING
4.6	59.8	HANGINGWALL ANDESITE

4.6-6.1 Andesite-Breccia/Andesite-Haloclastite
- grey green
- homogeneous fragments in slightly darker matrix
- fragments fine with vesicular andesite for most part
- lesser highly angular hyalloclastic debris
- open fractures limonitic with stains extending out beyond fractures, rim or calcite veins 20° CA
- core broken some grinding
- <1% very fine pyrite

6.1-18.3 Andesite-Massive
- medium green grey
- medium to fine grained
- variable calcite and chlorite filled vesicles
- limonitic open fractures, some calcite veins 10 to 20° CA
- matrix calcareous in places
- minor fine disseminated pyrite present locally

18.3-20.7 Mudstone-Laminated
- dark grey
- banding on mm scale only poorly defined 80° CA
- minor calcite veins subparallel CA, calcareous
- pyrite increased in bands to 5mm 15-25%
- 5-10% disseminated throughout
- local microfaults, breccias, crystallites poorly shown at 19.1-19.3
- broken

20.7-26.4 Andesite-Pillow Breccia
- green grey
- medium to coarsely vesicular with calcite filled vesicles > chlorite
- calcareous
- irregular calcite veins 10 to 20° CA
- in places mottled, very altered
- open limonitic fracture 45° CA, sericitic
- 22.0-23.0 core broken, limonitic

26.4-30.8 Andesite-Massive
- green grey, darker than previous
- finer crystalline, calcareous
- light green bleached zones associated with feldspar and quartz veins subparallel CA
- in part talcose, sheared, limonitic
- 30.0-30.8 light grey
- silicified, with quartz + calcite subparallel CA
- contact with below brecciated with limonitic stain, sheared

30.8-55.4 Mudstone-Laminated
- banding variably well defined 80° CA to 70° CA
- bands shown by slight changes of colour and grain size
- bands 1.0-2.0m to 2cm showing microfaults
- some areas only faintly banded, black 10 to 20cm, locally calcareous
- pyrite finely disseminated throughout 1-3% and concentrated in bands subparallel or slightly cross-cutting beds 10-15%, anhedral to euhedral
- trace bright silver soft in pyrite rich areas
- lesser medium crystalline pyrite clots
- sparse wary mm veins
- white clots to crystals sub mm in place
- feldspar +/- quartz veins 45°, subparallel CA
- 34.2, 34.6 belemnite wholes, fragments
- 36.7-36.8 friable black clay with sub mm pyrite cubes
- 39.9-40.3 andesite pillow breccia
- light brown to green grey, mottled
- finely vesicular
- may be brecciated with very angular brown chert
- fine discontinuous pyrite veinlets
- 40.8-40.9 quartz vein 90° CA, two crackle zone
- 44.1-44.6, 44.9-47.1, 47.3-48.6 andesite pillow breccia
- grey green to green grey, mottled
- calcite vesicular
- brecciated in places with angular brown chert fragments several cm in size
- irregular patches to veins of calcite with medium crystalline pyrite <1%
- in large part broken and ground - also 51.9-52.7
- 50.9 calcite vein 90° CA
- 54.3-55.4 core badly broken

55.4-59.8 Andesite-Massive
- medium green to green grey
- medium to finely crystalline
- for most part patchy broken with some grinding
- in places very friable
- fine calcite veinlets parallel CA to 20° CA
- minor rubble breccia with calcite cement
- <1% finely disseminated pyrite and smeared along open fracture

59.8 80.9 CONTACT ZONE
- dark grey to medium light grey (more light grey bands than before)
- rarely calcareous
- bands 80° CA defined by slight differences in colour and grain size as well as pyrite content, softness
- pyrite finely disseminated
- fine clots greater in some bands 1 to 10mm wide
- irregular diffuse felted patches
- fine erratic veinlets
- generally blocky

- bands of 5-10% ovoid to angular calcareous patches
- overall pyrite abundance 1-5% variable
- pyrite rich bands to 30%
- microfaults, folds, soft sediment fractures common
- 63.45, 63.50 first occurrence of light yellow-orange anhedral to subhedral sphalerite within cm band
- with finely disseminated pyrite

64.5-65.1 mudstone contorted bands vaguely swirled, minor folds, or water escapes
- pyrite very fine disseminated in matrix as sub mm striated crystals
- lower part crackle breccia and calcite veins
- seems sheared

65.1-65.3 clay friable

65.3-66.2 mudstone contorted synsedimentary breccias, bands wavy 30° CA

+ 66.0-70.0 bands 70° CA

67.5-67.8 approximately here trace disseminated light green metallic
- apparently tetrahedrite very finely intermixed with pyrite

71.5 mudstone contorted, also 72.0-72.6
- then return to 80° CA where visible

73.0-73.1 clay zone with calcite

+ 73.2-74.8
- trace orange subhedral sphalerite, as discrete often zoned crystals

74.8-80.2 Mineralized Zone
- bands of massive to semi-massive yellow-orange subhedral to anhedral
- medium crystalline sphalerite within matrix of ?gypsum with very fine disseminated to granular pyrite and tetrahedrite
- tetrahedrite also as sub mm discontinuous veinlets
- pyrite as discrete sub mm striated pyritohedra
- interspersed with wisps to bands of carbonaceous material which may show swirling or remain as apparent fragments
- sulfides appear to replace coarser matrix and to carrado into surrounding finer argillites
- often mineralization parallels bands but also cross cuts in places (?sulfides replacement of slightly coarser siltstone or synsedimentary breccia matrix)
- in places tetrahedrite as discontinuous rims on sphalerite
- rare long silver needles (?native ag) and silica rich patches
- trace galena as partial rim in larger than average pyrite grains
- 75.0-75.9 massive to semi-massive sphalerite 10-15% to 20-25%

- rest mostly admixed pyrite + tetrahedrite 20-25%
- also 76.0-76.1, 76.2-76.3, 76.3-76.4, 77.3, 77.4-77.5, 77.7, 78.0-78.3, 78.4-78.6, 79.15, 79.25, 79.3, 79.35
- lower grade bands common throughout
- typically slightly coarser and lighter grey as at 70.85-76.7, 77.8-78.0
- 76.7-76.8 very finely crystalline pyrite banded 85° CA
- 78.7-78.9 gypsum and fine pyrite form mesh-like net sub mm scale
- after last massive, coarsely crystalline band, pyrite very finely crystalline in argillite with discrete blebs to masses orange sphalerite + tetrahedrite to 5% in some bands
- at 80.1-80.1 broken friable clay rich

80.9 85.6 TRANSITION ZONE
- extremely soft
- ?gypsiferous, strongly sericitized dark grey to brown grey
- very altered, mottled
- vague clots, which may be feldspar crystals or felsic fragments much altered
- difficult to separate from material below
- contact arbitrary
- may be altered tuffaceous debris and fragments
- 1-2% pyrite as discrete crystals to clots, often with bleached rims
- 82.0-82.2 clay rich gouge
- talcose, 2-5% sub mm pyrite euhedral
- tuffaceous debris increased downward
- 84.2-84.3 friable clay rich gouge, subparallel CA
- contact with below placed at appearance of first stylolitic fragments

85.6 166.5 RHYOLITE UNIT
- variably intensely altered sericitized mottled shade of grey with fragments variably visible
- fragments may show styolitic borders or localized banding may be visible
- sparse fp veins
- pyrite <1% finely disseminated + less often as slightly coarser crystalline clots
- 87.3, 90.7, 90.9, 93.2-93.8, 107.5-108.3, 109.4-109.6, 111.0-111.1, 111.5-112.5 clay rich, friable, gouge with tectonic breccias
- 2-3% pyrite
- 88.4 irregular mass felted pyrite
- 94.0 trace orange sphalerite in band of mm
- ovoids with darker core (?crystallites)
- 96.0-108.0 friable apparently sheared and brecciated
- intensely altered
- 1-2% fine pyrite as dissemination and single euhedra
- local partings chloritic to talcose
- + 107.0 more talcose, slippery

- 107.5-108.0 xxx very mottled
- patchy? iron carbonate (pinkish)

113.7-130.7 Rhyolite-Lapilli
- much less altered than before with medium to dark grey mottles
- patchy silicification
- gouge zones at 113.7-114.2, 115.0-115.5 +/- quartz veins
- upper portions show fragment ghosts floating in darker coloured matrix
- fragments borders better defined downwards and more angular, heterogeneous, smaller
- pyrite <1% finely disseminated
- fragment border stylolitic in places
- still talcose in places
- 123.8-124.0 white clay gouge zone with quartz also 124.4-125.3, 125.8, 127.5-127.7
- + 127.0 tension fractures parallel CA
- 128.4 trace light orange sphalerite

130.7-136.9 Rhyolite-Breccia
- distinctly mottled light to dark grey
- light areas highly irregular, appearing corroded, and contain 10-15% fine disseminated pyrite
- overall pyrite 2-3%

136.9-166.5 Rhyolite-Undivided
- slightly mottled (light to dark green) to homogeneous
- sericitic but variably altered
- locally strongly silicified
- hard to separate into subunits as some areas fragmented, often vaguely mottled, swirled
- irregular discontinuous quartz veins
- trace orange sphalerite + galena throughout
- zones of friable clay rich gougey breccias as at 138.0-138.4, 138.9-140.0, 142.8, 147.6-147.8, 152.8-153.4
- pyrite 2-3%
- broken ground core 138.9-140.0, 155.1-155.3
- pyrite finely disseminated <1% along discontinuous stylolitic veinlets
- increased in slightly greyer areas
- 140.1-140.3 minor orange subhedral sphalerite and > subhedral galena 1-2% in silicified area with pyrite rich stylolitic partings
- 143.0-144.5 strongly silicified
- 144.8 light orange anhedral sphalerite in gouge zone with 5% pyrite
- 145.7-146.2 blocky white crystals coalesce in silicified rhyolite
- + 148.0 generally sheared, foliated granular
- pyrite + clay rich fracture parallel CA
- 149.4 trace orange sphalerite, quartz vein 20° CA
- 150.4 40° CA clay rich shear, bright orange sphalerite
- 155.4-155.7 2-3% orange sphalerite + galena with quartz veins to matrix

- + 157.0 distinct greenish tone but hard to talcose
- 153.8-154.0 1% tetrahedrite with pyrite in talcose zone
- 160.6 galena, sphalerite with pyrite in stylolitic shear
- upper part of friable talcose shear goes to greenish gouge by 161.0
- 161.2-163.2 tectonic zone abundant quartz vein influx, with talc, sheared, brecciated, ?stylolitic
- brewn subhedral to anhedral sphalerite with tetrahedrite almost crustiform, sequential, tetrahedrite smeared out along talcose shears
- pyrite euhedral to granular subhedral, medium crystalline
- sphalerite + tetrahedrite to 5%
- pyrite 2-3%
- 163.2-165.0 distinct dark green talcose
- friable to clay like gouge to very soft whole
- quartz veins variable angles

166.5 234.4 DATUM UNIT

166.5-167.4 Datum Unit-Upper Argillite
- contact with above gouge with veins
- block laminated 80 to 85° CA
- defined by slight changes pyrite content
- microfaults folds and water escape
- pyrite 5-10%

167.4-179.5 Datum Unit-Undivided
- vesicular but not datum dacite
- medium brown grey to grey brown
- fine grained
- variable fine to coarse vesicles filled with quartz, often mottled with irregular patches felted pyrite
- rare pyrite blebs 1 to 2mm show radiating textures
- pyrite also as irregular vesicles, masses, sometimes with styolitic border
- pyrite also rims some vesicles and infills crackle breccia cement
- averages perhaps 5%
- 168.5-169.1 zone of broken core
- grinding
- clay
- minor sphalerite 171.5-171.8, 172.1, 172.3
- 169.3, 170.1 dark brown sphalerite, with slightly coarser pyrite and quartz veins to influx
- trace subhedral galena (cubic cleavage)

179.5-189.7 Datum Unit-Upper Argillite
- faintly banded black with pyrite rich banded 70° CA
- minor quartz brecciation veins 30° CA
- +/-pyrite +/- orange brown sphalerite +/- galena
- very broken, black 185.3-187.4 carbonaceous
- sphalerite brown to orange brown, may be zoned
- subhedral, coarse crystalline +/- finer crystalline subhedral

galena
- sphalerite > galena, average 2-3%
- looks like open space fill
- 186.1-186.2 ?rhyolite in sheared/faulted contact above/below very silicified

187.7-189.7 Rhyolite-Lapilli
- white
- silicified
- could be dacite
- quartz veins at 25° CA
- may be brecciated/sheared above and below but rhyolite projects into argillite
- 1-2% pyrite

189.7-197.4 Datum Unit-Upper Argillite
- dark grey
- massive to faintly banded 75 to 80° CA
- with crackle breccias infilled with quartz, brown sphalerite, pyrite, minor chalcopyrite, trace galena, minor tetrahedrite
- total sulfides less than 5%
- 191.1 pyrite + tetrahedrite veins 85° CA

197.4-234.4 Datum Unit-Undivided
- very altered
- mottled browns to greys
- textures diffuse
- vague banding may suggest tuff
- locally vesicular
- elsewhere breccia with stylolitic often clay rich partings
- diffuse quartz veins to patches appears moderately to strongly sericitic
- veins 40 to 70° CA
- common quartz crackle breccia to 207.0, veins to 208.6
- pyrite along thickened stylolites and irregular patches
- minor disseminated brown sphalerite, trace galena
- 207.0-207.2 patch semi-massive granular pyrite
- 208.9 orange sphalerite, trace galena vein 90° CA
- 210.2 granular pyrite + sphalerite ?vein subparallel CA
- 212.9-216.1 massive pyrite
- contact with above by crackle breccia pyrite cement from 212.3 with minor brown sphalerite
- massive pyrite appears granular and brecciated with subangular to subrounded sulfides fragments
- appears spherulitic nodular with
- 1 to 10mm rounded blebs showing uniform rims to botryoidal (brecciated) intergrowths
- very finely to very coarsely crystalline
- pyrite appears to brecciate quartz veins
- trace orange to brown sphalerite with quartz veins
- clay rich friable partings
- dark minor brown anhedral sphalerite in places with pyrite
- infilling inter-crystalline porosity of very coarse pyrite crystals at 215.5-215.6

- minor tetrahedrite within pyrite
- downward pyrite fragments layer subrounded
- 216.1-221.7 crackle breccia with pyrite intermittent
- minor tetrahedrite, sphalerite massive to semi-massive intervals as at 216.2-216.3, 217.8-217.9, 218.9-219.1, 222.6-222.7
- 216.5-217.1 clay like
- friable but otherwise composition similar to above
- iron carbonate cement
- quartz vein with coarse brown sphalerite parallel CA
- 219.6 sphalerite rimmed by pyrite 40° CA
- 219.7 sphalerite vein subparallel CA
- + 222.2-224.2 hairline pyrite + tetrahedrite veins
- 222.5 orange brown sphalerite vein 40° CA rimmed by tetrahedrite, maximum 20.0m
- 225.4-232.0 sporadic rubble to crackle breccia with granular fine to medium crystalline pyrite cement
- minor broken sphalerite also granular
- pyrite overall 5-10%
- + 231.0 open fractures subparallel CA

234.4 EOH

CA89-101

0	3.2	CASING
3.2	64.5	HANGINGWALL ANDESITE

3.2-8.1 Andesite-Breccia/Andesite-Hyaloclastite
- medium green to green-grey mottled
- chewed-up with very irregular diffuse fragments
- fragment mm to + 6cm size
- matrix often darker grey
- abundant highly angular hyaloclastic debris
- calcareous for most part
- patchy chloritic alteration and silicification
- sparse open fractures with limonite to 30.0
- 1-2% fine disseminated pyrite
- 6.0-7.8 core broken, may be ground
- 7.6-8.1 feldspar vein subparallel CA

8.1-25.0 Andesite-Pillow Breccia
- medium green grey
- medium grained
- medium to finely vesicular
- calcareous matrix and vesicle fill
- vesicles 1 to 10mm
- very fine sub-mm chlorite vesicles
- minor heterogeneous lithic fragments
- 2-3% fine disseminated pyrite
- minor calcite veins low angles CA
- 1 to 2cm veins 30° CA at 11.0
- 10.7 chloritic vug fill with calcite, pyrobitumen
- 12.5 calcite vein 45° CA - 12.8 also
- 13.0-16.7 massive andesite
- minor cherty patches and fragments

25.0-28.5 Andesite-Pillow Breccia
- massive to finely vesicular
- green grey andesite
- calcareous
- locally cherty
- medium to medium fine grained
- vesicle fill mainly chlorite
- lesser calcite
- 27.5-28.5 brown grey
- very fine crystalline
- 1-2% very finely disseminated pyrite
- very fine sericite throughout
- sharp contact with below

28.5-49.8 Mudstone-Laminated
- black to dark grey
- variably laminated 70 to 75° CA
- laminae mm to 1cm bands of lighter grey siltier material or very finely granulated pyrite bands

- calcareous in places
- pyrite also very finely disseminated in argillites and as diffuse felted masses
- average variable
- minor slumps/folds/faults
- 31.0-32.5 very blocky
- same sections mushy, friable
- 34.3-34.4 ptygmatic folded pyrite bands
- 34.0-34.5, 34.8-35.4, 36.5-36.8, 37.7-38.4 blocky to rubbly, carbonaceous
- 35.8-36.0 white calcareous patches to fragments
- minor areas of bleaching
- + 36.0 continuously weakly to strongly calcareous
- 37.2-37.4 dark green grey
- finely crystalline tuff with calcareous vesicles to fragments
- irregular areas of bleaching
- 40.8-41.5 tectonic zone with tension calcite veins
- rubble breccia
- diffuse 5mm veins below subparallel CA
- 41.8-42.7 vesicular andesite with chlorite and calcite filled vesicle
- ?liesegang rings of medium grey to grey green (andesite pillow breccia)
- some lithic fragments
- 42.8-43.1 limy siltstone with carbonaceous wisps
- 5-10% pyrite
- 44.1-46.0 blocky, broken
- carbonaceous with slickensided surfaces
- 46.1-46.7 rubble breccia calcite cement
- angular, brecciated argillite fragments
- 46.7-47.2, 48.0-48.5 very broken, blocky
- carbonaceous
- in part friable
- clay with slickensided surfaces, pyrite rich, very fine crystalline
- 49.1-49.2, 49.7-49.8 crystallite zone with mm-lath-like white crystals as well as light grey crystallite blebs, 80° CA

49.8-59.4 Andesite-Massive
- light green to green grey
- variable medium to fine crystalline
- chlorite vesicular (sparse calcite) lesser mudstone laminated in part
- minor calcite veins
- variable angle CA
- pyrite as 1 to 10cm, anhedral clots <1% sparse fine dissemination
- broken 52.1-54.0, 55.3-55.5
- 50.7-52.1, 53.4-53.7, andesite mudstone
- blocky to friable
- laminae 80° CA
- 5mm to 2cm scale
- calcareous and pyrite rich bands
- some showing microfaults, slumps

- 54.6, 54.9 grey cherty band
- 57.4-57.5 quartz rich bands with foliated chlorite
- crackle breccia

59.4-64.5 Andesite-Crackle Breccia
- medium green grey
- medium grained
- uniform grain size except for darker grey crackle breccia in places
- in part diffuse grey colouration extends out from fractures anhedral pyrite in matrix <1%
- locally cherty, bleached pervasive sericite
- 62.5-63.1 medium crystalline pyrite replaces both matrix and fragments and may extend out from calcite fracture
- perhaps 5% over interval
- 63.5-64.5 mosaic breccia with calcite cement +/- pyrite
- pyrite also fills fine irregular fractures and disseminated in matrix 10-15%
- appears to be open fractures/fault subparallel to CA with argillite against andesite
- fingers of pyrite project into argillite
- contact marked by quartz veins 40° CA

64.5 82.0 CONTACT ZONE
- banded with bands defined by slight colour changes
- blocky throughout
- faintly calcareous in places
- rarely strongly calcareous
- silicified in places
- carbonaceous with graphitic slickensided partings locally
- pyrite as finely crystalline masses to bands subparallel to bedding
- as well as finely disseminated in argillite + 10%
- bands 80° CA to 40° CA
- local slumps, microfolds
- 40°: 66.0-74.0 50°: 74.0-75.0 80°: 75.0-82.0
- 79.8-80.1 very friable clay

80.1-81.8 Mineralized Zone
- bands of massive to semi-massive pyrite and sphalerite in places with whiter? metallic likely stibnite, finely intermixed
- bands are conformable to bedding or slightly cross cut
- showing microslumps and folds, also? water escape
- minor argillite fragments
- sphalerite, light yellow brown
- anhedral to subhedral
- may show two generations
- coarser against matrix of pyrite + ? white (stibnite)
- abundances variable and difficult to recognize separate components sphalerite + pyrite > ? white (stibnite)
- pyrite as subrounded clots or small fragments as well as in matrix

82.0 88.0 TRANSITION ZONE
- less broken
- more coherent than previously
- only faintly laminated 80 to 85° CA
- silicified
- angular homogeneous fragments
- trace to minor pale orange anhedral sphalerite with veins and as minor breccia matrix along stylolites
- 83.5-83.8 friable clay

83.8-88.0 Transition-Tuffaceous
- increased tuff comparent with lesser intermixed argillite downward
- locally mottled light to medium grey
- very soft, scratches with fingernail (gypsiferous?)
- faintly to poorly laminated 80° CA
- mottled, minor soft sediment deformation
- some ash to lapilli size fragments
- irregular discontinuous quartz veins
- pyrite 1-2% finely disseminated
- increased in some bands to 5-10%

88.0 116.4 RHYOLITE UNIT

88.0-96.3 Rhyolite-Lapilli
- very altered
- soft, scratches with fingernail but less easily than above
- lapilli may show darker rims against ligth grey
- minor feldspathic blebs to veins 70 to 80° CA
- local ?gypsiferous patches/blebs
- 2-3% finely disseminated pyrite
- sparse mm cubes
- local felted masses, irregular shape
- trace light orange anhedral sphalerite
- borders in places stylolitic
- interbeds more argillaceous tuff <5%
- hardens downward
- 95.4-95.6 quartz veins subparallel CA

96.3-102.6 Rhyolite/Mudstone Rhythmite
- no true rhythmite as lacks repetitive cycles
- admixed tuffaceous argillite and argillaceous tuff
- 50-60% argillaceous material in variably well defined bands
- ash to lapilli size fragments
- feldspathic veins to patches 50° CA
- pyrite in fine felted masses and disseminated in matrix and fragments 2-3% throughout
- local very soft (?gypsiferous)
- in places sheared
- 98.8-99.7 gouge zone/tectonic breccia
- porous, friable
- subrounded to subangular pyritic clasts in rock flour +/-

quartz matrix
- 100.1-100.2 clay friable + 102.0 feldspathic patches ? altered clasts more abundant
- 102.5 pyrite rich
- like material immediately about transition zone 20-30% pyrite

102.6-104.9 Laminated-Rhyolite
- bulk in dark grey to black laminated argillite with very much lesser tuff
- no real rhyolite may be faulted mudstone laminated
- very carbonaceous friable some slickensided surfaces
- talcose locally
- many patches to veinlets of feldspathic material
- fine pyrite rich laminae 80° CA to irregular felted masses several cm across
- brecciated in places

104.9-113.0 Andesite-Massive
- light green grey to medium green grey
- medium grained
- fine chlorite filled vesicles in places
- strongly sericitized
- minor feldspar crackles some with local medium crystalline pyrite variable angles CA
- 104.9-105.0 pyritic in irregular felted masses with associated feldspathic crackle
- + 111.6 quartz vein with feldspar subparallel CA
- core more broken
- increasingly silicified

113.0-116.1 Contact Zone Argillite-Massive
- very broken and friable argillite
- impossible to tell original character
- appears to be major fault
- carbonaceous slickensided
- talcose and pyritic in places
- quartz vein to crackles
- 114.0-114.2 white, very silicified ?rhyolite in stylolitic contact with argillite
- trace orange anhedral sphalerite infilling translucent centres of quartz filled ovoids (?vesicles)

116.1-116.4 Rhyolite-Breccia
- medium grey, mottled
- vague breccia ghosts visible, patchily silicified
- some argillite wisps to bands

116.4 EOH

CA89-100

0 0.6 CASING

0.6 59.4 HANGINGWALL ANDESITE

0.6-22.8 Andesite-Massive
- massive
- locally brecciated
- common calcite/quartz veining, up to 1cm, 30 to 50° CA
- 0.6-3.0 rubble, cm scale
- 13.1-13.7 brecciated andesite, cm fragments/clasts in mud matrix
- 22.0-22.8 gradational reworked sediment, wacke
- lower contact, sharp at 65° CA
- gradational from 22.0-22.8 into argillite

22.8-25.7 Mudstone-Carbonate Rich
- banded with bedding of 55° CA
- locally crystallites
- blocky core 23.5-25.6
- lower contact at 55° CA

25.7-27.3 Mudstone-Debris Flow
- andesitic clasts up to cm scale
- mud matrix
- lower contact sharp at 20° CA

27.3-28.9 Mudstone-Carbonate Rich
- faint crystallites
- bedding at 25 to 35° CA

28.9-57.2 Andesite-Massive
- fine grained
- locally brecciated, vesicular
- carbonate veining common
- generally mm scale
- minor broken core
- lower contact broken

57.2-59.4 Mudstone-Debris Flow
- blends andesite clasts, up to decimetre size in mudstone matrix
- pyrite aggregates towards lower contact
- 1-2% in lower 60cm
- stratigraphic location of contact argillite
- lower contact broken

59.4 67.5 TRANSITION ZONE
- moderate to strongly sericitic alteration
- very fine grained disseminated mineralization, 2-3%
- pyrite dominate with lesser stibnite, tet
- sphalerite locally in fractures

- common faulting, broken core
- sphalerite concentration at 65.8, 66.3
- 61.2 fault, clay gouge, 80° CA
- 62.7-62.9 broken core
- 62.9-63.6 fault, gritty clay gouge
- 65.3 fault, gritty, brittle gouge
- lower contact gradational

67.5 161.5 RHYOLITE UNIT
- moderate to strongly alteration
- similar to contact alteration
- fine grained disseminated pyrite common
- less common disseminated stibnite, arsenopyrite
- local concentration sphalerite
- numerous faults
- 2-3% disseminated sulfides
- gradational into rhythmic banded rhyolite
- 71.5-74.2 cm sections of broken core
- 74.3 local concentrated sphalerite, galena + tet, +/- arsenopyrite + stibnite
- locally 3-5%
- 77.9 60cm mud gouge
- 79.3-80.4 core loss, fault zone, brittle, 50° CA
- 80.9 30cm mud gouge
- 87.6-89.5 broken, rubble, cm scale
- 95.0-96.0 mislatch
- 97.5-101.6 alteration zone
- int. sericite 3-5% disseminated fine grained sulfides?/sulphosalts
- honey coloured sphalerite
- contact at 100° CA
- 108.6 sphalerite, disseminated crystals along fracture along CA
- lower contact gradational

117.9-122.8 Rhyolite-Flow Banded
- rhythmic banding, 90° CA to 40° CA, decreasing from 90 to 40° down hole

122.8-161.5 Rhyolite-Lapilli Tuff
- locally rhyolite flow banded
- metre length
- isolated occurrences of galena mineralization
- 125.5-126.8 intervals of broken core, 20cm scale
- 128.5-129.5 rhythmic banded rhyolite, 70° CA
- 133.7 pyrite, sphalerite, galena concentrated in veining
- 4-5% over 10cm, pyrite dominant
- 135.0 isolated aggregates of galena, minor chalcopyrite
- 147.6 20cm rubble
- 151.9-153.0 fault zone
- brittle, brecciated gouge

161.5 EOH

CA89-99

0	0.6	CASING
0.6	83.6	HANGINGWALL ANDESITE

0.06-16.8 Andesite-Massive
- broken
- oxidized core from 0.6-6.5
- 6.5-46.8 medium grained andesite
- locally crackle breccia

16.8-34.2 Andesite-Pillow Breccia
- pillow fragments of cm scale
- locally hyalloclastic andesite
- common carbonate + quartz veins
- no preferred orientation
- 26.2 oxidized rubble
- 34.1 concentration of pyrite/pyrrhotite, 7-10%
- 34.2 lower contact, sharp at 60° to CA

34.2-36.8 Argillite-Crystallite
- up to 70% crystallites
- bedding at 80° to CA
- 36.5-36.7 broken core
- lower contact broken

36.8-44.1 Andesite-Breccia
- blended andesite fragments with mud matrix
- rare interbedded argillite, cm scale

41.2-41.7 rubble

41.7-42.0 argillite upper contact at 60°, lower at 30° to CA

44.1 lower contact, sharp 25° to CA

44.1-47.3 Mudstone-Crystallites
- up to 30% white crystallites
- local pyrite mineralization veinlets (carbonate) at 60 to 70° to CA
- lower contact sharp at 35° to CA

47.3-67.9 Andesite-Breccia
- andesite clasts in carbonate + mud matrix
- rare mineralization, generally restricted to matrix
- dominate pyrite, increase pyrite down hole to lower contact
- occasional slickensides, 60° CA on fault surface (45° CA)
- minor fractured core, oxidized
- lower contact at 66.9, sharp, 40° to CA

67.9-70.9 Mudstone-Crystallites
- carbonate veining at 65 to 75° to CA

- rare cm scale veins
- 1% pyrite, locally concentrated in bands/aggregates
- lower contact broken

70.9-83.6 Andesite-Massive
- massive, locally brecciated

83.6 84.0 CONTACT ZONE
- broken, no mineralization noted
- upper + lower contacts broken

84.0 94.0 TRANSITION ZONE
- lower contact gradational, broken
- rare sericitic/talc alteration
- weakly sheared at 75° CA
- 1-2% pyrite
- generally fine grained disseminated smears parallel to structure
- 1% arsenopyrite, trace stibnite, sphalerite
- 85.0 fault, clay gouge, 35° CA
- 86.3 fault, clay gouge 45° CA
- 86.8 feldspar veining, 80° CA
- 89.6-90.7 section of intense sericitization/talc?/gypsum? alteration
- soft xx <2.5 with white secondary minerals/blebs
- soapy feel
- 91.0-94.0 increase of felsic component

94.0 151.2 RHYOLITE UNIT
- metre sections of intense alteration similar to contact
- local concentration of sphalerite, galena, tet
- disseminated pyrite widespread, 1%
- common faulting/shearing
- 94.5 fault, broken core for 20cm
- clay matrix with felsic fragments
- gouge at 55° CA
- 98.2-98.6 sphalerite, galena + tet mineralization
- locally 10% with sphalerite dominant
- matrix hosted

101.8-102.5 fault zone
- cemented
- brittle gouge 20 to 30° CA

106.1-106.5 broken, rubble

107.5-110.2 intense sericitization/talc alteration
- similar to contact

117.7-119.5 talcose hairline veinlets, 45 to 75° CA

133.0-136.0 cm scale quartz/feldspar veins, 45 to 75° CA

137.2-138.0 local crackle breccia

134.2-151.2 metre sections of broken core

151.2 EOH

CA89-98

0 0.6 CASING

0.6 83.6 HANGINGWALL ANDESITE

0.6-2.7 Andesite-Undivided/Andesite-Massive
- andesitic + argillite rubble, cm scale oxidized

2.7-19.4 Andesite-Massive
- medium to coarse grained
- quartz + carbonate veins common from 25° to CA to 65° to CA
- cm intervals of broken core, oxidized
- trace xxx
- 3.8-4.0 rusty broken core
- 9.0-9.5 fracture core, oxidized, fracture along CA
- 9.7 carbonate vein at 15° to CA, white, barren
- 13.5-13.7 broken rusty core
- 1.8 white quartz vein at 60° to CA, 7cm
- 19.4 lower 40cm chill margin- lower contact at 19.4 at 65° to CA

19.4-23.5 Mudstone-Crystallites
- mm scale white crystals up to 50% comp
- upper + lower 30cm absent of crystals
- hairline calcite veinlets common at 40° to CA
- locally 3% pyrite towards lower contact
- gradational into debris flow
- 20.8 white calcite vein, 4cm at 25° to CA
- 23.0-23.5 pyrite banding/bedding at 50°
- gradational lower contact

23.5-37.8 Mudstone-Debris Flow
- andesitio fragments in argillitic matrix
- locally vesicular andesite flow
- 50cm scale
- mineralized commonly along fragments edges, pyrite pyrrhotite
- lower contact gradational
- 25.3-26.0 vesicular andesite
- 27.5 pyrite smears along andesitic fragment
- 28.4 pyrite aggregates in matrix
- 30.2 pyrrhotite aggregates/smears in matrix
- 33.0-36.2 up to 1.0m interval broken core, mildly oxidized

37.8-53.0 Andesite-Massive
- fine to medium grained variable
- locally vesicular
- 42.3 grey quartz vein at 70° to CA, mm scale
- 43.3-44.0 fractured core, oxidized
- 46.6-47.6 fractured core, parallel to CA, oxidized
- 53.0 broken lower contact

53.0-54.1 Mudstone-Undivided

- ghosted xxlites
- white quartz veining along CA at upper contact
- gradational lower contact

54.1-57.0 Mudstone-Debris Flow
- rare pyrite mineralization
- 56.5-57.0 broken core

57.0-71.1 Andesite-Massive
- fine to medium grained
- 57.74 fault, at 15° to CA
- oxidized
- carbonate infilling
- 62.0 white quartz vein , 8cm, at 25° to CA
- 71.1 lower oontact, sharp, at 75° to CA
- 20cm chill margin

71.1-72.7 Mudstone-Crystallites
- bedding at 70° to CA
- 72.0-72.5 broken core
- 72.7 lower contact at 30° to CA

72.7-83.6 Andesite-Massive
- locally brecciated
- metre sections vesicular vein
- 72.8-73.0 broken, mildly oxidized fragments
- 75.5 quartz vein 5cm at 45° to CA, local concentrated pyrite
- 77.4-78.2 broken core, fresh surfaces
- 80.4 local pyrite concentration with quartz vein, 45°, 1cm
- 83.4 1-2% pyrite at lower contact
- 83.6 lower contact at 75° to CA

83.6 85.5 CONTACT ZONE
- bedding at 80° to CA
- calcite veins at 25° to CA
- crosses contact
- blocky rubble from 84.0-85.5
- locally 1-2% pyrite in bands + disseminated
- graphitic coated blocks
- lower contact broken

85.5 91.9 TRANSITION ZONE
- strongly sericitized, structure at 90° to CA
- 2-3% stibnite
- 1-2% pyrite
- local concentration stibnite seen on broken core
- fine grained needles, up to 5%
- lower contact gradational

91.9 167.3 RHYOLITE UNIT
- felsic fragments up to cm scale

- locally intensely sericitic/talc alteration
- gradational into flow banded rhyolite
- sulfide mineralization, sphalerite, pyrite, galena + tet common in local concentration
- faulting common
- disseminated pyrite throughout, trace %
- 92.3 quartz vein, white, 55° to CA

97.8-98.4 concentration of sphalerite, aggregates 2-3%, local concentration

98.4-100.5 blocky core, cemented gouge at 99.0
- core less

104.3 fault gouge, clay 60° to CA

105.6 fault gouge, 40° to CA

106.0 fault gouge, clay, 30° to CA

106.7-109.6 sphalerite rich zone, locally up to 10%
- honey coloured
- up to 5mm crystals

109.7-118.3 metre length sections of intense sericitization/talc alteration
- rare feldspar crystals, in star shaped aggregates
- medium grained pyrite mineralization towards end of zone

124.3 ghosted feldspar crystals

125.5-126.2 debris flow?
- large rhyolitic clasts, 15cm, in sericitic mud matrix
- local sphalerite concentrated at 126.2

127.0-133.0 Rhyolite-Flow Banded
- foliation variable from 50 to 20° CA
- foliation/shearing increases down hole
- gradational into massive flow

133.0-137.3 Rhyolite-Flow/Rhyolite Ash
- massive, gradational to banded ash tuff
- foliation locally developed
- sulfide mineralization common towards end of hole
- generally in fracture + matrix
- lower 5.0m blocky before 167.3
- 142.0 40cm broken core
- 145.0-146.5 foliation 40 to 50° CA
- 151.8-152.5 10-15% pyrite, 1-2% sphalerite, trace galena?/tet?
- sulfides in fractures around rhyolitic clasts given brecciated appearance
- 159.0-160.5 occasional intervals of sulfide mineralization, restricted to fractures
- locally 5% with pyrite > galena >> chalcopyrite/sphalerite

- mineralization intervals up to 20cm in length
- 162.6-167.3 block core

167.3 EOH

CA89-97

0 0.6 CASING

0.6 95.7 HANGINGWALL ANDESITE

0.6-18.5 Andesite-Massive
- green, fine to medium grained
- locally grade into pillow breccia
- broken, rusty common at top of hole
- carbonate veining common
- trace mineralization
- 0.6-15.8 >1.0m intervals of broken core
- oxidized surfaces
- lower contact, sharp at 50° to CA

18.5-23.2 Mudstone-Crystallites
- black, bedding at 80° to CA
- contacts absent of tables for 10-20cm
- crystallites up to 40%, mm scale, commonly in bands parallel to bedding
- local pyrite concentration in bands, mm scale
- rare fossils
- quartz/carbonate veins crystal-cuts bedding at low CA angles
- common slump structures
- lower contact sharp at 50° to CA

23.2-47.5 Andesite-Massive
- fine to medium grained
- metre intervals of fine grained vesicular andesite
- gradational lower contact
- quartz/carbonate veins common
- trace mineralization
- 23.3-25.0 crackle breccia
- 28.1 quartz carbonate vein at 30° to CA
- 34.0 quartz carbonate vein at 30° to CA, 5cm
- 42.3-43.2 crackle breccia
- 46.0-47.5 vesicular andesite

47.5-88.4 Andesite-Pillow Breccia
- pillow fragments cm scale
- carbonate matrix
- minor broken core
- surfaces generally oxidized
- trace sulfides
- generally restricted to carbonate matrix gradational contacts
- 56.8-57.1 blocky, broken core
- weakly oxidized
- 63.1-63.5 weak fractured core, oxidized

80.4-95.7 Andesite-Massive
- fine to medium grained
- vesicular from 86.5-87.5
- chill margin, bleached from 89.9-95.7

- local pyrite concentration towards lower contact
- 1-2% anhedral
- mm size crystals associated with quartz vein at 30° to CA
- 95.7 lower contact sharp at 80° to CA

95.7 95.9 CONTACT ZONE
- lower contact broken
- 1-2% disseminated pyrite
- trace 1% disseminated stibnite

95.9 103.5 TRANSITION ZONE
- argillaceous upper 3.0m
- shearing at 35° to CA
- disseminated pyrite, stibnite common, generally parallel to structure
- 1-2% disseminated stibnite, 1% pyrite
- local sphalerite concentration in veinlets
- 95.7-99.5 broken, rubbly core
- 99.7-103.5 felsic transition
- lower contact gradational
- trace sulfides
- 100.0-100.5 felsic talc, 30-40%, mm scale

103.5 152.7 RHYOLITE UNIT
- felsic fragments up to cm scale
- locally moderate to weakly altered, sericitic?/talc?
- disseminated pyrite throughout, 1%
- local concentration of pyrite + sphalerite
- faulting common
- gradational to ash tuff
- 105.8 20cm broken core
- 109.6 local concentration yellow sphalerite, 1-2%
- 109.7-111.2 intensely altered rhyolite?/mudstone? soft , primary textures overprinted
- 11.3 fault gouge, cemented at 15° to CA
- 111.7-112.2 fault zone, rubbly, cemented gouge at 20° to CA
- 113.3 mm scale sphalerite crystals
- 115.7-116.5 2-3% disseminated pyrite, shearing at 25° to CA
- 119.5-122.5 up to 30cm sections of broken core
- sphalerite veinlets at 70° to CA, xxx at 121.6
- 123.3-124.5 3-4% disseminated pyrite, trace 1% sphalerite occurring in matrix
- 126.0 local sphalerite concentration, 3-5% subhedral aggregates
- 130.0 disseminated sphalerite, 1%

133.0-152.7 Rhyolite Ash?
- absence of felsic fragments
- fine grained
- commonly brecciated with calcitic veining at various CA
- angles (crackle brecciated)
- intervals of broken core, up to 1.0m in core length, to end of

hole

152.7 EOH

CA89-96

0 0.6 CASING

0.6 106.8 HANGINGWALL ANDESITE

0.6-23.0 Andesite-Massive
- massive, green, medium to coarse grained variable
- occasional quartz veining, generally bull white
- broken, oxidized core common
- rare sulfides, generally with veinlets in fracture fillings
- gradational lower contact

0.6-6.0 broken core, intervals up to 1.0m, oxidized

9.0-10.0 quartz vein, 10cm, white, 85° to CA
- lower contact gradational over 40cm

23.0-28.1 Andesite-Pillow Breccia
- pillow fragments, cm scale, in carbonate + mud matrix
- sulfide mineralization common in matrix
- generally pyrite dominant
- occasional interbedded argillite, up to 40cm core length
- minor broken, rusty core

23.9-24.0 pyritic argillite
- pyrite in bands at 65° to CA

24.4-24.8 pyritic argillite, bedding at 65° to CA
- pyrite laminations parallel to structures
- lower contact at 50° CA

26.2-26.5 broken core, oxidized

26.7 locally 5% pyrite in carbonate matrix
- lower contact, sharp at 45° to CA

28.1-31.5 Mudstone-Crystallites
- up to 40% white crystallites, mm scale
- local interbedded andesitic breccia, 1.0m in core length
- carbonate veining common at contact
- pyrite mineralization near contacts

29.4 bedding/foliation at 65° to CA

29.9-31.1 pillow brecciated andesite
- white carbonate vein, 5cm at lower contact
- broken oxidized core at upper contact
- lower contact broken

31.5-74.2 Andesite-Massive
- generally medium to coarse grained
- locally fine grained vesicular carbonate + or quartz veins

common
- mineralization rare, restricted to fracture/veins
- minor broken core

31.5-33.3 vesicular andesite

41.0-41.2 white carbonate vein at 60° to CA
- oxidized surfaces on broken contact surfaces

50.4-50.6 broken core, fresh surfaces

52.8-67.0 intervals of broken core, unweathered, up to 1.0m core length

68.0-68.4 argillite, carbonate vein near upper

74.2-77.2 Andesite-Crackle Breccia
- upper/lower contact gradational
- carbonate veining common locally pyrrhotite mineralization associated with veining, <1% pillow fragments common

77.2-106.8 Andesite-Massive
- locally brecciated, pillows xxx medium to coarse grained
- 79.2-81.4 broken core, fresh surface
- 86.6-87.6 fractured core, oxidized surfaces
- 94.2-98.0 intervals of pillow breccia, up to 50cm

105.2-106.8 bleached andesite/chill margins
- fine grained, massive, brecciated at lower contact
- disseminated pyrite common anhedral to subhedral, up to 5mm
- white quartz vein common, generally parallel to CA

106.8 lower contact at 75° to CA

106.8 107.5 CONTACT ARGILLITE
- pyrite common, in bands at 70° to CA, parallel to banded
- 1% pyrite, trace stibnite
- lower contact at 70° to CA

107.5 109.5 TRANSITION ZONE
- medium altered, quartz/feldspar veining common, generally parallel to structure
- broken core, rubble from 107.8-108.2
- 1-2% disseminated arsenopyrite, pyrite, trace stibnite
- lower contact gradational

109.5 159.1 RHYOLITE LAPILLI TUFF
- massive, felsic fragments
- locally flow banded, brecciated
- moderately sheared
- disseminated sulfides, pyrite dominant throughout

- local concentration sphalerite
- shearing/faulting increases down hole

117.0 10cm flow banded rhyolite at 75° to CA

122.8-123.2 broken core

123.5 2mm band of sphalerite at 65° to CA

140.2-140.5 rubble

144.0 fault, clay gouge at 50° to CA

144.3 fault, clay + fragment gouge, at 40° to CA

150.9-154.0 altered zone
- felsic fragments sheared/altered
- secondary white (talc?) altered common
- pyrite mineralization disseminated, locally 2-3%
- 152.0 brittle gouge, at 70° to CA
- 152.5 clay gouge, at 40° to CA
- 153.8 shearing, at 40° to CA

159.1 EOH

CA89-95

0	1.5	CASING
1.5	101.9	HANGINGWALL ANDESITE

1.5-20.4 Andesite
- vesicular for the most part
- core vein broken and oxidized down to 5.5
- quartz/carbonate vein 5cm with sphalerite subparallel to CA
- occasional calcite veinlets at 35° to CA
- limy bed 15.1-15.8 nearly 11° to CA
- irregular contact fracture lined with limonite
- becoming finer grained chill margin 19.3 to contact

20.4-21.8 Argillite
- black
- no well develop bedding
- stylolitic style fractures (hairline) of carbonate
- andesite frequent at 21.1

21.8-27.7 Andesites
- fine grained massive to vesicular
- lot of limonite staining on fracture surfaces
- wispy carbonate stringer
- few millimeters thick rimmed with pyrite at various angles to CA
- 3cm calcite vein at 35° to CA at 26.5
- 26.8 to contact is finer grained chill margin

27.7-31.1 Argillite
- upper section vein limy
- abundant crystallites three greater than 50% this unit
- occasional tuffaceous band
- bedding planes frequent contain hairline bands of pyrite at 45° to CA
- 1-2% disseminated pyrite 30.0-31.1 calcite stringer crystal to CA at 30.5-30.7
- distinct increaee in pyrite content last half of interval

31.1-64.0 Andesite
- 2.0m chill margin at upper contact frequent limonite staining on fracture
- primarily vesicular to massive with minor amounts of debris
- occasional quartz and calcite stringer trace sulfides (pyrite + pyrrhotite)
- 10cm thick calcite vein at 20° to CA at 51.8 after which the andesite becomes sub porphyritic to 56.0
- 56.5 contact core is vein broken
- still have limonite staining on fracture surfaces
- increase in hairline calcite veinlets at 62.0-63.0
- at 63.0 is 10cm argillite in contact with 5cm calcite vein at 40° to CA with crystallites

64.0-65.4 Argillite
- laced with crystallites bedding at 55° to CA
- frequent limonite clasts up to 5cm long
- crystallite rosettes up to nearly 1cm diameter
- 1% pyrite occurring as rounded blebs, in limy clastic fragments and rimming clastic fragments
- lower contact brecciated with pyrite stringers

65.4-78.0 Andesite
- massive to vesicular with frequent lapilli fragments cemented with calcite occasionally rimmed with pyrite
- abundant calcite stringers at various angles to CA
- several bands 10cm thick of debris breccia and hairline calcite fracture trace pyrite

78.0-79.5 Argillite
- contains abundant crystallites partially to totally replaced with pyrite
- at 78.9 is 10cm of bladed cockscombs marcasite
- bedding not too prominent with 70° to CA
- thin films of pyrite on bedding planes
- 3-5% pyrite in interval

79.5-80.6 Andesite
- tuff band fine grained abundant calcite stringers at 20° to CA

80.6-82.0 Argillite
- very graphitic alteration abundant crystallites
- bands of pyrite along bedding planes
- disseminated 3% pyrite

82.0-101.9 Andesite
- 82.0-83.4m fine grained limy
- 83.4-84.4 breccia andesite with interstitial pyrrhotite blebs
- 84.4-88.8 coarse textured andesite
- sub porphyritic with local brecciation and debris dark green colour
- andesitic varies from tuffaceous to grainy sub porphyritic
- 95.0-100.0 speckled dark green with sheared slickenslide fracture filled with chlorite + calcite
- fine grained chill margin contact 101.0-101.9
- coarse blebs of pyrite at contact
- 1cm in diameter and stringers
- occasional fracture filling pyrite veinlets

101.9 105.0 CONTACT ZONE
- strongly graphitic sheared slickenslide fracture bedding at 85° to CA
- abundant needles of stibnite (< 1%) disseminated throughout
- occasional quartz/calcite veinlets
- core very rubbly

105.0 107.3 TRANSITION ZONE
- very graphitic no bedding angular fragments of argillite in matrix of more tuffaceous material
- trace disseminated stibnite

107.3 154.5 RHYOLITE UNIT
- argillaceous near top 5.0m from contact
- strongly altered to end of hole with sericite
- some talc
- chlorite often rims fragments
- lapilli flow with occasional tuffaceous bands
- minor trace stibnite + sphalerite
- sphalerite at 117.5
- flow banding at 35° to CA at 149.3
- foliation at 145.0

154.5 EOH

CA89-94

0 3.0 CASING

3.0 29.6 HANGINGWALL ANDESITE

3.0-9.7 Mudstone-Laminated
- some coarser banding
- pyrite occurs (20%) parallel to bedding + disseminated and some in coarser bands
- bedding at 80° at 9.3
- reworked larger pyrite crystals at 8.7

9.7-20.0 Mudstone-Undivided
- debris flow units found within this massive argillite foning upwards
- at 11.3 blue hydroxide alteration begins
- carbonate found from 3.0m on
- calcite veins also
- coarser flows at base and in introduction of andesitic clasts at 20.0

20.0-23.5 Mudstone-Debris Flow
- gransition zone with andesitic clasts in argillite which is altered to blue hydroxide
- core is broken between 22.0 and 23.5

23.5-29.6 Andesite-Pillow Breccia
- lithic tuff at upper contact with carbonate matrix
- broken between 23.6 and 24.1
- local crackle breccia throughout coarse grained at 28.1
- near lower contact, lithic tuff fault? at 29.4-29.6 as very rubbly

29.6 36.5 CONTACT ZONE
- trace of sulfides
- rubble zone
- blue hydroxide alteration + iron leaching

36.5 41.0 TRANSITION ZONE
- rhyolitic clasts present hairline quartz fracture at 45° and parallel to CA
- clasts have been sheared almost perpendicular to CA
- core is broken
- scarce mineralization, 1% disseminated pyrite
- dark alteration, chloritic?

41.0 191.1 RHYOLITE UNIT

41.0-89.4 Rhyolite-Lapilli
- chloritic alteration sheared clasts at upper contact 51.2-56.5

- chloritically alteration rhyolite
- sheared fabric at 60° to CA
- contact at 80° to CA at 56.5
- mineralization begins here - galena + sphalerite about 1%-locally concentrated
- shearing parallel to CA at 60.0
- 60.2-66.7 core is mixed up very low % minerlization again-sphalerite + galena locally concentrated
- heavily altered rock
- chlorite from 60.2-72.2 rock is broken up, also 80.0-80.4
- possible faults at 80.1 - rubble there and again at 85.3 (gouge present)
- shearing throughout, subparallel to about 20° to CA

89.4-191.1 Rhyolite-Breccia
- this rhyolite unit is characterised by brecciation, lapilli tuff, flow banded seritic and chloritic alteration
- mineralization is scarce with only trace pyrite present

89.4-93.6 brecciated with strain orientations at 65° to CA
- quartz veins + hairline fractures at 30° to CA

93.6-95.1 chloritic alteration

95.1-96.6 rhyolitic breccia, variable clasts size from mm-cm scale

96.6-97.8 core is soft + broken (talc alteration)

97.8-100.0 relic altered breccia

100.0-102.7 heavy chlorite alteration

102.7-110.0 brecciated unit with sericitic alteration at 50° to CA at 106.4
- strain orientation at 70° to CA at 109.8

100.0-114.1 increased silicification

114.1-120.5 lapilli tuff, breccia, strain orientation at 40° to CA with sericitic alteration

120.5-125.0 flow banding at 80° to CA
- gradational upper and lower contact

125.0-127.0 rhyolite breccia
- sericitic alteration at 70° to CA at 128.0

127.0-146.0 altered brecciated/lapilli tuff rhyolite
- heavily sericitized with hairline fractures at 60° to CA at 139.8, 45° to CA at 40.1
- at 133.5-133.9 chlorite altered
- 135.3-136.1 broken core
- 148.0-150.0 minor broken core, cm scale

- 162.0-167.0 intervals of broken core, up to 50cm
- 172.0-172.6 rubble, broken core
- 178.0-180.7 up to 1.0m intervals of broken core
- 180.8-182.9 silicified, quartz veins, mm scale at 50° to CA

191.1 EOH

CA89-93

0	5.2	CASING
5.2	70.4	HANGINGWALL ANDESITE/ARGILLITE

5.2-25.1 Andesite-Pillow Breccia
- pillows - greenish vesiculated
- very fine grained crystalline
- white sparry calcite vein, at 45° to CA, 40°, 30°
- grey calcite breccia infill at 40° CA - irregular
- oxidized fractures at 30 to 35°
- pyrobitumen at 18.6

25.1-26.3 Mudstone-Laminated
- white sparry calcite vein 30° sparry to bedding
- slump breccia 26.0-26.3
- fracture at 10° to CA

26.3-31.4 Andesite-Pillow Breccia
- greenish, very fine crystalline
- white sparry calcite vein at 25, 30° to CA
- creamy dolomite vein at 30° to CA

31.4-32.8 Mudstone-Laminated
- light to dark grey
- crystallites light grey pyrite laminated very fine grained
- white sparry calcite veining at 10, 20 to 30° to CA
- creamy dolomite vein at 30° to CA

32.8-40.4 Andesite-Pillow Breccia
- greenish, very fine crystalline
- vesicular bluish green chlorite/white calcite
- sparry white calcite veins - bluish green chlorite + pyrite
- cherty patches irregular
- grey calcite breccia infilling - irregular
- trace at 35 to 45° to CA

40.4-42.5 Mudstone-Laminated/Mudstone-Contorted
- dark grey - thick bedded carbonaceous
- pyrite laminations at 75° to CA
- very fine grained white sulfide disseminated - trace 43.7
- slumping contorted
- white calcite matrix and lacy veining 47.5-48.5
- light grey silty beds
- white calcite veining along bedding planes at 60° to CA
- light grey fossil debris

52.5-55.2 Andesite-Pillow Breccia
- greenish very fine crystalline
- breccia
- grey calcite infilling
- white sparry calcite vein at 20 to 30° to CA
- lacy and striped veins

- conformable contact at 45° to CA

55.2-61.2 Mudstone-Laminated/Mudstone Contorted
- dark grey-black
- carbonaceous with graphitic slips
- light grey limy beds
- minor fossil debris
- blackish blue cherty bed
- slump at 20° to CA
- pyrite rosettes
- white calcite rims

61.2-70.5 Andesite-Massive/Dyke?
- dark greenish blue, coarse crystalline
- salt + pepper texture
- mafics hornblends and feldspars
- white calcite veining at 30° to CA - ribbons at 50° to CA
- dark greenish black chlorite
- upper contact conformable at 50 to 60° to CA to sediments

70.4 85.1 CONTACT ZONE

70.5-77.9 Argillite-Laminated
- light grey cherty top well laminated at 60° to CA
- dark grey carbonaceous
- laminated light grey silty and limy laminations at 65° to CA
- 71.0 mud seam white calcite (pinkish?) - vein breccia
- 76.7-78.7 carbonaceous gouge with very fine grained disseminated sulfides
- 77.5-79.0 faluted broken

78.9-84.0 argillite with seams and laminations and veins of mineralization
- light brown
- several crushed zones with calcite vein breccia
- honey coloured sphalerite crystals in matrix of gypsum and very fine grained sulfide
- mineralization pseudomorphs bedding also crystal-cutting
- nears base zone become cherty bluish black
- beds at 55° to CA

85.1 88.7 TRANSITION ZONE
- cherty argillaceous matrix with minor tufaceous debris-sericitic
- bluish white crystallites
- feldspars lath like glomeroporphyritic like texture at 84.3-85.4
- very fine grained pyrite laminated and veins
- tensional whita calcite vein at 45 to 10° to CA
- irregular wispy pyrite
- translucent gypsiferous like alteration of felsic ash
- minor disseminated sphalerite

- crush zone 85.5-86.5 fault; fabric at 45° to CA
- irregular wispy sericitic felsic material increasing % down
- 87.8-88.1 blebs and spots of reddish realgar
- 87.0-87.2 blackish metallic alteration with fine disseminated sulfides

88.7 186.2 RHYOLITE UNIT
- variably mottled medium to dark grey, fragments, heterogeneous, well-defined to ghosted, wispy
- fragments, stylolitic compressed in places
- frequently patchily talcose
- localized disseminations to masses very finely crystalline felted pyrite sometimes with coarser quartz + calcite, pyrite 5-20% over intervals to 10cm
- sparse stylolites often with increased pyrite adjacent
- sparse 1.0-10.0m calcite tension fractures, variable angles
- lesser diffuse edged quartz veins to 1.5cm, at 75° to CA
- local light orange subhedral sphalerite as at 90.1, 90.2
- 94.2-94.3 ptygmatic 10mm pyrite vein subparallel CA
- 95.3-95.4 chlorite altered fragment with increased very fine calcite fracture variable angles CA
- 97.1 as above foliated at 45° to CA
- 95.1-95.6 reworked ash to lapilli
- 98.1-99.1 well foliated with parallel calcite veins at 45° to CA

99.8-100.4 talcose, foliated at 35° to CA

100.4-103.0 generally darker granular (higher ash)
- appears reworked with matrix talc and to 10% finely disseminated pyrite
- trace anhedral
- very fine chalcopyrite at 101.9
- in places sheared at 45° to CA

103.0-115.5 sparse fragments rarely visible,
- granular reworked with 1 to 5cm talcose crush zones at 45° to CA as at 107.9
- trace subhedral to anhedral sphalerite associated with vague slylolites as at 111.0
- light/irregular patches felted pyrite with trace sphalerite as above at 105.5-106.0, 107.3
- 107.4 chlorite alteration

88.7 186.2 RHYOLITE UNIT
- fragment much smaller than above
- more granular
- minor lapilli size fragments
- pyrite fine disseminated to 1 to 5cm wavy veins to patchy felted meshes
- trace euhedral orange sphalerite locally

115.8-116.4 pyrite vein like to meshes, highly irregular, with single grains sphalerite
- 116.0 diffuse bordered quartz vein subperallel CA
- gradational contact with below

120.1-186.2 Rhyolite-Lapilli
- mottled light to dark grey
- fragments sharply defined to ghosted, wispy
- variably talcose in irregular patches
- strongly talcose 120.1-126.0
- pyrite 1-2% very finely disseminated
- increasing to patches (felted) to irregular veins and along stylolites, 5-10% over intervals several cm
- pyrite replaces matrix or selective fragments
- 120.6 pyrite finely disseminated in matrix and mm size crystals

122.4-123.8 sheared, talcose at 45^{o} to CA with dense patches felted pyrite averaging 2-5% over interval

130.3, 131.7, 131.7 minor chlorite alteration

131.0, 131.6, 132.8, 132.9, 135.8 minor yellowish sericite, some along very narrow veins

132.5-133.8 differs bordered quartz vein at 45^{o} to CA
- apparently replaces into matrix
- also 134.1-134.3

137.0-138.5 talcose
- sheared variable/strongly at 10 to 20^{o} to CA
- in part badly broken
- shearing with open or calcite-filled fractures continue to 141.5 and up to 10% pyrite finely disseminated in matrix 141.7

141.5, 141.7, 143.0 minor chlorite alteration in diffuse patches

143.1, 144.3 trace anhedral orange sphalerite

142.9-144.6 quartz veins diffuse edges, some matrix included
- overall quartz veins 5-10% of interval, variable angles
- stylolitic in place

144.6-144.7 crushed zone, talcose, fractures

145.0-150.0 Rhyolite-Breccia
some fragments + 6cm

145.6-146.3 pyrite to 15% very finely disseminated in matrix + fragments
- chlorite 146.1

147.7 chlorite with mm subhedral pyrite

149.4-151.7 as before with closts of medium crystalline subhedral

to anhedral sphalerite to 5% over 1 to 2cm
- minor (1-2%) to trace subhedral galena
- most often discrete from sphalerite
- sphalerite may show zoning
- pyrite 1-5% with sphalerite from crystalline variably talcose and locally chloritic

152.2-154.8 patchy chlorite and talc
- shearing variable well defined at 45 to 20° to CA
- wavy in places with platey cleavage

156.2-156.9 tectonic breccia
- subparallel CA
- very angular homogeneous fragments
- talcose matrix

159.5-163.3 light to medium grey
- few fragments visible
- diffuse chloritic patches
- minor mm striated pyrite cubes
- 161.5-161.8 2-3% anhedral medium crystalline pyrite

163.3-166.4 strongly chloritic dark green grey with zones to single subhedra medium crystalline pyrite, averaging 2-3% over interval

166.5-166.7 feldspar veining

168.0-168.7 friable crush zone, tectonic breccia

169.6-169.8 feldspar veining

170.1-170.6 friable crush zone

170.6-178.5 strongly mottled with irregular patches chloritic alteration
- hairline crackled quartz veins subparallel CA

179.0-181.1 series of tectonized crush zones to 0.2m, clay-like talcose matrix

180.5-180.7 ?carbonate vein +/- quartz at 45° to CA, no fizz, with irregular closts pyrobitumen below

185.6-186.2 strongly chloritic gouge zone
- dark green
- very fine tectonic breccia

186.2 234.4 FOOTWALL DACITE

186.2-194.9 Datum Unit-Lithic Tuff
- medium grey to brown grey
- mm to cm heterogeneous subangular to subrounded fragments

variably well visible
- pyrite finely disseminated and locally in felted clasts replacing matrix and to a lesser extent discrete fragments
- minor discontinuous pyrite veinlets to 1 to 5mm
- local areas with black chert fragments to patches

186.2-187.0 pyrite very finely crystalline to medium crystalline 5-15%

191.7-191.9 coarsely crystalline subhedral to anhedral pyrite, two generations, vein low angle to CA
- in places ptygmatic

192.0 fewer fragments visible, vaguely vesicular
- pyrite ovoids (?vesicles, fragments) and in matrix to 20%
- vague banded patches and mm foliations parallel CA
- feldspathic debris, quartz filled vesicles

194.9-199.1 Datum Unit-Tuff
- medium grey with light bleached areas with diffuse borders
- mainly laminated at 45 to 55° to CA
- in places laminae form vague (?leissegang rings) circular shapes 5-10mm to 10cm, slightly flattened
- elsewhere brecciated
- lighter bleached areas show reddish irregular ?hematite stain
- minor irregular quartz vein with red brown sphalerite and trace subhedral galena as at 196.0, 195.7-196.0, 198.4
- pyrite felted masses to coarsely crystalline two generations brecciated coating to veins - 2-15% over interval, average 5%
- very finely disseminated sericite throughout
- 196.2 black chert fragments, also 196.7, 196.9
- 197.2-197.9 talcose, clay-like crush zone
- 197.9 poorly developed dendritic alteration
- 198.2 very coarsely crystalline two generation pyrite brecciated coatings
- rubble breccia with quartz cement
- minor subhedral red brown sphalerite

199.1-206.0 Datum Unit-Datum Dacite
- medium brown grey, vesicular
- very fine to coarse with vesicles filled with quartz
- very fine ash fragments in places to breccias
- irregular quarts and/or feldspar rich vugs to veins (<5mm)
- pyrite very fine crystalline
- felted to 20% in matrix
- lining vesicles and in irregular veins to bands
- trace anhedral orange sphalerite with diffuse quartz veins
- + 201.3 lighter grey
- patchy silicification with areas irregular felted pyrite
- some with trace anhedral orange sphalerite

206.0-209.7 Dacite Breccia
- light to medium grey
- often with homogeneous fragments sharing darker mm rims

- minor quartz veins at 55° to CA
- pyrite in irregular coarse grained subhedral to anhedral clotted masses
- in part replaces matrix
- in places two generations

209.7-220.9 Datum Unit-Tuff
- variably light to medium grey
- fine grained with very fine lapilli to ash sized
- fragments visible in places throughout
- irregular bands to areas of pink-grey discoloration
- pink-grey areas may show greenish yellow?
- epidote rich areas to blebs to blocky feldspar crystals
- 210.2-210.7 pink area with pyrite as clots to disseminations average 5-10% as matrix discrete clasts, wisps to veins
- 2-5 mm quartz veins at 80° to CA
- 217.0-217.4 red pink area with yellowish mm foliation parallel CA
- clots fine crystalline pyrite to several cm and finely disseminated 5-10%
- 214.3-215.1 pervasive banded quartz veining with lesser pyrite bands, slightly wavy - all subparallel CA
- 216.4-217.0 mm laminae yellowish sericite or carbonate subparallel to CA
- pinker bleaching with coarser pyrite
- 218.4-218.6 medium crystalline anhedral pyrite within felted pyrite 30-40%
- trace galena with coarser pyrite
- 219.8-220.9 pyrite infills coarse breccia to 15%
- contact with below gradational

220.9-225.1 Datum Unit-Lithic Tuff
- light medium grey
- "translucent" textured with fine heteregeneous lithic fragments floating in lighter matrix
- spots to blebs to veins yellowish sericitic carbonate
- pyrite as fine disseminations to veinlets with coarse crystalline aggregates to clots 2-5% average
- dark grey chert at contact

225.1-228.0 Datum Unit-Lithic Tuff
- medium grey
- lacks "translucent" quality of above
- mm size fine laminae
- yellowish sericite at 40° to CA
- ash size fragments increased
- discrete yellowish sericite blebs to fragments
- 5-10% very finely disseminated pyrite
- 227.8-228.0 coarse quartz vein with areas of matrix
- irregular with subhedral rich brown sphalerite and lesser galena

228.0-234.4 Datum Unit-Lithic Tuff

- light to medium grey "translucent" textured, with patches to veinlets slightly pinkish feldspar
- irregular greyish-white silicified areas
- pyrite as fine disseminated and discrete mm striated cubes to 15% locally - average 5-10%
- 228.7 diffuse quartz vein to CA
- 230.0 increased dark grey vein chlorite fragments
- 232.0 splotchy area of yellowish sericite alteration

234.4 EOH

CA89-92

0 4.6 CASE

4.6 69.6 HANGINGWALL ANDESITE

4.6-14.8 Andesite-Breccia
- 15% matrix of grey calcite, chlorite, quartz, pyrobitumen and pyrrhotite
- trace pyrrhotite (bladed)
- occasional bleached rims on fragments
- 1% cw fracture filling

14.8-15.4 Mudstone-Debris Flow
- andesite clasts (80%)
- mudstone clasts (5%) in calcareous xxx matrix
- clasts subangular to subrounded
- up te 1cm across

15.4-17.4 Mudstone-Laminated
- 1-3% pyrite in layers at 90° to CA
- 1% cw fracture filling
- 16.4-17.4 20% recovery rubble

17.4-24.4 Andesite-Massive
- weakly brecciated
- pale green-beige
- bleached aphanitic vesicular chill margins to olive green
- sub porphyritic cores
- trace pyrite
- 0.5 to <2% cw fracture filling

24.4-26.9 Mudstone-Laminated
- 1-3% pyrite
- crystallites very fine
- 0.5 to <2% cw fracture filling
- graphite along fracture planes (shear planes) at 70° to CA

26.9-41.9 Andesite-Massive
- as in 17.4-24.4

41.9-41.5 Mudstone-Laminated
- layers at 75° te CA
- rubbly
- 1-3% pyrite
- 5% layere limestone in upper half of unit
- 0.5 to <2% cw fracture filling
- graphite along shear planes at 75° to CA

47.5-62.0 Andesite-Massive
- marker andesite
- pseudo ophitic texture
- 2 to <5% cw + feldspar + chlorite fracture filling-slickensided

- trace pyrite

62.0-65.2 Mudstone-Laminated
- 40% recovery
- pyrite mud cw fracture filling evident
- pale siliceous layers at 70° to CA from 64.7-65.2 (1% pyrite)

65.2-69.6 Andesite-Massive
- weak argillic alteration
- 1% pyrite
- weakly brecciated
- 0.5 to <2% cw fracture filling

69.6 69.3 CONTACT ZONE
- rubbly calcite + quartz veined
- 1% pyrite
- andesite fragment 7cm across
- bleached
- angular at 69.7

69.8 73.6 TRANSITION ZONE
- pyrite rich altered ash matrix
- weakly altered ghosted rhyolite fragments
- foliation at 35° to CA
- 1-3% sphalerite (honey coloured)
- 1% tennantite
- 1-3% galena
- 3-5% feltic pyrite
- 72.3-73.2 rubbly, intense shearing at 35° to CA

73.6 216.9 RHYOLITE UNIT

73.6-78.9 Rhyolite-Lapilli
- 5-10% matrix
- 1-3% feltic pyrite
- shearing at 35° to CA, moderate
- weakly altered
- 73.6-78.5 1-3% sphalerite, 1% galena, trace tennantite
- 75.8-77.2 sheared gouge zone, 20% mud, 80% fine rubble

78.9-91.1 Rhyolite-Ash
78.9-83.8 intensely foliated at 50° to CA
- intensely altered muscovite + chlorite

83.8-91.9 weakly brecciated ash tuff
- trace sphalerite altered galena
- 1-3% feltic pyrite

91.9-118.2 Rhyolite-Lapilli
- moderately foliated at 50° to CA
- stylolitic fractures threughout (112.3) with "dusty" black

fracture filling
- 3-5% feltic pyrite + possible trace workzite
- 99.2 trace sphalerite
- minor chlorite alteration of clasts

112.3-118.2 "wispy" rhyolite fragments
- weak to moderate muscovite + chlorite alteration
- 1-3% pyrite - feltic

118.2-120 intensely sheared chlorite altered tuff
- 1-3% pyrite very fine grained
- shears at 30° to CA

120.0-121.6 Rhyolite
- foliation at 40° to CA
- moderate

121.6-126.2
- intensely sheared
- chlorite altered rhyolite
- shears at 25° to CA
- 3-5% pyrite - very fine grained
- wispy clasts

126.2-136.2
- wispy ghosted fragments in intensely altered ash matrix (70% matrix)
- shears at 40° to CA
- 3-5% feltic pyrite in matrix
- 134.0-136.2 rubbly zone

136.2-164.0
- shears at 40° to CA
- 1% feltic pyrite
- 142.8-144.1 wispy glassy lime fragments (10%)
- chlorite altered fragments (5%)
- 152.1-152.7 20% mud, rubbly zone
- 157.6-162.9 fault zone
- 10% gouge, xxxx angular rubble good recovery
- 153.1-153.7 60% mud fault zone, good recovery

167.3-169.1 70% mud fault zone, good recovery

169.1-172.8 RAT
- intensely altered
- shears at 50° to CA

172.8-181.4 Rhyolite
- 5% quartz-feldspar filled fractures
- 176.0-179.0 rubbly fault zones chlorite altered fragments

181.4-186.0
- moderately altered ash tuff
- foliations at 25° to CA

- 3-5% feltic pyrite

186.0-190.0 intensely muscovite + chlorite altered rhyolite
- ghosted, wispy fragments in dark grey pyrite rich matrix
- 3-5% pyrite feltic
- foliations (smearing direction) at 35° to CA

189.0-197.2 Rhyolite
- sucrosic texture
- moderately altered
- 5% matrix
- foliations at 50° to CA (preferred orientation of clasts)

197.2-197.4, 197.7-198.1
- fine grained (aphanitic) olive green andesite (basaltic andesite?) dykes

197.1-202.2 Rhyolite
- intensely muscovite + chlorite altered
- xxxxxxxx glassy (altered glassy) fragments
- foliations at 50° to CA
- <5% feltic pyrite in matrix (dark grey)

202.2-216.9
- 1-3% pyrite feltic, in matrix
- 10% matrix, intensely altered
- occasional banded clasts - minross alteration of clasts
- foliations at 40° to CA, weak

216.9-223.2 Datum Unit-Upper Argillite
- weakly brecciated
- 1-3% pyrite in layers at 70° to CA
- trace sphalerite, trace galena in secondary quartz veinlets
- 2 to <5% quartz veinlet and fracture filling
- graphite along fracture surfaces

223.2-226.3 Datum Unit-Datum Dacite
- vesicular
- beige
- 0.5 to <2% quartz + feldspar as vesicle and fracture filling along with pyrite
- 5-8% pyrite

226.3-228.3 Rhyolite-Lapilli
- sheared, clean, upper contact at 40° to CA
- minor chlorite alteration
- 1% pyrite
- trace sphalerite
- weak foliations at 30° to CA

228.3-233.9 Datum Unit-Upper Argillite
- looks somewhat like an ash flow
- brecciated, contorted pyrite layers
- approximate orientation of layers at 75° to CA

- graphite along fracture planes

233.9-247.9 Rhyolite-Lapilli
- foliated intensely altered
- sheared to 237.8 (1-3% pyrite)
- foliations/shears at 45 to 55° to CA
- chlorite + muscovite alteration
- 233.8-234.2 40% quartz modules (spherulites) xxxx like - up to 0.5m across in chlorite rich matrix
- 236.1-236.4 FDAS
- dacite ash unit, sheared into place
- upper contact at 70° to CA, slickensided
- lower contact at 90° to CA

237.8-238.9 (1-3% pyrite)
- 1% sphalerite
- 1% galena

238.3-238.6 3% sphalerite, 3% galena in chlorite rich matrix

239.0-239.9
- foliations at 50° to CA
- intense chlorite alteration
- 5% mud (clay)

239.9-244.7
- 1-3% pyrite
- moderate chlorite alteration
- decrease in clast size to loner portion of unit

247.7-249.1 Datum Unit-Upper Argillite
- 1-3% pyrite in layers at 70° to CA
- 0.5 to <2% quartz as fracture filling

249.1-256.6 Datum Unit-Datum Dacite
- beige vesicular, pyrite rich
- 5-8% pyrite + quartz as fracture and vesicle filling + 1-3% calcite
- 250.0-254.0 "spidery" fractures throughout filled with quartz and calcite

256.6-274.0 Datum Unit-Upper Argillite
- 1-3% pyrite
- layering at 65° to CA at 256.6 to sub paralleled at 262.2 to 50° at 266.4
- 0.5 to <2% quartz as fine grained crystallites from 26.6-274.0 in layers and as blebs

274.0 EOH

CA89-91

0 0.6 CASING

0.6 109.0 HANGINGWALL ANDESITE

0.6-4.2 Andesite-Massive
- broken
- rubbly core from 0.6-4.2
- oxidized broken surfaces
- lower of broken

4.2-6.6 Mudstone-Debris Flow
- mudstone matrix with cm scale clasts of andesite + or pillow fragments
- up to 30-40% clast composites
- lower contact distinct at 45° to CA

6.6-88.4 Andesite-Massive
- generally massive
- fine to medium grained variable
- locally brecciated, vesicular, pillowed
- broken rusty core common, decreases down hole
- carbonate veining common, variable angles, 20 to 60° to CA
- mineralization rare
- pyrite/pyrobitumen associated with carbonate veining
- 6.6-8.5 vesicular andesite
- 10.5-10.7 rusty broken oore
- 13.8-14.6 pillows
- 15.3-17.5 broken rusty core
- 18.9 carbonate vein, white 4cm at 55° to CA

18.0-26.4 intervals of broken rusty core
- highly oxidized
- intervals up to 50cm core length

31.6-35.5 bleached andesite
- contacts gradational
- carbonate veining common, up to 4cm wide at 55° to CA, barren

38.3 white carbonate vein at 30° to CA, barren

42.5 white carbonate vein at 25° to CA

44.8 white carbonate vein, parallel to CA

54.5-56.6 fractured core
- rusty surfaces

62.5-64.0 fractured core
- mildly oxidized surfaces
- mudstone silver/clast

86.2-87.0 argillite, crystallites variable contacts at 35° to CA

- 1% pyrite at contacts
- lower of sharp at 60 to CA

88.4-89.8 Argillite (Crystallite)
- talties up to 5cm
- locally 30-40% pyrite bands common at 45° to CA
- lower contact broken

89.8-109.0 Andesite-Massive
- dark green
- fine to medium grained occasional segments of argillite, <50cm in length
- local pyrite mineralization at contacts
- fine in veinlets
- 90.3-90.6 argillite, upper contact at 65° to CA
- lower contact at 70° to CA

109.0 110.0 CONTACT ARGILLITE
- bedding at 65° to CA
- trace mineralization carbonatized broken surfaces
- lower 50cm broken, rubbly core
- lower contact breken

110.0 112.0 TRANSITION ZONE
- moderate to weakly altered
- lower contact gradational to rhyolitic breccia
- trace stibnite
- 110.8 fault gouge at 40° to CA

112.0 156.4 RHYOLITE LAPILLI TUFF
- 115.4-116.7 broken core
- vuggy dissolution comities
- 117.5-119.0 pervasive sericitic alteration
- light green colour
- 121.0-121.7 breken core, rubbly
- 125.5 20cm rubbly core
- 145.3-146.5 talcose alteration
- fault gouge, cemented from 145.7-146.5

156.4 EOH

CAA9-90

0 2.1 CASING

2.1 92.2 HANGINGWALL ANDESITE

2.1-9.7 Andesite-Crackle Breccia
- blocky/broken core 2.1-4.9
- oxidized 6.6-9.7 broken
- fractured core, oxidized
- lower contact, sharp at 30° to CA

9.7-12.5 Mudstone-Undivided/sil
- upper/lower contact sharp
- block, ghost crystallites
- locally carbonaceous
- laminated silicified
- trace 1% pyrite
- lower contact, sharp at 80° to CA

12.5-92.2 Andesite-Massive
- medium to coarse grained variable
- 15.3-16.0 carbonate veining along CA
- 17.0-17.8 broken rusty core, <5cm fragments
- 26.2 carbonate vein, at 40° to CA
- 32.0-34.8 broken core
- oxidized 20cm whole core segments
- 40.0-42.2 broken core, oxidized
- 44.4-47.9 white carbonate vein
- upper/lower at broken
- 59.0-60.5 pillow breccia
- 74.3-75.0 andesitic dyke
- fine grained contact at 65° to CA
- lower contact broken

92.2 96.8 CONTACT ZONE-ARGILLITE
- massive
- black
- bedding at 85° to CA

94.8-96.2 carbonate rich
- carbonate as veining up to cm scale, at 80° to CA
- trace stibnite?/pyrite
- lower contact gradational

96.2 100.0 TRANSITIONAL ZONE
- moderately altered
- weakly mineralized
- trace 1% locally stibnite no realgar
- lower contact gradational into a rhyolitic tuff
- minor broken core

100.0 148.4 RHYOLITE UNIT
- weak to moderate sericitic alteration in matrix
- trace sulfides
- locally realgar as specs
- weak to moderately foliated locally int defn minor broken core
- foliation at 45° to CA
- 111.0 cemented gouge at 75° to CA
- 126.0 gouge, clay at 50° to CA
- 129.8-130.2 broken core
- 133.4 broken core for 10cm
- 137.3 gouge, sericitic alteration at 50° to CA
- 146.7-147.5 broken core

148.4 EOH

CA89-89

0	1.5	CASING
1.5	70.1	HANGINGWALL ANDESITE

1.5-8.8 Andesite-Massive
- locally brecciated
- trace sulfides
- cm section of interflow sediments
- 2.2-2.3 rubbly core, oxidized
- 3.9-4.3 broken core, oxidized
- 8.0-8.4 argillite
- 8.8 lower contact, sharp at 45° to CA

8.8-13.5 Mudstone-Crystallites
- crowded crystallites, up to 60%, mm scale
- local pyrite mineralization
- rare fossils
- some broken core
- 11.0 pyrite laminated
- mm scale, at 55° to CA
- 13.0 fault gouge
- rubble, at 65° to CA
- lower contact gradational over 10cm

13.5-31.0 Andesite-Massive/Andesite-Pillow Breccia
- metre segments of brecciated andesite
- grained, fine grained with some medium grained variable
- 15.0-17.9 pillow breccia
- 22.4-23.4 pillow breccia
- 30.3-31.0 broken core
- mild oxidization
- lower at broken to grades into andesite crackle breccia

31.0-47.3 Andesite-Crackle Breccia
- quartz +/or carbonate veining common, various angles
- chlorite fragments common in carbonate matrix
- minor broken core
- trace sulfides with local concentration of pyrobitumen (sphalerite?)
- 41.8 2-3% pyrobitumen in calcite veining
- 44.3-44.6 broken core, oxidized
- 44.9 pyrobitumen along carbonate vein at 45° to CA
- 45.1-54.4 broken rusty core
- 45.9 white quartz carbonate vein at 15° to CA
- 47.3 lower contact sharp at 20° to CA

47.3-54.6 Mudstone-Crystallites/Mudstone-Debris Flow
- generally crystallitic with metre scale interval of debris breccia/slump breccia
- common pyrite fragments, some pyrite as replacement
- occasional pyrite bands at high CA angles
- rare fossils

- carbonate veining common at upper contact, near parallel to CA

47.5-51.2 debris flow/slump breccia
- slump structures common
- cm scale fragments (argillaceous) commonly pyrite rich
- sporadic, rare crystallites
- banding at 80° to CA

51.2-54.6 crystallite variable
- bedding at 85°
- lower contact at 75° to CA

54.0-70.1 Andesite-Massive
- fine grained local pyrite concentrated at upper contact
- common broken core
- 55.5-56.4 broken oxidized core, cm block
- 57.4 white carbonate vein, 4cm at 45° to CA
- 57.8 carbonate/chlorite veinlet, parallel to CA

65.0-68.6 metre sections of broken rusty core
- coarse grained variable andesite at 65.8
- possible dyke

69.5-70.1 brecciated
- carbonate veining at low CA angles
- pyrite mineralization common within carbonate 1-2%

70.1 76.7 CONTACT ARGILLITE
- massive grained, rare fossils
- 1-2% disseminated fine grained metallic mineralization, arsenopyrite?/stibnite?
- trace 1% pyrite
- upper contact broken
- bedding at 80 to 90° to CA
- lower contact broken

76.7 127.4 TRANSITION ZONE
- per alteration (clay/sericite?)
- local high grade concentration realgar, orpiment, stibnite
- carbonate + felsic veining common
- transitional into a rhyolitic tuff/flow
- top 20.0m argillaceous, lower 30.0m more felsic in comp

76.7-93.7 Argillaceous Contact
- trace 1% stibnite/realgar from 76.7-84.1
- realgar increase towards 84.1
- fault gouge 79.0, at 65° to CA
- broken core at 79.3-81.1

84.1-86.2 locally massive realgar, orpiment with semi-massive stibnite
- locally up to 70% realgar >> orpiment

84.1-85.7 brecciated argillite within massive realgar/orpiment matrix
- coarse grained stibnite 70% realgar >> orpiment >> stibnite

85.7-86.2 15-20% realgar >> orpiment in felsic veining
- some crystal-cutting

85.6-87.5 blocky core, cm segments 5% realgar

87.5-93.7 trace 1% realgar as specs

93.7-127.4 Felsic Contact
- intensely sericitic/clay alteration
- locally siliceous
- stibnite common in upper 10.0m
- metre segments of felsic (phenocrysts?) of cm scale, up to 80%
- faulting/shearing common
- coarse grained stibnite locally
- 94.9 10cm segment, semi-massive at tet?
- 96.0 shearing at 50° to CA
- 97.0 realgar associated with felsics, 5% realgar >> orpiment
- 98.0 locally stibnite as aggregates, cm scale
- 100.0 fault, clay at 45° to CA
- 101.0 fault, clay 70° to CA
- 104.0 fault, clay gouge for 20cm
- 104.8 fault, clay gouge at 45° to CA

140.9-106.2 sphalerite mineralization
- honey coloured
- aggregates in bands at 65° to CA
- locally 5%

108.2 broken, rubbly core (faults?)

108.5-110.0 felsic masses giving a spotted or mottled appearance
- secondary alteration

110.2-111.0 local sphalerite as aggregates with concentration of galena?/tet

111.3-120.7 spotted felsic alteration
- felsics up to 80% rock comp stockwork felsic veinlets common
- trace sulfides

120.7-127.4 massive sericitic alteration
- gradational into a rhyolitic flow
- shearing at 35° to CA
- lower contact gradational arbitrary
- trace 1% disseminated stibnite?
- trace disseminated pyrite

127.4 151.0 RHYOLITE

- intensely sericitic alteration
- highly sheared
- broken
- trace pyrite
- 129.0 shearing at 30° to CA
- 131.0 fault gouge, cemented/clay/fragments
- 132.9-134.2 rhythmically banded rhyolite
- 134.4-145.7 int pervasive sericitic alteration originating text overprinted
- possible interside bed
- 147.5 sericitic alteration
- 149.0 fault gouge, at 30° to CA

151.0 EOH

CA89-88

0 1.5 CASE

1.5 73.9 HANGINGWALL ANDESITES
15.5-10.1 Andesite-Massive
- coarse grained variable
- broken core 1.5-2.0, 3.7-4.8
- lower at broken

10.1-13.1 Mudstone-Carbonate Rich
- bedding at 85° to CA
- lower 10cm crackle breccia
- argillite fragments in carbonate matrix
- carbonate veining crystallites pyrite bands (80° to CA)
- lower at 85° to CA

13.1-73.9 Andesite-Massive
- upper 3.0m bleached
- locally andesite crackle breccia
- xxx medium grained to coarse grained variable
- rare pillows

16.0-16.4 pillow, calcite veining at 40° to CA
- 14.7 quartz vein, grey, at 50° to CA
- 20.2 pillow
- 22.4 broken oxidized core
- 30.6-30.9 broken core, fresh
- 32.4-33.5 broken core, oxidized
- 41.5-41.9 broken oxidized core
- 49.4-50.4 andesite vesicular variable
- 50.5-51.7 broken core, oxidized
- 55.8 white quartz vein, 4cm, at 30° to CA
- 59.0-60.0 fractured core
- broken along CA minor white quartz vein along fracture
- 60.2 brittle fault, at 35° to CA
- 69.4-71.2 trace pyrite
- local concentration in fractures

71.5-73.9 bleached andesite crackle breccia from 72.4 to lower of 1-2% pyrite
- locally concentrated from 73.0 to lower contact broken

73.9 85.0 CONTACT ZONE
- massive
- black
- medium carbonaceous
- bedding at 80 to 90° to CA
- occasional slump structures
- trace sulfides
- 74.4-75.0 broke core up to 7cm
- 81.4-84.4 block oore, cm scale block

- lower contact broken

85.0 107.8 TRANSITION ZONE
- pervasive sericitization/alteration (type?) to 99.4
- white secondary alteration (clay?) from 99.4-107.8, decreases down hole
- gradational into felsic tuff
- realgar mineralization common from 88.8-104.6
- realgar commonly associated with felsic veining
- trace sulfides

88.7-91.8 trace realgar
- specs associated with felsic veining

95.1-99.7 sporadic realgar mineralization in felsic veinlets
- shearing at 65° to CA
- locally 3-5% realgar between at 97.4
- semi-massive in veinlet 5mm wide

99.0 fault gouge
- clay, 10cm at 65° to CA

99.7-105.4 realgar general as isolated specs

101.0 fault gouge
- clay at 80° to CA

- lower contact gradational over 2.0m

107.8 153.0 RHYOLITE UNIT
- rhythmically handed rhyolite
- gradational into metre sections of tuffaceous rhyolite
- strongly altered/sheared, abundant gouge, matrix
- locally intensely sericitic/talcose altered
- trace sulfides

107.8-116.4 metre segments of intensely sericitic/talcose altered rhyolite
- soft greasy, lack flow texture
- shearing mod at 50° to CA

122.5 fault
- sericitic broken gouge, at 45° to Ca

127.1-127.5 fault gouge
- broken cemented at 40° to CA

128.0 shearing at 45° to CA

132.8-133.2 broken gouge

134.7-136.4 broken core

- intensely sericitic alteration
- flow structures absence

1-147.3-148.6 intensely, sericitic
- broken core

153.0 EOH

CA89-87

0	4.6	CASING
4.6	85.2	HANGINGWALL ANDESITE

4.6-11.5 Andesite-Crackle Breccia
- aphanitic, vesicular, bleached
- 20% crackle breccia matrix
- trace pyrite
- 9.5-9.7 sheared-calcite fracture filled (20%)
- shears at 40° to CA
- 5% crystallites

11.5-15.4 Mudstone-Laminated
- 50% calcareous layers (lime mud)
- 1-3% pyrite in layers at 60° to CA
- 5% cw as fracture filling parallel to laminations and as breccia matrix
- whole unit tends to be brecciated and calcite healed
- 1-3% crystallites
- graphite along shear planes at 60° to CA
- unit relatively rubbly

15.4-20.7 Andesite-Massive
- weakly brecciated andesite flow
- 1-3% cw as fracture filling and veinlets general orientation of fractures of 60° to CA
- minor zones of crackle brecciation
- trace pyrite

20.7-22.7 Mudstone-Carbonate Rich
- 60% limestone layers
- 5% crystallites
- 10% pale grey silty layers
- 1-3% pyrite
- layers at 65° to CA
- cw 0.05 to <0.5% as fracture filling

22.7-40.9 Andesite-Massive
- weakly brecciated, 3-5% cw as fracture filling
- occasional zones of crackle brecciation
- trace pyrite, trace pyrobitumen with crackle breccia matrix
- locally vesicular, aphanitic along chill margins to sub porphyritic cores
- fracture orientation between 35 and 55° to CA

40.9-5.2 Mudstone-Carbonate Rich
- 75% lime mud layers
- 1-3% pyrite
- layers at 50° te CA
- fossiliferous - trace from 40.9 to 44.0
- 0.05 to <0.5% cw as fracture filling parallel to bedding
- 5% light grey siliceous layers in xxxx 40cm of unit

53.2-60.3 Andesite-Breccia
- vesicular 10% vesicles up to 2cm diameter andesite fragments, 65%, 5-10% black, dendritic alteration
- 20% argillite fragments
- 15% matrix
- calcareous and vesicle filling
- 3-5% pyrite in vesicles and in matrix
- occasional zones of massive argillite up to 40cm wide
- occasional zones of aphanitic, weakly altered andesite-vesicular

60.3-64.7 Mudstone-Carbonate Rich
- 40% calcareeus layers
- 1-3% pyrite in layers
- layers at 50° to CA
- trace calcite rhombs
- a rhomb shaped crystal cluster of calcite concentrated in occasional layers

64.7-66.4 Andesite-Massive
- weakly brecciated
- 0.05 to <2% cw as fracture filling
- 10% black, dendritic alteration
- 1% pyrite

66.4-66.9 Mudstone-Carbonate Rich
- 1% pyrite as very fine grained disseminations
- 0.05 to <0.5% cw as fracture filling
- no preferred orientation

66.6-67.4 Andesite-Massive
- 0.05 to <0.5% cw fracture filling
- trace pyrite

67.4-71.4 Mudstone-Carbonate Rich
- 90% limestone
- 1-3% pyrite in layers
- layers at 70° to CA
- weakly sheared with graphite along shear planes at 70° to CA

71.4-72.1 Andesite-Massive
- as in 66.9-67.4

72.1-74.1 Mudstone-Laminated
- 5% limestone layers
- 10% pale grey siliceous layers
- 1-3% pyrite in layers
- layers at 60° to CA
- increase in siliceous layers towards the bottom of the unit

74.1-80.8 Andesite-Massive
- marker longer
- dark olive green

- pseudo ophitic cores to aphanitic
- weakly vesicular chill margins
- 3-5% cw as fracture filling
- preferred orientation of 30° to CA
- 1% chlorite associated with above fracture filling
- trace pyrite

80.8-83.0 Mudstone-Laminated
- 1-3% pyrite in layers at 40° to CA
- weakly sheared at 40° to CA
- graphite coated shear planes
- 2 to <5% cw as fracture filling and along upper contact which exhibits extreme brecciation
- 1-3% calcareous (limestone) layers

83.0-85.2 Andesite-Massive
- weakly brecciated
- bleached
- argillically altered
- trace pyrite

85.2 107.7 CONTACT ZONE
- layers at 45° to CA, 1-3% pyrite
- 1-3% limestone layers in upper portion of unit (85.2 to 88.9)
- 96.3-105.5 3-5% tennantite, 3% sphalerite, 1-3% pyrite in layers up to 15cm thick average of 1.5cm
- 101.3-103.4 10% quartz, 5% calcite as vug filling - layered
- trace sphalerite, trace lemantite, 1% pyrite in vugs

107.7 109.5 TRANSITION ZONE
- 50% intensely altered ash matrix
- 50% intensely altered ghosted
- wispy rhyolite fragments
- muscovite + chlorite alteration
- 5-8% very fine grained felted pyrite
- intensely foliated at 45° to CA

109.5 186.2 RHYOLITE

109.5-112.8 Rhyolite-Undivided
- reworked ash tuff with lapilli to breccia sized rhyolite fragments in coarse grained matrix or LAHAR
- 50% coarse grained rounded rhyolite pieces with frosted rhyolite fragments weakly wispy slight muscovite + talc alteration
- 1-3% feltic pyrite

112.8-128.4 Rhyolite-Lapilli
- intensely altered muscovite + chlorite and foliated
- foliation at 30° to CA
- ghosted wispy rhyolite fragments

- 3-5% feltic pyrite minor coarse grained disseminations
- 5-25% matrix

128.4-134.2 Rhyolite
- trace pyrite - feltic
- weakly altered
- 5% matrix

134.2-153.0 Rhyolite
- trace pyrite
- moderate chlorite alteration to 139.3
- weakly wispy fragments
- foliations at 40° to CA
- 1% pyrite as occasional feltic blebs

153.2-157.0 RAT.
- intensely altered
- dark grey green
- 3-5% feltic pyrite
- foliations at 50 to 55° to CA

157.0- RLF
- 1-3% pyrite
- weakly foliated at 40° to CA
- 160.0-163.8 trace calcite alteration of clasts
- 163.9-164.0 trace galena

173.9-174.1 rubble

174.1-174.9 5-8% feltic pyrite in matrix

174.9-186.2 Rhyolite
- 1-3% feltic pyrite
- minor chlorite alteration of clasts
- 185.9-186.2 wispy, ghosted clasts

186.2-187.9 Datum Unit-Upper Argillite
- 1-3% pyrite in layers at 40° to CA
- contorted, weakly

187.9-192.7 Datum Unit-Datum Dacite
- 10% pyrite as chloroform fracture filling (botryolial) [weakly brecciated-broken up] and as vug and vesicle filling units quartz
- beige vesicular - dacite tuff

192.7-208.5 Datum Unit-Upper Argillite
- 3-5% pyrite in layers at 35° to CA
- weak shearing at 35° to CA
- weakly brecciated
- trace quartz fracture filling

208.5-217.8 Debris Flow
- medium to coarse grained clasts layers at 35° to CA
- 3% pyrite

- 10% lithic fragments up to 0.5cm across

217.8-236.6 Datum Unit-Datum Dacite
- beige vesicular, aphanitic
- brecciated
- dendritic pyrite alteration
- 10% pyrite
- 2 to <5% quartz filled fractures
- trace sphalerite, trace galena, trace chalcopyrite overall
- 230.1-231.8 3-5% sphalerite, 3-5% galena trace chalcopyrite as coarse grained dissemination and blebs

236.6-242.0 Datum Unit-Ash Flow Tuff
- pale grey green
- weakly brecciated
- 1-3% quartz fracture filling
- weakly foliated at 40° to CA
- 3-5% disseminated pyrite

242.0-251.4 Datum Unit-Lithic Tuff
- layers at 40 to CA
- pale grey matrix 30°
- subrounded clasts, preferred orientation at 40° to CA
- pink-beige clasts fragments
- grey siliceous fragments
- dark grey argillite fragments
- glassy fragments
- 1-3% pyrite
- 245.4 trace chalcopyrite

251.4-243.2 Datum Unit-Ash Flow Tuff
- pale pink-beige
- 5% subangular lithic fragments
- weakly brecciated
- 5-8% pyrite
- 253.2-257.8 1% sphalerite, 1% galena

283.2-285.0 Datum Unit-Lithic Tuff
- subrounded fragments (light green lithic tuff - conglomeratic)
- 30% pale green dacite matrix
- 1-30% disseminated pyrite

285.0 EOH

CA89-86

0	4.5	CASE
4.5	76.3	HANGINGWALL ANDESITE

4.5-5.9 Mudstone-Laminated
- breccia
- cw 1-2% fracture filling
- pyrite 1-3% along layers at 60° to CA

5.9-12.0 Andesite-Massive
- weak breccia
- 5% cw - fracture filling, 15° to CA
- vesicular, 1% pyrite
- black to olive-beige
- possible argillite alteration

12.0-15.9 Mudstone-Laminated
- 1-3% pyrite in layers at 80° to CA
- 1% cr as veins
- 20% layers core limestone

15.9-32.3 Andesite-Massive
- weak breccia occasion zones of crackle brecciation
- sub porphyritic olive green cores to aphanitic, vesicular, bleached pale green rinds
- trace pyrite
- rinds are weak to moderately argillically altered
- 19.6-20.2 mudstone laminated
- 1% pyrite in layers at 70° to CA
- weakly rubbly

32.3-46.5 Mudstone-Laminated
- 1-3% pyrite in layers at 55 to 65° to CA
- 30% limestone layers
- 34.7 fossil
- minor soft sediment deformation features
- 36.9-37.2 possible sericite alteration
- 0.5 to <2% cw parallel in bedding and on occasional veinlets

46.5-52.8 Andesite-Massive
- occasional crackle breccia zones
- weakly brecciated
- for the most part aphanitic vesicular
- 1-3% dendritic black alteration
- 1% pyrite
- 0.5 to <2% cw as veinlets and fracture filling
- 50.2-50.4 massive argillite

52.3-53.9 Mudstone-Carbonate Rich
- 80% limestone layers
- 1-3% pyrite in layers at 65° to CA
- occasional fossils

53.9-55.9 Andesite-Massive
- as in 46.5-52.8

55.9-61.2 Mudstone-Carbonate Rich
- 1-3% pyrite in layers at 80° to CA
- 90% limestone
- 0.5 to <0.5% cw veinlets

61.2-73.0 Andesite-Massive
- marker andesite
- pseudo-ophitic core to bleached aphanitic vesicular chill margins
- 3-5% cw as fracture filling at approximately 15° to CA
- argillically altered lower contact
- trace pyrite

73.0-73.4 Mudstone-Laminated
- 1% pyrite in layers at 70° to CA
- 0.5% to <2% cw fracture filling
- weakly rubbly

73.4-76.3 Andesite-Massive
- weakly brecciated
- 5-8% cw fracture filling and as veinlets
- intense argillic alteration near lower contact
- pale yellow green

76.3 84.0 CONTACT ZONE
- 1-3% pyrite in layers at 70° to CA
- 10% grey siliceous layers near top of unit
- 78.6-79.6 angular rubble zone
- 80.1-80.7 gouge zone
- graphite along shear planes at 70° to CA
- 81.4-84.0 1-3% sphalerite, 5% tennantite (granular - silver black - too small crystals to determine crystal xxxbet), in layers at 70° to CA possibly syngenetic
- possibly replacement of a primary mineral

84.0 86.3 TRANSITION ZONE
- intense foliatiens at 60 to 40° to CA
- intensely altered ash matrix to muscovite + chlorite
- grey semi-flattened rhyolite fragments (40% total)
- 5-8% feltic pyrite, 1% sphalerite, possible trace tennantite

86.3 202.0 RHYOLITE-UNDIVIDED

86.3-101.4 Rhyolite Ash
- upper contact exhibits erosional features
- ie/slump structure
- looks reworked

- subrounded clasts
- from ash to lapilli sized
- 89.4-92.5, 95.0-95.5, 99.0-99.2, 99.5-100.5 gouge zones, 20-50% mud (clay)
- 1-3% feltic pyrite throughout
- 86.8-89.4 trace sphalerite, trace galena
- foliations at 50° to CA - weak
- 96.5-97.0 intense talc alteration
- shears at 70° to CA
- 96.2-98.0 1% sphalerite, trace galena

101.4-150.3 Rhyolite
- siliceous, sexxsic texture, subangular to subrounded clasts, up to 20% matrix
- 1-5% pyrite overall
- 105.5-107.3 rubble
110.7-113.7 40% clay + rubbly gouge shears at 50° to CA
- 101.4-103.7 50% clay - shears at 30° to CA
- 113.8-114.8 5-8% feltic pyrite, 1-3% tennantite, 1% sphalerite, 1% galena
- 113.5 quartz vein fracture filling at 45° to CA with 1% matrix silver as fine wires along the quartz crystals and in vugs
- moderately intense talc + muscovite + gypsum alteration of the matrix
- 120.7-136.3 3-5% pyrite, 1% sphalerite, 1% galena as fracture filling and blebs in the matrix
- clasts are white-grey siliceous
- 135.0-135.1 5% pyrite, 8-10% sphalerite, 3% galena as fracture filling

136.7-138.6 rubbly gouge zone
- 20% clay
- 1-3% fine grained pyrite

140.6-150.3 intense muscovite + chlorite alteration
- sericite along shear planes at 20 to 50° to CA
- approximately 1% very fine grained feltic pyrite
- relict clasts are wispy and pale white grey-green, ghosty

150.3-170.7 Rhyolite
- as before
- moderate foliations
- minor chloritic alteration of clasts
- intense alteration of matrix
- 1-3% pyrite- 152.3-153.3 traces sphalerite, trace galena on fracture filling
- 152.2-152.3 80% clay gouge zone
- 153.3-1540 rubble
- 157.8 foliations at 40° to CA

170.7-181.2 intensely altered muscovite + chlorite sheared at 45 to 55° to CA
- 175.1-178.0 50% mud
- 178.0-181.2 60% relict clasts

- preferred orientation in shearing direction 45 to 55° to CA

181.2-198.2 Rhyolite
- occasional flow laminated fragments
- quartz vein 1-3% as fracture filling
- 15% matrix
- 30% pyrite as feltic blebs to coarse grained euhedral crystals in matrix
- weak chlorite alteration of matrix
- 181.2-183.8 trace galena, trace sphalerite
- 182.4-182.7, 185.3-186.0, intensely sheared
- gouge zones 195.6-196.0
- shears at 40° to CA
- 188.5-194.1 angular rubble zones
- 195.2-195.5 flow banded massive rhyolite or rhyolite/mudstone rhythmite (ash)
- contact banding

198.2-202.0 60% glassy fragments
- chlorite altered in dark grey ash matrix
- shearing at 50° to CA
- weak liamme texture to glassy shards
- 198.4-199.2 intensely sheared "talc" muscovite + chlorite altered
- shears at 50° to CA
- 1-3% pyrite - very fine grained

202.0 204.0 DATUM UNIT-UPPER ARGILLITE
- 1-3% pyrite in layers at 60° to CA
- trace sphalerite at 203.4
- weakly brecciated
- 0.05 to <0.5% cw microveinlets

204.0 206.4 DATUM UNIT-DATUM DACITE
- foliations at 40° to CA
- weak to moderate
- 8-10% pyrite, 1% sphalerite, trace galena
- 10% veinlets - quartz/pyrite filled

206.4 216.5 DATUM UNIT-UPPER ARGILLITE
- 1-3% primary pyrite in layers (lamination) at 50° to CA
- brecciated
- matrix of quartz +/- barite +/- achloaria + pyrite 1-3%, + 1% sphalerite + 1% galena

216.4 228.0 DATUM UNIT-DATUM DACITE

216.4-221.4 BMMS
- 60% sulfides
- 40% pyrite

- 10% sphalerite
- 10% galena
- trace chalcopyrite
- 15-20% quartz as flooding and fracture filling
- 20% dacite datum clasts

221.4-228.0
- 15% pyrite
- 3-5% sphalerite
- 1-3% galena
- 20% quartz fracture filling and flooding
- clasts are pale grey-beige, siliceous, vesicular
- brecciated and quartz + sulfide headed
- weakly rubbly throughout datum unit datum dacite

228.0 EOH

CA89-85

0	7.6	CASE
7.6	74.5	HANGINGWALL ANDESITE

7.6-8.2 Andesite-Massive
- bleached, vesicular, weakly brecciated
- rubbly
- 3% CM as fracture filling
- trace pyrrhotite, 1% pyrite

8.2-8.5 Mudstone-Laminated
- laminations at 55° to CA
- 1-3% pyrite in layers or as blebs
- 1% crystallite

8.5-11.1 Andesite-Crackle Breccia
- olive green to bleached to beige chill margins
- vesicular
- quartz-calcite flooded, 15% quartz, 5% calcite as wide fracture filling-flooding
- 15% crackle breccia matrix

11.1-15.3 Mudstone-Laminated
- 3-5% pyrite in laminations at 75° to CA
- 40% limy mud layers
- 5% crystallites
- 1% pale grey silty laminations

15.3-28.2 Andesite-Massive
- olive green sub porphyritic with pale beige aphanitic chill margins
- occasional zones of crackle breccia
- weakly brecciated
- 0.5 to <2% cm veins and fracture filling
- trace pyrite/pyrrhotite

28.3-45.7 Mudstone-Laminated
- laminations at 60° to CA
- 1-3% pyrite
- 75% lime mud layers
- broken-up, occasional gouge zones
- decrease in calcareous layers towards the bottom of the unit
- more massive layers towards the top of the unit ← fewer laminations near the bottom

45.7-46.3 Andesite-Breccia
- bleached vesicular andesite fragments
- 5% cw fracture filling, oxidized
- trace pyrite

46.3-47.2 Mudstone-Laminated
- layers at 80° to CA

- 1% pyrite
- 20% calcareous layers
- 0.5 to <2% cw fracture filling

47.2-51.4 Andesite-Massive
- beige-olive green - bleached
- weakly brecciated flow
- 0.5 to <0.5% cw as veinlets and fracture filling
- trace pyrite

51.4-52.6 Mudstone-Laminated
- layers at 60° to CA
- 1-3% pyrite in layers
- 5% calcareous (lime mud) layers
- 0.5 to <0.5% cw fracture filling
- upper contact at 60° to CA
- lower contact broken-up rubbly
- competent - reheeled with calcite

52.6-53.7 Andesite-Breccia
- olive green, vesicular brecciated andesite
- 10% cw as veinlets and fracture filling
- 3% pyrite associated with above cw

53.7-62.4 Mudstone-Laminated
- 1-3% pyrite in layers at 80° to CA
- 20% lime mud layers
- 5% pale grey silty layers

62.4-70.9 Andesite-Massive
- dark olive green, sub ophitic (pseudo-ophitic) cores to paler olive green vesicular chill margins
- 3-5% cw no fracture filling in association with minor chlorite
- main fracture orientation at 35° to CA slickensides
- 68.0-69.0 rubble
- 69.4-70.9 rubble

70.9-71.9 Mudstone-Laminated
- 20% black argillite
- 5% limy mud layers
- 75% pale grey silty layers (chert)
- 1% pyrite
- layers at 75° to CA

71.9-74.5 Andesite-Massive
- pale beige, bleached, vesicular
- weakly brecciated
- 1% pyrite

74.5 80.5 CONTACT ZONE
- 1-3% pyrite in layers at 65° to CA
- 20% pale grey siliceous silty layers

79.4-80.5 foliations at 40° to CA
- 1-3% stibnite
- 1-3% sphalerite, 1% galona
- as massive layers up to 2cm wide and as blebs mud disseminations

80.5 82.4 TRANSITION ZONE
- 20% xxcasely altered and matrix
- 3-5% feltic pyrite
- weak foliations at 40° to CA

82.4 235.3 RHYOLITE-UNDIVIDED
- 15-20% matrix
- moderately altered muscovite + chlorite feltic pyrite
- clasts angular to subangular
- 88.8-91.4 intense muscovite of matrix
- shears at 100° to CA
- 84.4-85.0 1% sphalerite, 1% galena
- as blebs and fracture filling
- 93.1-94.1 1% sphalerite, 1% galena
- 93.3-94.7 sheared zone at 45° to CA
- 101.9-105.9 10% ash matrix
- dark grey-black

116.4-178.0
- moderately intense alteration
- foliations at 40° to CA
- 135.7 foliations at 40° to CA
- occasional zones of chlorite (completely altered original rock) up to 10cm wide - 1% of zone
- 3-5% feltic pyrite
- dark grey
- 152.0-153.7 trace galena, trace sphalerite as blebs along fractures with no preferred orientation

151.3-165.4 siliceous rhyolite lapilli tuff
- less alteration
- 1-3% quartz flooding and fracture filling
- 1-3% pyrite
- 158.2-160.1 rubbly fault zone
- 164.5-165.2 rubbly fault zone
- 175.3 foliation at 40° to CA

178.0-179.1 gouge zone 50%
- shears at 40° to CA

178.0-196.4 occasional breccia fragments up to 12cm across
- 191.8-192.2, 196.0-196.4 very fine grained vesicular
- dark olive green - andesite dykes (?baseline andesite?)
- 192.2-192.7 gouge zone

196.4-203.3 Ash Tuff

- 3-5% pyrite
- foliations at 70° to CA
- weak to moderately foliated/altered

203.3-218.0 Rhyolite
- rubble 50% clay
- shears at 50° to CA
- 208.5-210.0 competent zone
- 5-8% pyrite-feltic, 1% galena, 1% dxxxsy, vuggy quartz
- 214.2-218.0 gradational change
- 10% clay at 214.2 to 100% clay at 218.0
- 1-3% pyrite throughout

218.0-219.8 95% clay, 5% rock bits

219.8-225.7 50% talc as sheared zones
- shears at 50 to CA
- pale grey-beige alteration of relict clasts

225.7-235.3 Rhyolite
- dark grey clasts to 229.0 is intensely altered (talc + muscovite + chlorite) matrix
- 10% matrix
- 1-3% pyrite
- moderately foliated at 40° to CA

225.7-226.4 sheared, gouge zone

- rhyolite to end of hole - relatively unaltered
- weakly foliated at 40° to CA

235.3 EOH

CA89-84

0	5.8	CASING
5.8	100.2	HANGINGWALL ANDESITE

5.8-6.2 Andesite-Pillow Breccia
- 1.0-5.8 broken andesite rubble
- fine grained green

6.2-6.5 Mudstone-Laminated
- grey to black, crystallites
- trace xxxx + wispy pyrite
- oxidized fractures

6.5-8.1 Andesite-Pillow Breccia
- fine grained
- green
- breccia, vug fine stringers of very fine grained pyrite
- oxidized fractures

8.1-10.9 Mudstone-Laminated
- grey-black
- VFR crystal cutting B 34° to CA
- oxidized fractures

10.9-24.6 Andesite-Pillow Breccia
- fine grained
- green
- irregular infilling argillite + gypsum calcite - trace pyrite, white calcite vein at 20 to 40° CA - chlorite?
- dark grey cherty infilling

24.6-30.2 Andesite-Pillow Breccia/Andesite-Hyaloclastite
- chilled margins/selvages
- sparry white calcite vein - pyrobitumen, gypsum, calcite, flosite
- white calcite vein 30

30.2-38.6 Andesite-Hyaloclastite
- matrix occasionally limy
- mafic, argillite, banded felsic looking debris 5cm white calcite vein at 30° to CA

38.6-41.0 Mudstone-Laminated/Mudstone-Contorted
- dark grey-black
- laminated to contorted xxxxxp
- pyrite laminations trace disseminated pyrite and blotches
- gradational into unit above
- 40.4 cave*

41.0-47.6 Andesite-Pillow Breccia/Andesite-Crackle Breccia
- gypsum + calcite infilling pyrite disseminated + vein trace
- green fine grained to chilled fragments

- oxidized fractures

47.6-48.7 Mudstone-Laminated
- dark grey to black laminated to contorted
- trace pyrite laminated, disseminated veins
- 48.0-49.0 cave*

48.7-60.0 Andesite-Pillow Breccia/Andesite-Crackle Breccia
- green
- fine grained, vesicular (calcite-chlorite)
- brecciated, carbonate veined
- gypsum + calcite crackle breccia filling
- white calcite vein breccia and veining 10 and 45^{a}
- 59.6 green mineral (florite)

60.0-69.5 Mudstone-Laminated
- black carbonaceous
- laminated basal portion shaped + contorted
- broken sheared slickensides - oxidized fractures
- fossils
- white quartz veins irregular to 60^{o} to CA crystal cutting bedding
- tension gash
- pyrite laminations, blebs
- gypsum limy sections (line mud)
- disrupted calcite vein shear along bedding

69.5-78.5 Andesite-Pillow Breccia
- green fine grained pillow breccia fragments chilled
- gypsum calcite crackle breccia
- white calcite vein at 40^{o} to CA
- shear 65 to 10^{o} white calcite vein oblique to core
- black matrix/irregular veining

78.5-83.8 Andesite-Massive
- flow?
- green-grey fine grained margins
- crystalline core - mafics xxx crystals
- white calcite vein at 20^{o} to CA
- gypsum calcite breccia et base chilled lower contact

83.8-85.5 Mudstone-Laminated
- black te grey well laminated
- gypsum limy band pyrite laminations
- white calcite veining at 45^{o} to CA + irregular tension fillings

85.5-86.3 Andesite-Pillow Breccia/Andesite Crackle Breccia
- green fine grained
- angular breccia fragments in gypsum calcite matrix
- argillaceous upper/lower contacts

86.3-88.2 Mudstone-Laminated
- black
- pyrite laminations

- white calcite vein at 40° to CA
- brecciated base
- white calcite + pyrite vein irregular
- tension 10° to CA

88.2-91.5 Andesite-Pillow Breccia
- pillow breccia fragments
- vesicular calcite-chlorite lower contact at 70° to CA
- white calcite vein
- gypsum calcite breccia filling
- oxidized fractures

91.5-94.7 Mudstone-Laminated
- black laminated
- pyrite laminated fossils
- traces of white felsic ash
- gypsum ls fossil debris

94.7-95.5 Andesite-Pillow Breccia
- green fine grained
- vesicular calcite
- gypsum white calcite vein at 10 to 20° to CA

95.5-98.6 Mudstone-Laminated
- black well laminated
- pyrite laminated
- gypsum limy bands - fossil debris
- green grey tuffaceous layers
- bladed pyrite
- white calcite vein - vein breccia

98.6-100.2 Andesite-Pillow Breccia
- breccia
- gypsum calcite-chlorite selvages vein and infilling
- shear at 65 to 70° eblique to core

100.2 114.2 CONTACT ZONE

100.2-112.8 Argillite-Laminated
- black laminated
- pyrite laminations/disseminated white calcite stybolitic veinlets - vein at 80° to CA to 40° to CA
- gypsum limy laminations, tuffaceous laminations minor xxstings
- carbonaceous, graphitic slips-shears

112.8-114.2 Transition-Mud Ma
- argillite with greyish tuffaceous sericitic wisps
- white blotchy alteration disseminated sulfides, sphalerite, metallic mineral strongly sheared graphitic at 65° to CA

114.2 118.2 TRANSITION ZONE
- mix of greyish blue cherty fragment or breccia with blackish

micaceous alteration, styolic fractures
- disseminated white stibnite? needles
- whitish greys mottled alteration dusty pyrite wisps

118.2 180.4 RHYOLITE-LAPILLI
- highly altered patches mostly matrix sericite alteration with abundant shear fabric and disseminated sulfides
- black metallic wispy alteration with sulfides
- blotchy spotted granular alteration
- light grey rhyolite lapilli

118.2-121.0 bluish - fps quartz vein at 30° to CA
- styolitic fracture with mineral coatings

121.0-122.0 strongly altered (crystals) trace sulfides

122.0-122.5 spotted rhyolite

122.5-123.0 crystals

123.0-124.1 talcose pale whitish green (sericite)
- wispy shear fabrics
- disseminated sulfides trace

124.1-125.0 lapilli - several quartz-fps vein at 10° to CA

125.0-125.6 sericite altered lapilli

125.6-128.6 wispy matrix sericite altered lapilli to breccia greyish blue quartz fps vein sphalerite-galena?

128.6-129.2 spotted whitish chalky alteration

129.2-130.0 granular spotted alteration in wispy sericitic fabric

130.0-132.6 wormy veined + granular fps alteration

132.6-133.0 strong sericite, crystals

133.0-134.2 wormy veins
- alteration xxxson fragments gypeserous areas

134.2-134.5 fps quartz vein

134.5-136.2 wormy vein alteration

136.2-138 sil stybolic vein galena

138.0-139.5 sericitic wispy matrix
- wispy sulfides
- 139.5 white quartz fps breccia filling

139.5-141.0 darker grey granular zone with fine styolitic xx with

dusty sulfides

141.0-142.5 fabric zone
- fps vein
- fault gouge
- sericitic alteration wispy

142.5-146.0 quartz fp vein breccias
- wispy zones of sericite alteration xxxx green with wispy shears
- trace disseminated sulfides
- gypsum splotches galena
- 151.0 fault gouge 1 to 2cm
- 151.5 sphalerite-galena styolitic veinlets + crystals
- 152.0 crystal trace sulfides very fine grained

154.5-156.2 sericitic alteration and crystals
- trace sulfides very fine grained

156.2-158.1 grey styolitic fv

158.1-162.0 sericitic alteration crystals
- trace sulfides very fine grained

162.0-175.0 Lapilli
- styolitic fr coating and blebs sphalerite/galena
- white fps
- 163.0-163.5, 166.2, 169.0, 171.0
- 172.8-174.8

175.0-180.4 greenish grey lapilli weak sericitic matrix

180.4 EOH

CA89-83

0 3.0 CASING

3.0 96.7 HANGINGWALL ANDESITE

3.0-7.5 Andesite Massive
- buff coloured massive, vesicular andesite
- minor carbonate veining, 30° to CA
- minor cm segments of argillite
- 3.0-4.0 broken, blocky core
- 7.1 20cm argillite
- 7.5 lower contact at 45° to CA

7.5-15.9 Mudstone-Carbonate Rich
- massive, locally laminated
- rare pyrite bands
- cm scale aections of crystallites, stretched parallel to structure
- cm scale interflows of andesite
- 7.5-8.8 broken core, 4cm segments
- 7.8-8.0 brecciated andesite
- 8.1 pyrite banding, at 65° to CA

8.2-8.3 crystallites, aligned at 65° to CA

8.3-8.6 broken core, up to 6cm segments

8.6-9.1 andesitic crackle breccia
- 9.6-10.1 crystallites, no preferred orientation
- 12.0-13.5 broken core

13.5-13.8 andesitic flow

13.8-16.0 broken core, up to 10cm segments
- 15.9 lower contact, broken, high CA angle

15.9-15.7 Andesite-Massive
- gradational between vesicular
- fine grained to coarse grained
- common broken/fractured core
- broken surfaces generally oxidized occasional carbonate veining
- locally brecciated
- 16.1-17.5 vesicular andesite
- gradational into a coarse grained andesitic flow
- 21.1 crackle breccia for 20cm
- 25.5 10cm broken/rusty core
- 28.8-29.0 broken carbonate rubble
- 31.8-41.0 broken core, rusty surfaces
- 42.2 fracture/microfault at 90° to CA carbonate infilling
- 47.3-49.5 broken core, fresh surfaces
- 50.9-51.7 fine grained andesitic flow, gradational chill margin 30cm

- lower contact 51.7, at 45° to CA

51.7-54.1 Mudstone-Crystallites

51.7-52.3 broken core
- rusty-green stemming on broken surfaces

52.3-52.8 crystallites, up to 30%, mm scale

52.8-53.0 pyritic/graphic shear on broken surfaces
- 54.1 lower contact at 65° to CA

54.1-55.8 Andesite-Massive
- brecciated vesicular andesite for 60cm, pyrite mineralization locally at upper of
- 55.6 blue-grey quartz vein, 1-2% pyrite, 2cm wide, 35° to CA
- cut by carbonate veinlet parallel to CA

55.8-59.6 Dyke-Latite
- upper contact sharp at 50° to CA
- massive fine grained
- weakly disseminated chilled margins
- quartz carbonate veining common, generally along CA
- cm scale segments of coarse grained andesitic flow
- lower at brecciated 45o to CA

59.6-82.0 Andesite-Massive
- green
- fine to medium grained
- minor veining
- gradational into brecciated andesite
- pyrite mineralization common down hole
- 63.5-63.9 broken core, oxidized surfaces
- 71.0-72.0 broken core, no oxidization
- 76.0-81.5 intervals of broken core, up to 1m in length - no oxidization
- 81.4-82.0 broken core

82.0-92.4 Andesite-Bleached/Andesite-Crackle Breccia
- mixed unit of bleached andesite/crackle breccia
- rare pillows
- quartz/carbonata veining common
- 84.0 pillow/pillow fragments
- 84.8-86.8 andesite crackle breccia
- 88.1 cm scale segment of argillite
- 88.3-89.1 broken rubbly core, fresh surfaces

90.5-92.4 andesite crackle breccia
- pyrite mineralization common in matrix
- subhedral pyrite up to 5mm in andesite + matrix

91.2-92.4 10 to 15% pyrite

92.4-95.7 Mudstone-Laminated
- black
- generally carbonaceous
- cm scale andesitic interflows
- blocky core
- banding at 70 te 80° to CA
- 92.5-93.5 broken blocky core, cm fragments
- 94.3-94.5 andesitic flow
- local pyrite mineralization as disseminated cubes up to 3mm
- 95.7 lower contact, irregular

95.7-96.7 Andesite-Crackle Breccia
- pyrite mineralization as cubes/aggregate up to 1cm

96.7 101.1 CONTACT ZONE
- broken throughout zone
- upper/lower contacts breken
- 20 to 30% core >10cm
- shearing locally at 55° to CA
- broken surfaces graphitic
- disseminated pyrite stibnite trace - 1%

101.1 107.9 TRANSITION ZONE
- fine grained disseminated stibnite?
- local concentrated realgar upper + lower contacts gradational
- int alteration faulting/shearing common
- 101.4-102.0 broken core
- 102.1 white clay? alteration to end of zone
- 102.5 fault gouge at 40° to CA
- 103.0-103.5 shear zone, brittle defn at 30° to CA
- 104.6-105.0 lapilli tuff?/breccia? felsic clasts/phenocrysts up to 5mm
- specks of realgar within felsics
- 107.1-107.3 realgar associated with felsic veining

107.9 153.0 RHYOLITE-BRECCIA
- felsic fragments up to 5mm trace disseminated sulfides
- 110.3-110.7 broken core

116.4-117.4 brittle defn at 60° to CA

117.4-123.0 shearing at 65° to CA
- 127.8-128.3 increase of felsic comp locally banding, 70° to CA
- 130.5-134.3 contorted banding, shearing increases down hole, 20 to 30° to CA
- 136.6 fault gouge at 65° to CA
- 137.8-138.2 broken core
- 140.8-147.0 intervals of broken core, 20cm

153.0 EOH

CA89-82

0 3.7 CASING

3.7 88.3 HANGINGWALL ANDESITE

3.7-6.2 Andesite-Crackle Breccia
- local brecciated fragments in carbonate matrix minor argillite interbeds
- 3.9-5.0 broken rubble, core
- 6.2 lower contact, broken, at 40° to CA
- pyrite hole for 2cm

6.2-15.5 Mudstone-Carbonate Rich
- generally massive
- black weakly foliated with bands of white spotty mineral
- occasional pyrite in massive (cm scale) with some stretching parallel to structures
- two gen of carbonate veinlets
- thin hairline veinlets along CA xxx by carbonate veinlets parallel to structures
- minor offset of hairline veinlets minor andesitic flows
- 6.2-6.4 brecciated argillite in carbonate matrix 1-2% pyrite
- 9.7 foliation at 60° CA
- 11.6-11.8 broken core
- 13.0-13.2 broken core
- 13.4-13.7 andesite flow
- 15.5 lower contact at 15.5, gradational over 10cm at 85° to CA

15.5-51.5 Andesite-Massive
- massive, aphanitic to granular
- rare pillows
- occasional carbonate veining generally at high CA angles with local pyrite mineralization minor broken core
- locally brecciated, coarse grained
- 17.3 white carbonate veining, at 45° to CA
- 23.7 pillow
- 38.0-49.5 metre sections of broken co-cc alternating unbroken medium to coarse grained andesitic flow
- broken core commonly oxidized
- 49.7-51.5 brecciated andesite
- angular fragments in carbonate matrix
- gradational to pillow breccia

51.5-58.0 Andesite-Pillow Breccia
- dark green
- coarse grained with mafic phenocrysts of mm scale
- pillow fragments cm scale

58.0-71.7 Andesits-Maesive
- massive, locally coarse grained metre segments
- 59.4-60.2 broken core, oxidized
- 60.9 white carbonate veining, trace pyrite, at 45° to CA
- 61.8 micro fault/fracture, oxidized, at 30° to CA

- 64.5 white carbonate veining, 1cm, at 20° to CA, 1-2% pyrite associated
- 65.3 fault
- rusty oxidized fault surfaces, at 35° to CA
- 69.8-70.4 minor broken core
- moderate to weakly oxidized surfaces

71.7-73.3 Mudstone-Laminated
- black with laminated light brown bands
- upper + lower contacts gradational, at 90° to CA
- foliation/bedding at 85° to CA
- broken core at contacts

73.3-88.3 Andesite-Massive
- fine to medium grained
- locally brecciated altered
- pyrite mineralization as euhedral cubes towards lower contact
- minor faulting
- minor broken argillitic interbeds
- 78.8 locally 5-10% pyrite associated with carbonate veining

79.0-79.4 broken core
- 79.4 fault
- cemented argillitic gouge
- pyrite mineralization hole (mm scale) at 45° to CA
- 79.6-83.4 brecciated andesite, calcareous matrix
- low concentrated pyrite mineralization associated with matrix or along fractures 2-3% pyrite over interval
- 83.4-84.3 broken argillite/debris flow
- 85.7 pyrite/carbonate veinlet, mm scale, at 45° to CA

86.0-88.3 massive fine grained andesite, chill margin
- bleached, tuffaceous in appearance
- coarse grained pyrite cubes euhedral, anhedral aggregates
- concentrates along carbonate veining, 40 to 50° to CA, 10-15% pyrite locally
- disseminated pyrite throughout

88.3 99.4 CONTACT ZONE

88.3-99.4 Argillite Contact
- weakly carbonaceous cm scale bleached andesitic debris flow at upper contact
- upper contact broken
- occasional calcite veining
- local pyrite vein as aggregates
- 89.2-89.4 andesite flow at 45° to CA
- foliation at 70° to CA at 89.6
- disseminated 1% pyrite
- broken core 95.7-96.6
- probably fault zone

97.3-99.4 altered argillite

- intensely clay/sericitic altered
- faulting/shearing at 97.6, at 45° to CA
- blue-grey alteration in bands at 55° to CA
- 98.3 fault gouge, clay 10cm at 65° to CA
- 99.0 fault gouge, clay at 55° to CA

99.4-117.8 TRANSITION ZONE
- dark grey, pervasive strong altered
- greasy talcose, soft
- white soft secondary mineral up to cm scale
- faulting/shearing common
- mineralization variable with stibnite, realgar, pyrite + sphalerite present, contact gradational pyrite as dissemination wide spread
- 101.0-102.3 shearing at 30 to 50° to CA intense sericitic/clay altered soft
- 103.9 fault gouge, broken, at 60° to CA
- 104.5 fault gouge, clay at 60° to CA
- 106.0 first appearance of realgar parallel in calcite veining at high CA angles
- 107.0 fault gouge, clay
- 108.4-108.7 fault gouge, clay at 80° to CA
- 109.5 fault broken
- first appearance of honey coloured sphalerite

113.0-115.0 shearing at 45° to CA
- lower contact gradational at 117.8

117.8 154.5 RHYOLITE UNIT
- rhythmically banded rhyolitic flow
- gradational contacts into an ash tuff + lapilli tuff
- generally well foliated at 50 to 70° to CA
- locally faulted
- mineralization weak
- dominant pyrite as disseminated occurrence of sphalerite at 120.9
- 120.9-121.1 cluster of honey coloured sphalerite crystals, associated with quartz veining
- 124.0 foliation at 70° to CA
- 134.5-140.0 sphalerite + pyrite in veinlets at low CA angles, mm scale
- 143.2 quartz veining at 30° to CA
- 144.0-145.5 lapilli tuff

146.5-150.5 shear zone
- several faults, rubbly core
- structure variable from 45 to 60° to CA
- gouge variable between clay + cemented fragments

150.5-154.5 - lapilli tuff

154.5 EOH

CA89-81

0 3.0 CASING

3.0 101.5 HANGINGWALL ANDESITE

3.0-7.0 Andesite-Crackle Breccia
- brecciated buff coloured andesite, cut by quartz/carbonate veinlets
- quartz vein generally at 45° to CA
- dominant white bull quartz carbonate veining at various angles
- locally massive
- 4.8-6.8 broken rubbly core oxidized surfaces contact at 90° to CA at 7.0

7.0-14.2 Mudstone-Laminated
- black, locally massive, laminated with carbonate/sediments/ash? at 85 to 90° to CA
- occasional fossil
- local andesite flow(20cm)
- 8.3-9.0 broken core
- 12.3-12.6 fractured core
- 12.6-12.8 andesite flow
- 14.2 lower contact at 14.2 at 90° to CA

14.2-62.5 Andesite-Massive
- massive flow
- medium to coarse grained carbonate veining common at low CA angles
- locally broken/faulted
- broken surfaces generally oxidized
- local (pyrite, pyrite with veining 26.0)
- 14.5-15.0 broken core oxidized surfaces
- 17.5 carbonate veining, white, at 20° to CA
- 19.5-19.8 broken core, oxidized
- 21.1 fault, cemented gouge, at 15° to CA
- 23.8 quartz/carbonate veinlet along CA
- 25.7 white carbonate veinlet along CA for 1.0m
- 30.4 fault, cemented gouge, at 50° to CA
- 39.0-43.0 coarse grained phenocrysts of plug, chlorite mm scale
- 49.7-50.2 broken core
- 51.0-51.3 broken core
- 52.5 fracture/fault? oxidized surfaces, at 15° to CA
- 57.6-58.0 broken cores

59.3-59.3 argillite, upper contact gradational for 10cm, silicified, at 90° to CA

59.5-60.4 vesicular andesite, local pyrite concentration as smears

60.4-62.0 brecciated pyrite mineralization along low angle carbonate veinlets 1-2%

62.5-75.0 Andesite-Pillow Breccia
- mixed unit of andesite/mudstone
- locally sections of coarse grained andesitic flow
- fragments up to cm scale
- upper/lower contacts are gradational
- rare pyrite minaralization locally concentrated with veins
- pillow fragments cm scale tuffaceous interflows

75.0-93.7 Andesite-Massive
- dark green
- coarse grained
- massive flow
- 88.5-88.5 vesicular andesite - pillow 88.5
- 89.1 pyrite veinlet, mm scale, at 50° to CA
- 92.0-93.5 bleached andesite

93.7-94.5 Mudstone-Carbonate Rich
- black, foliated at 55° to CA
- upper contact brecciated at 25° to CA
- trace 1%, sphalerite
- local andesite breccia (cm scale)

94.5-95.9 Andesite-Breccia
- bleached, locally brecciated pyrite mineralization associated with carbonate veining
- locally 1%

95.9-100.0 Mudstone-Carbonate Rich
- foliation at 80° to CA defined by brown banding
- local coarse grained pyrite in aggregates 96.1
- graphitic shear on broken surfaces common minor broken core

100.0-101.5 Andesite-Crackle Breccia
- local concentration of pyrite along carbonate vaining at lime anglea to CA 1-2% pyrite xx carbonate veining

101.5 103.5 CONTACT ARGILLITE
- upper contact broken
- massive white carbonate veining locally at 80° to CA
- disseminated stibnite, trace 1% throughout
- local concentration of pyrite 1-2%
- broken core throughout unit
- lower contact at 70° to CA

103.5 113.1 TRANSITION ZONE
- moderately eericitized/altered zone
- generally massive with numerous faults at various attitude
- mineralization is variable stibnite + arsenopyrite, tet? galena? xxx sphalerite
- moderately competent with minor broken/friable core

103.6 honey coloured sphalerite associated with 1cm carbonate veinlet, at 85° to CA
- 104.7 fault gouge - 40cm at 75°

103.6-106.0 trace 1% stibnite

106.0-108.6 local smears of silver grey metallic mineral, tet/galena occasional sphalerite trace stibnite to 1%

108.7 fault gouge 20cm clay + cemented at 70° to CA

109.1 fault gouge cemented at 30° to CA

109.2-109.7 concentrated zone of mineralization 3-5% disseminated pyrite
- 2-3% stibnite/arsenopyrite 6cm smears of tet/galena

109.8 fault gouge
- brittle
- partial clay altered, at 70° to CA

110.3 disseminated pyrite

112.2 increase of felsic material

113.1 154.8 RHYOLITE UNIT

133.1-116.5 Rhyolite Breccia
- massive
- fragmented with clasts of cm scale in sericitic matrix trace disseminated sulfides (arsenopyrite/stibnite?)

116.5-154.8 Rhyolite Lapilli Tuff
- massive, locally sheared/foliated
- felsic fragments up to cm scale in dark sericitic matrix locally sheared/altered
- occasional pink feldspar veining
- minor faulting
- minor broken core
- trace fine grained mineralization, arsenopyrite?
- 118.5 fault, talcose gouge, at 45° to CA
- 118.9-119.3 broken core
- 129.3 foliation/shearing at 45° to CA
- 133.0 fault quartz infilling, minor clay at 50° to CA
- 133.2-133.7 broken core
- 136.6-137.0 brecciated rhyolite
- felsic fragments (quartz/foliated) in pink feldspar matrix
- 140.4 shearing at 65° to CA talcose mm scale veinlets along slip planed

- 142.8-143.5 sericitic interflow sediments
- 152.6 20cm cemented gouge at 85° to CA
- 153.7 fault gouge, cemented, quartz veining at 60° to CA

154.8 EOH

CA89-80

0 3.0 CASING

3.0 95.4 HANGINGWALL ANDESITE

3.0-6.7 Andesite Crackle Breccia
- light buff colour with quartz/carbonate veinlets generally 30 to 40° to CA
- occasional disseminated sulfides, dominant pyrite associated with veinlets
- broken surfaces often rusty
- lower contact 6.7 at 70° to CA

6.7-15.1 Mudstone-Carbonate Rich
- black, moderately foliated at 75° to CA
- occasional disseminated pyrite mineralization parallel to structure
- local andesitic interflows
- rusty staining pred. on broken surface rare fossils
- local clusters of secondary crystal clusters growth (white in colour)
- broken core 9.6-9.8
- 12.3-12.7 andesite flow
- lower contact at 15.1, at 25° to CA

15.1-90.1 Andesite-Massive
- light green
- massive, occasional quartz/carbonate veins
- gradational contacts between coarse grained variable + fine grained, locally brecciated
- 17.0 quartz vein, white, 3cm at 35° to CA
- 26.0-27.0 quartz veining along CA
- 30.1-30.8 broken core
- 31.7 white quartz veinlet, 3cm at 50°
- 38.2 white carbonate veinlet, 10cm at 80°
- 39.0-39.5 broken core
- 48.8-52.5 broken core, rusty surfaces
- 52.5-52.9 interbedded mudstone
- 53.2-56.7 locally brecciated
- 58.0 white quartz vein at 60° to CA, cm scale

58.5-64.1 Brecciated Andesite
- 60.6-60.9 broken rusty oxidized andesite
- 66.5-68.0 fractured core
- locally broken
- oxidized on broken surfaces
- 66.7 possibly fault/fracture at 20° to CA
- 70.5-80.4 intervals of broken core 2 at 66.7 up to 50cm length
- broken surfaces generally oxidized minor interbedded mudstone 76.4-76.8
- 83.4 brecciated andesite 78.5-80.1
- 90.1 lower contact sharp at 45° to CA
- calcite veining parallel to CA cuts contact

90.1-92.9 Mudstone-Carbonate Rich
- carbonate rich, local pyrite concentration in bands at 80° to CA, mm scale
- 92.9 lower contact at 45°

92.9-95.4 Andesite-Breccia
- brecciated at upper + lower contacts
- bleached for last metre
- locally massive pyrite mineralization rimming argillite fragments at 94.7
- 95.4 lower contact at 85° to CA

95.4 100.2 CONTACT ZONE-ARGILLITE
- generally massive with occasional calcitic lamination at 80° to CA
- debris flow with fragments of bleached andesite from 95.5-96.6
- fine grained disseminated stibnite crystals, trace 1% throughout
- rare pyrite mineralization generally as bands
- 99.0 quartz vein, white, 10cm at 90° to CA

100.2 131.7 TRANSITIONAL ZONE
- variable altered through zone
- shearing/felsic comp. increase down hole
- upper contact sharp at 60° to CA
- lower contact gradational over 2m
- faulting common
- mineralization fine grained, variable % stibnite, arsenopyrite, galena, sphalerite + tet? locally >5%

100.2-113.0 moderately altered, moderately sheared
- mineralization from 100.2-106.0 disseminated stibnite/arsenopyrite massive mineralization
- 105.4-105.3 as smears, galena/stibnite

101.0 clay gouge at 45° to CA

102.4 clay gouge at 35° to CA

102.7 clay gouge at 20° to CA

104.8 clay gouge 10cm at 60° to CA

106.3 clay gouge at 50° to CA

106.6 clay gouge for 15cm at 40° to CA

107.4 clay gouge at 30° to CA, 80° to CA

111.4 clay gouge for 10cm

110.0 foliation at 70° to CA

113.0-128.1 white mottled (clay/talc) strongly altered, strongly sheared
- extremely friable, xxx sericitization/talc
- local concentrated pyrite, sphalerite
- foliation/shearing at 60° to CA

113.1 clay gouge at 70° to CA

114.7 clay gouge 4cm at 60° to CA

116.2 clay gouge

115.8-116.2 disseminated pyrite, 3-5% at 40° to CA

116.5-118.7 local concentrated sphalerite

119.5-124.0 extremely friable

124.0-128.0 moderately altered dark grey with mottling absent to minor

128.0-131.7 competent, minor altered, gradational to rhythmatic banded rhyolite

131.7 146.9 RHYOLITE
- rhythmatic banded rhyolite, banding at 80° to CA
- locally altered, faulted
- local realgar mineralization (trace 1%)
- 138.0 local concentration of realgar associated with felsic banding
- noticed after splitting 3-4 specks (trace 1%)
- 142.5 fault gouge cemented fragments, 10cm at 40° to CA
- 142.7-145.0 alteration zone, per. talc?, soft, greasy, friable
- 144.8 fracture/slip at 30° to CA

146.9 EOH

CA89-79

0 4.2 CASING

4.2 99.9 HANGINGWALL ANDESITE

4.2-11.1 Andesite-Massive
- green buff in colour
- locally vesicular with infilling of calcite, rare pyrite
- 5.0-9.0 brecciated with andesitic clasts in carbonate matrix
- quartz veining (mm) offset by carbonate veining (mm)
- gradational to massive andesite
- 11.1 contact sharp at 80° to CA

11.1-17.6 Mudstone-Laminated
- banded mudstone
- black
- well banded often with pyritic bands mm scale
- bedding/laminations at high CA, angle, 70 to 80°
- rare fossil, 2cm diameter
- occasional white calcite veinlets at low CA's angle more massive towards lower contact
- blotchy (12.3-12.5, 15.8-17.3)

17.6-46.2 Andesite-Massive
- massive, local intercalated mudstone (17.9-18.1)
- gradational between vesicular to coarse grained occasional spermatic pyrite associated with fractures/quartz veinlets
- 16.7 white calcite vein, at 45° to CA 3cm, barren
- 24.4 as above, at 20° to CA
- 25.3-26.9 andesite tuff?, lower contact at 55° to CA

46.2-50.1 Mudstone-Carbonate Rich
- foliation at 60, rusty fractures

50.1-80.7 Andesite-Massive
- generally massive with gradational vesicular andesite interflows (1.0m scale)
- 57.6-57.9 vesicular andesite, contacts at 40
- 60.2 pyrrhotite mineralization in white calcite veinlet, at 30° to CA
- 60.4-63.4 vesicular andesite
- carbonate infilling up to 2cm disseminated
- 70.3-71.2 white carbonate veining clay CA
- broken core from 69.8-71.2
- rusty weathering along broken surfaces
- 73.5-73.6 vesicular andesite, at 50° to CA
- 74.7 white quartz veinlet, rimmed with calcite at 45° to CA
- 76.5 local brecciated andesite, carbonate matrix, 1% disseminated pyrite
- 77.0-77.3 broken core
- 79.3-80.7 broken core

80.7-87.7 Mudstone-Carbonate Rich/Andesite-Breccia

- rhythmic unit of mudstone + andesite
- contacts generally gradational from a mudstone fo a brecciated mudstone matrix breccia
- andesite clasts generally bleached
- pyrite banding common in mudstone - rare fossils
- 81.0-82.0 mudstone broken
- increase of andesite fragments towards 82.0
- broken surfaces rusty
- 82.0-82.9 broken core, andesite breccia
- 84.1-85.9 bleached andesite

84.1-85.9 laminated pyrite mudstone to pyrite as bands, shears on broken surfaces

85.9-87.7 andesite breccia
- bleached andesitic clasts in mudstone matrix, lower contact gradational into andesites

87.7-93.7 Andesite-Massive
- massive, locally vesicular
- prxx bleached
- rare veining
- local mineralization associated with veining
- 92.7-92.8 quartz veining along CA
- pyrite rimmed on andesitic clasts within vein

93.7-97.5 Andesite-Massive
- mudstone - upper at 90° to CA
- local concentration between andesite/mudstone
- occasional pyrite bands at 80 to 90° to CA
- 94.8 fossil
- 95.8 white calcite veinlet, 5cm, 90° to CA

96.9-97.5 broken core

97.5-99.9 Andesite-Breccia
- 98.8 possibly fault
- local pyrite mineralization concentrated along fracture/fault 30° to CA

99.9 101.5 CONTACT ARGILLITE
- massive with increase carbonate veining towards lower contact
- finely disseminated bladed stibnite, trace 1% parallel structure 80 to 90° to CA
- pyritic/graphitic smears along broken surfaces
- 100.0-100.2, 100.7-100.9 broken core

101.5 108.0 TRANSITIONAL ZONE
- dominantly mud matrix with felsic fragments increasing towards lower contact
- 101.5-103.1 broken/black core
- 103.1 calcite veining along foliation at 60° to CA

- 103.6 fault, clay gouge, 60° to CA
- 104.3 shearing at 30 to 40° to CA
- 106.0-108.0 appearance of felsic clasts
- lower contact gradational

108.0 150.0 RHYOLITE (BRECCIA)
- massive brecciated rhyolite occasional quartz/carbonate veining, either at low angles to CA or x 90
- mineralization is rare, some disseminated pyrite
- fabric developed at 45° to CA down contact
- 114.7 fault gouge 50° to CA clay comp.
- 118.2 white quartz veining 35° to CA
- 119.6 white quartz veining 30° to CA
- 123.5 white quartz vein 35 to CA cut by second quartz vein at 85° to CA
- specks of galena (trace %) in low angle quartz vein
- 125.5 quartz vein at 30° to CA
- 125.6 cemented fault gouge, parallel to CA
- blocky core 132.5-133.7
- 140.8 structure - shearing at 50
- thin carbonate veinlets parallel to structure

150.0 EOH

CA89-78

0 3.8 CASING

3.8 91.3 HANGINGWALL ANDESITE

3.8-12.5 Andesite-Massive
- buff, green in colour,
- generally massive locally porphyrite with phenocrystals/+ vesiculas? of carbonate - 5mm
- locally crackle breccia occasional calcite vein with disseminated pyrite
- 3.8-4.2 blocky andesite-massive
- 9.6 calcite vein, 1cm,
- disseminated pyrite at 50° to CA
- 9.6-10.5 andesite-crackle breccia

12.5-17.1 Mudstone-Carbonate Rich
- black
- massive
- carbonate - upper contact sharp at 90°
- locxx pyrite mineralization as smears on broken surfaces minor andesite 16.1-16.8
- lower contact at 70° to CA

17.1-61.6 Andesite-Massive
- massive locally broken with oxidized/rusty strong
- sporadic calcite vein
- mm to cm scale at xxxx CA's occasional disseminated euhedral pyrite <1%
- rare mudstone
- 18.7 carbonate veinlet, white at 20° to CA
- 19.3 quartz carbonate veinlet at 35° to CA
- 22.6 carbonate veinlet, possibly Fe-xxg locally - 10cm wide
- 26.3-26.8 broken core
- fault at 20° to CA at 26.8, gouge crushed out
- rusty limonitic staining or broken surfaces
- 29.7-36.0 coarse grained with mm scale phenocrysts of play pyrite
- 34.4 quartz veinlet, ctr. marked with carbonate rimmed pyrite pyrrhotite as isolated blebs 1% at 30° to CA
- 38.7 fault gouge work-shed out
- 38.7-39.5 broken core
- 40.9 carbonate veinlet, 1cm, 1-2% pyrite at 60° to CA
- 41.4-42.0 mudstone - oxidized pyrite staining or broken surfaces 1%
- 44.2 white carbonate veinlet, 5mm at 0 to CA
- 48.0-54.0 vesicular, mm, carbonate infilling
- 56.2 white quartz carbonate veinlet, 10cm at 50° to CA
- 56.6 white quartz carbonate veinlet, 4cm at 40° to CA
- 58.2 grey quartz veinlet, 1% pyrite in clusters

61.6-65.7 Mudstone-Pyritic
- black mudstone

- massive with pyrite bands, 50 to 60° to CA
- occasional fossil
- bands up to 1cm rare dend pyrite stringers

65.7-67.0 Andesite-Crackle Breccia

67.0-77.7 Mudstone-Pyritic
- mudstone with pyrite bands, up to cm scale
- 50 to 60° to CA rare fossils

77.7-82.8 Andesite-Massive
- locally vesicular
- brecciated at upper contact for 15cm
- locally bleached
- 79.6-80.0 brecciated
- 80.3 xxxxx white quartz vein at 70° to CA
- 80.5-82.0 broken core
- 82.0 fault, at 25° to CA
- 82.4-82.8 brecciated andesite

82.8-88.8 Mudstone-Laminated
- banding at 40 to 50° to CA common pyrite banding parallel to foliation
- mm scale

88.8-91.3 Andesite-Massive
- 88.0 fractures/foliation at 45
- andesite buff coloured with calcite veinlets (mm) parallel to long CA
- veinlet margins chilled, often pyrite along margins

91.3 96.5 CONTACT ARGILLITE
- rare calcite veinlets (white)
- trace stibnite broken surfaces often metallic (graphite/pyrite?) clear

96.5 118.0 TRANSITIONAL ZONE
- upper contact broken lower contact gradational into a rhyolite fault
- foliation at 40
- fine grained stibnite mineralization
- generally 1-2% locally semi-massive
- 97.3-98.0 2-3% stibnite locally 5%
- 98.0-100.0 externally altered (clay?)
- very friable
- 101.4 local sphalerite concentration, 2-3%
- 102.1-102.7 3-5% stibnite locally semi-massive on broken surfaces
- 102.7-104.0 1-2% stibnite occasional smears on broken surfaces

102.7-109.0 sericitic/talc? alteration per locally fine grained lacking felsic fragments

109.0-118.0 increase of felsic fragments, up to cm scale
- locally pyrite dissemination between 114.0-115.0

118.0 154.5 RHYOLITE FLOW
- white to light grey in colour, often banded
- locally brecciated
- occasional sericitic?/talcose? mudstone intervals locally pyrite
- 123.0-123.2 interbedded mudstone
- 123.6-123.9 as above broken core
- possible fault at 123.6
- 133.0 fault at 40°
- 133.7-134.0 brecciated
- 142.8-145.0 brecciated
- 147.7-154.5 brecciated gouge 149.1
- fault gouge 151.0 at 60°

154.5 EOH

CA89-77

0 4.5 CASE OVERBURDEN

4.5 78.0 HANGINGWALL ANDESITE

4.5-6.0 Andesite-Pillow Breccia
- green fine crystalline
- vesicular calcite carbonate vein
- disseminated pyrite 4.9-5.1

6.0-6.1 Mudstone-Laminated
- white crystallites
- calcite pyrrhotite vein

6.1-14.2 Andesite-Crackle Breccia/Andesite-Pillow Breccia
- green fine crystalline, crackle breccia
- argillaceous matrix at base

14.2-16.9 Mudstone-Laminated
- black/grey laminated, pyrite, crystallites, slumped carbonate, calcite vein broken poor recovery
- rusty fragments

16.9-29.0 Andesite-Crackle Breccia/Andesite-Pillow Breccia/Dyke-Diabase?
- green fine crystalline, vesicular, calcite vein, rusty fractures crackle breccia

29.0-30.5 Andesite-Massive/Dyke-Diabase
- chilled very fine aphanitic from 45 to 30°

30.5-39.7 Andesite-Massive
- (dyke) medium to fine crystalline (fps 1-2mm, green chlorite vein 40 carbonate vein 30, breccia base calcite vein), minor trace pyrite disseminated rusty fractures along CA

39.7-40.6 Mudstone-Laminated
- black/light grey laminated white calcite frv
- broken breccia base

40.6-54.1 Andesite-Pillow Breccia
- green, trace crystalline
- vesicular calcite-chlorite
- white calcite trace vein
- 50.5 calcite vein 10 green mineral xxxous

54.1-63.8 Mudstone-Laminated
- black
- laminated pyrite lam
- gypsum ls
- fossils
- 7 marcasite pyrite
- rusty fr, lamination

- calcareous base

63.6-67.7 Andesite-Crackle Breccia
- green
- fine crystalline
- brecciated and veined - bitumens - chlorite - black calcite rusty fracture at 30° to CA
- calcite vein at 10° to CA
- faulted ban rusty black gouge

67.7-72.5 Mudstone-Contorted
- black
- brecciated and white calcite veined to p.
- faulted base - slumped B - 30 to 50 white calcite vein - 25°

72.5-74.2 Andesite-Crackle Breccia/Andesite-Pillow Breccia
- green/black brecciated
- gypsum calcite crackle breccia
- vesicular to 1cm calcite filled vesicles
- disseminated pyrite trace in vein breccia

74.2-76.0 Mudstone-Laminated
- black-laminated
- pyrite lor
- fossil at CA

76.0-78.0 Andesite-Crackle Breccia
- green fine crystalline pyrite + gypsum calcite veining at 40° to CA

78.0 87.4 CONTACT ZONE

78.0-87.4 Argillite-Laminated
- contact argillite-black thider bedded
- few laminations
- some fossil debris + calcareous intervals pyrite laminated, fossils
- disseminated white calcite
- realgar veinlet 80.3
- gy limestone 81.7-81.8
- black calcite 82.5, 84.0, 85.4, 86.0
- black blotches
- alteration 86.9
- veinlet realgar white calcite
- speckled on fitted feathery crystalline texture

87.4 88.1 TRANSITION ZONE
- transition zone strongly altered
- bluish black strong stibnite veining
- realgar size massive section 1-2cm
* stibnite with calcite veins
- black matrix

88.1 159.1 RHYOLITE-UNDIVIDED

88.1-117.0 Rhyolite Tuff
- rhyolite strongly altered and sheared tuffaceous
- sericite schist grey
- indistinct fragments
- 92.3-93.0 modular spotted granular blebs of mineralcryptic veining
- very fine disseminated pyrite
- sheared

93.8-94.3 broken + gouge

95.0-95.2 gouge granular

95.9-96.4 gouge shear

99.3-99.6 gouge granular shear

100.0-103.0 (0.5cm xx) broken gouge

103.6-104.6, 105.0-105.8 gouge

117.0-127.1 Rhyolite/Mudstone Rhythmite
- rhythmically banded 0.5 to 1cm bands light grey to dark grey bands
- minor brecciation

127.1-142.5 Rhyolite/Mudstone Rhythmite
- possibly unit above but strong sericite alteration and granular blotchy feldspar
- dark grey colouration fine disseminated pyrite dusty
- bluish white cryptic veining
- weak to strong fabric at 45° to CA
- trace stibnite? or tetrahidorite

142.5-148.4 Rhyolite/Breccia
- white to dark grey breccia patchy weak to strong sericite alteration
- weak fabric
- abundant fractures and small shears

148.4-150.0 Rhyolite
Fault Zone Crushed and Granulated Rhyolite

150.0-159.1 Rhyolite-Lapilli
- light grey indistinct textures

157.6-159.1 sericite alteration
- weak fabric at 50° to CA

159.1 EOH

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0 3.0 CASING

3.0 115.4 HANGINGWALL ANDESITE

3.0-24.0 Andesite Pillow Flow

3.0-5.0 pillow breccia, fragments up to 10cm diameter
- calcareous chill margins

5.0-10.0 hyalloclastic debris flow

10.0-14.0 mixed debris flow
- pillow breccia with massive bands limonite stained on fracture surfaces

14.0-20.0 massive andesite with fine calcite stingers 1mm
- 16.5 pillow fragerimmed with debris ~~box~~ breccia
- 17.5 1cm quartz vein with hairline rim of calcite

21.5-24.2 debris flow bleached fragments of andesite
- 10cm bands of argillite at 22.3 and 20cm band of argillite at 23.8
- both contain laminae and blebs of pyrite

24.0-27.8 Argillite
- bands of pyrite + pyrrhotite along bedding planes throughout bedding 60° to CA
- brecciation for 1.0m at lower contact large 10cm fragments of bleached andesite mixed with massive and disseminated pyrite/pyrrhotite lower contact 50° to CA
- argillite/calcite throughout

27.8-36.5 Andesite
- 27.8-31.0 vesicular, olive green
- local pillow breccia rimmed with calcite
- local crackle breccia rimmed with pyrite, calcite + bitumen
- calcite stringers in the massive sub porphyritic andesite 31.0-35.8
- 35.8-36.5 brecciated andesite at contact with fragments of argillite
- calcite fracture filling near contact 35° to CA

36.5-44.5 Argillite
- brecciation + blebbing disturbance 36.5-38.0
- 37.7 2cm quartz vein in breccia argillite with andesite breccia fragments
- 38.0-38.2 5cm to hairline calcite stringers at 60° to CA with circular alteration specks "crystallite?" gypsum?
- argillite pyritic 1-2% throughout often occur as bands 2mm thick
- 40.8-41.4 bleached andesite breccia fragments rimmed with calcite + pyrite limonitic fracture surface sheared with

graphitic slickensides

44.5-62.5 Vesicular Andesite
- local debris flows + breccia, pyrite filling hairline fractures limonitic fracture at 43.0-46.0
- pyrite 1-3% local dissemination pyrrhotite breccia at 50.0-50.5 with limonite fracture coating 3cm quartz/calcite vein at 50.5 at 35° to CA
- 45.4-47.7 debris flow
- 51.5-52.0 brecciation + fracturing + graphitic coated fracture filling with calcite core
- crackle breccia 57.0-58.0
- calcite breccia at 58.0 with bitumen
? - 6.1m to 5.0m of quartz/carbonate vein sub parallel CA oxidized lime cavities boxwork test
- 60.0-62.5 finer grained flow with brecciated likely chill margins disseminated pyrite/pyrrhotite in the breccia zones

62.5-63.9 Argillite
- contact 40° to CA, crystallite alteration throughout
- abundant hairline calcite fracture often mineralized in pyrite
- abundant sulfides pyrite + pyrrhotite 3-5% in bands 60° to CA lower contact brecciated at 40° to CA

63.9-64.5 Argillite
- flow breccia local fragments of argillite rimmed in pyrite + chalcopyrite
- abundant sulfides along fracture

64.5-65.0 Argillite
- massive with disseminated pyrite throughout 1-2%

65.0-66.3 Andesite
- vesicular with 1-2% disseminated pyrite/minor pyrrhotite along fracture as well

66.3-66.6 Argillite
- contact 45° to CA sharp abundant + band of sulfides at contact disseminated throughout lower contact breccia

66.6-66.8 Andesite
- pillow fragment lower contact 45° to CA pyrite occurring in hairline fracture

66.8-68.8 Argillite
- very fine disseminated pyrite with minor pyrrhotite throughout
- coarse dissemination at lower contact where a network of hairline calcite fracture filling occurs
- lower contact shows wispy alteration calcite + barite? gypsum? brecciated pyrite filling limy gash fractures

68.8-79.9 Andesite
- vesicular with chill margin at upper + lower contacts, 1% sulfides (pyrite + minor pyrrhotite) occurring mainly in fracture

and dissemination throughout
- fine calcite fracture veinlets throughout 72.2-78.0
- rusty weather on fracture + rubbly core

75.3-78.3 massive fine grained andesite

78.3-79.0 chill margin contact 60° at CA bleached appearance

79.0-94.8 Argillite
- bedding 60° at CA lighter coloured calcareous beds throughout
- very fine grained sulfides dissemination in the less calcite argillite decreasing where limy bands of pyrite occur throughout
- 84.3 brecciated as at 85.2-85.5 with volcanic fragments at the latter cemented in carbonete
- slump feature at 89 associated with wispy calcite alteration
- 92.15 across cutting calcite alteration for 1cm
- 93.0 fossil
- strong sulfide (pyrite) mineralization 94.0-94.5
- 5% calcite alteration veinlets + gash fracture 94.5-94.8

94.8-98.4 Andesite
- chill margin near upper contact with argillite and brecciated, calcareous bands near contact 75° to CA orthogonal gash fractures calcite veinlets in argillite at contact
- 2-3% sulfides at upper contact as occasional large blebs and frequent fracture filling, rimming calcite alteration and bedding in argillite at contact 5cm long bleb of pyrite at 97.0
- andesite coarser grained away from contact with lesser disseminated pyrite vesicular and almost sub porphyritic becoming finer grained at lower contact
- calcite fracture at 35° to CA, 45° to CA, 55° to CA

98.4-100.1 Argillite
- occasional bands of pyrite 1mm thick
- some crystallite calcite alteration lower 40cm are tuffaceous with bedding 65° to CA

100.1-111.3 Andesite

101.4-102.8 olive green chill margin fine grained becoming vesicular to 102.8
- minor disseminated pyrite where coarser grained

102.8-110.0 dark green chlorite andesite dike ??sill?? occasional calcite veinlets with chlorite alteration medium fine grained
- 101.5-102.0 almost porphyritic or vesicular appearances, very coarse with calcite alteration over peint

110.0-111.3 fine grained olive green chill margin andesite quartz/calcite vein at 109.8 15° to CA

111.3-113.3 Argillite
- very graphitic slickenslide breaks on bed planes 60° to CA
- 112.7 rubbly core in cross cutting quartz/carbonate gash

fracture
- disseminated blebs of pyrite along bed planes
- wispy white worm like alteration (gypsum ?barite?)

113.3-115.4 Andesite
- fine grained massive andesite with calcite stringer enveloped with minor quartz quartz vein at 115.0 5mm thick at 30° to CA

115.4 132.3 CONTACT ZONE
- argillite is well bedded with bed angles ranging from 45 to 60° to CA, contains frequent limy beds in addition to thicker (up to 50cm) tuffaceous sediment
- argillite becomes more graphitic
- core becomes more rubbly down hole toward transition zone
- occasional gash fracture + bed filled with calcite +/- quartz
- bed plane slickensides very frequent dissemination in places, galena + sphalerite mineralization occur as described below
- 119.8 gash fracture + bed quartz/calcite
- 120.0-120.5 tuffaceous sediments with fragments of argillite disseminated pyrite minor
- occasional sphalerite blebs at 121.0

132.3 138.0 TRANSITION ZONE
- very graphitic
- heavily altered and sheared argillite grading into more rhyolite argillite or argillaceous rhyolite
- numerous very fine disseminated blebs of sphalerite and very fine blades + smears of stibnite especially rimming alteration rhyolite clasts 134.2-135.5
- very fine disseminations of stibnite in very graphitic argillite 133.7-135.0
- 134.5 an orthorhombic crystal unidentified sulfide, hardness greater than 5.5m, uneven to poor clvg, metallic
- stibnite also occurs along graphitic smears and as disseminations in the argillite
- dissemination cavities at 135.2 + 136.5 + 135.8
- foliation at 133.0-133.5

138.0-196.7 Rhyolite
- moderate to heavily altered flows, tuffs + breccias increasing alteration down hole
- sphalerite occurs as isolated disseminated blebs thin out the hole, specifically at 142.5, 148.1, 158.7, 169.8, 161.2, 168.7, 181.5, and disseminated GN occurring at 193.0

138.0-138.4 Ash Tuff
- laminated at 70° to CA

138.4-167.4 Lapilli Flow
- angular/subangular fragments moderate-heavy alteration fragments less alternate

167.7-167.8 Ash Tuff
- alternate fine grained flow

167.8-188.1 Lapilli Flow
- angular fragments strong alteration

188.1-190.2 Ash Tuff
- heavily alternated (increase) more sheared

190.2-196.7 Lapilli Flow increase
- very heavily alternated ~~inc.~~ fabric subparalleled to CA
- foliation contact with lower dacite 20° to CA
- foliated at 192.3-198.4

196.7 206.4 DACITE
- dacite debris flow with angular moderate alteration fragments of lapilli size fragment
- minor disseminated sphalerite 1-2% to CA
- 201.5 very angular fragments with glassy shards
- occasional vesicular

206.4-207.0 Argillite
- wispy bands of pyrite mineralization graphitic, somewhat sheared

207.0-212.0 DACITE
- well mineralized with (10%) pyrite especially near lower contact locally vesicular
- vesicles often rimmed + partially replaced with pyrite vesicular filled with quartz
- sheared near lower contact fabric 45° to CA
- altered lapilli size fragments more felsic + rimmed with pyrite

212.0-231.9 Argillite
- rubbly + broken core from upper contact to 219.0 foliations at 213.3-214.5 + 218.6-219.5
- lower pertion becomes more massive
- bed at 45° to CA periodic lighter bands of tuffaceous + limy material occasional calcite stringers + bed quartz vein at 213.0
- ash larger at 226.1

231.9-238.2 Lithic Tuff
- gradational facies change from very dark tuffaceous unit grading into coarser tuff near lower contact abundant pyrite throughout increasing down hole
- 235.0-235.2 5-7% pyrite
- 234.0 is a 5cm heavily pyritized lithic fragment

238.2 249.9 DATUM DACITE
- strongly alternated may be foliated contact at 238.2
- very heavily mineralized with pyrite, sphalerite, with lesser gn (20% over alteration)

Galena

- numerous quartz veins, 1 to 10cm thick at 50° to CA
- lot of fragment alteration
- sulfides occur as massive stringers, + disseminated blebs
- sulfides decrease on lower half of interval
- overall is quite siliceous, abundant quartz alteration stringers foliated at 243.7 (strong shearing with gouge 243.7-244.8) strong sericite to silica alteration

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0 3.0 CASE

3.0 97.5 HANGINGWALL ANDESITE

3.4-14.6 Andesite-Pillow Breccia
- 3.0-6.0 rubble
- 1% QN at 20° to CA veinlets
- 10% xx x xxxx xxxxxxxxxx
- disseminated with trace chlorite, trace pyrite, trace xxxxxxxxx
- xxxxxxxx maroon xxxx xxxx to pale green (up to 2cm thick) bleached chill margins
- occasional xxxxx breccias
- 10.7-16.3 rubble

14.6-16.7 Andesite-Massive
- weakly brecciated
- 1% CW at 20 to 25° CA veinlots
- trace pyrite

16.7-18.1 Andesite-Breccia
0.05 to <0.5 xx xxx as veinlets and muscovites at 20 to 30° to CA
- trace pyrite, trace pyrrhotite as chill matrix - grey calcite

18.1-19.9 Mudstone-Debris Flow
- coarse clastic debris flow
- 20% matrix, 1% grey calcite
- 10% unaltered fragments
- 70% andesite fragments - bleached
- clasts subrounded to subangular
- from 0.1 to 2cm across average of 0.5cm
- trace pyrite

19.9-24.3 Mudstone-Laminated
- layers at 85° to CA, 1-3% pyrite
- 3% crystallites
- 40% limestone (carbonate mud) layers
- 1% xx from 20 to 40° to CA as veinlets and microveinlets

24.6-24.1 andesite fragment xxxxxx completely pyrite, 4% pyrite

24.3-36.5 Andesite-Crackle Breccia
20-25% crackle breccia matrix of grey carbonate + chlorite + trace pyrite, trace pyrrhotite
- occasional weak andesite breccia zones
- locally vesicular
- 28.4-29.0 rubble - black argillite
- 40% recovery over this zone, 1% cw at 45° to CA - microveinlets + veinlets

36.6-38.1 Mudstone-Laminated
- layers at 85° to CA, 1-3% pyrite
- 20% carbonate mud layers

- 0.5 to <2% cw at 30 to 40° to CA as veinlets

38.1-41.1 Andesite-Massive
- weakly brecciated
- 0.5 to <2% cw at 40° to CA as veinlets
- weak crackle brecciation - 10% matrix
- trace pyrite

41.1-41.6 Mudstone-Carbonate Rich
- layers at 30° to CA, 1% pyrite
- 0.05 to <0.5% cw as veinlets at 40° to CA
- 70% limestone layers (lime mud)

41.6-49.9 Andesite-Massive
- olive green, aphanitic bleached chill margins (frequently vesicular) to sub porphyritic cores
- local crackle breccia zones
- trace pyrite

49.9-52.4 Mudstone-Laminated
- layers at 90° to CA, 1-3% pyrite
- 5-4 foseils - sericisation
- 1% crystallites

52.4-65.0 Andesite-Breccia
3-5% cw at 35 to 45° to CA, veinlets and fracture filling
- locally vesicular, trace pyrite
- occasional zones of crackle brecciation
- 58.5-59.5 oxidized rubble zone
- 6x.2-65.0 - broken up oxidized zone
- xxxxxxxxxx rubble

65.0-71.8 Mudstone-Carbonate Rich
- layers at 85 to 90° to CA - distinct pyrite layers
- 1-3% pyrite
- 90% lime mud layers
- 0.05 to <0.5% cw at 30 to 45° to CA

71.8-72.3 Andesite-Breccia
- 10% argillite
- bleached aphanitic, vesicular andesite fragments
- angular
- layers at 80° to CA, 1-3% pyrite
- 10% limestone layers

72.8-73.2 Andesite-Breccia
as in 71.8-72.2
- 40% argillite
- 5% cw contorted veins and fracture filling

73.2-78.3 Mudstone-Carbonate Rich
- 1-3% pyrite in layers at 70° to CA
- fossil at 77.1 and 77.5
- 95% limestone mud

78.3-80.5 Andesite-Massive
- low, weakly brecciated
- 5% shearing black alteration
- 1% pyrite
- 0.05 to 0.5% CV calcite vein

80.5 -83.8 Mudstone-Laminated
- xxxx at 75° to CA, 1-3% pyrite
- trace crystallites
- 1% calcite along fractures and as veinlets

83.8-92.3 Andesite-Massive
- weakly brecciated
- 1% calcite in fracture filling at 30° to CA
- trace pyrite

84.3-84.5 10% black feathery alteration
- sub ophitic texture
- fractures are shears - slickensides are surface to shear direction in plane of fracture

92.3-95.1 Mudstone-Carbonate Rich
- 5% calcareous layers - limy mud
- 10% pale grey siliceous layers in upper portion of unit
- 1-3% pyrite in layers at 70° to CA
- 7% CM as microveinlets at 30° to CA and as fracture filling paralleled to xxxxxx

95.1-97.5 Andesite-Massive
- andesite breccia zone from 96.6-97.5 10% CW
- trace pyrite

97.5 126.1 CONTACT ZONE ARGILLITE-LAMINATED

97.5-111.5 xxxxxxx
- 90% lime mud layers
- 1-3% pyrite
- layers at 75 to 80° to CA (lamination)
- 0.5 to <2% CW is microveinlets at 30° to CA and as texture (filling paralleled to lamination)

111.5-126.5? Laminated Argillite
- 3-5% pyrite in layers at 60° to CA
- 113.4-115.4 1% chlorite needles
- 115.4-116.3 1-3% chlorite needles

115.2-116.3 1-3% sphalerite, trace galena
- shears at 40° to CA
- intensely altered - smooth xxxx lime surface

116.3-117.3 50% blotchy quartz as aphanitic, 1% galena or stibnite (~~xxpt.g~~) (very fine grained)

117.3-117.8 as in 115.2-116.3

117.8-126.1 Laminated Argillite
- weakly contorted lamination at 60° to CA, 3-5% pyrite
- 125.0-125.1 dacite fracture filling - trace pyrite xxxxxx on dacite crystals

126.1-130.5 CONTACT ZONE TRANSITION-TUFFACEOUS
- argillite fragments (smeared) in intensely altered ash matrix (talc altered)
- 40% matrix
- shearing at 35 to 40° to CA (intense)
- 5-8% feltic pyrite in matrix

130.5-137.6 Rhyolite-Lapilli
- 80% altered (muscovite-chlorite + gypsum)
- 5-8% pyrite in matrix (feltic)
- 30% matrix, dark grey
- fragments smeared in foliation direction - 35° to CA (ghosted + wispy)
- intensely sheared

132.6-138.2 - moderately altered (30% talc alteration - sericite + chlorite + gypsum)
- 133.5-134.9 weak foliations at 20° to CA
- rest of unit xx xxxxxx have weakly ghosted blotches
- 1-3% pyrite

138.2-138.9 - intense muscovite + chlorite + gypsum (talc) alteration
- sheared, feathered fragments
- intense foliations at 40° to CA
- 5-8% pyrite, feltic rich matrix

138.9-157.3 chlorite altered fragments - 20% - pale olive green
- 1-3% pyrite feltic
- 141.1-143.7 1% sphalerite, trace galena as blebs and disseminations - occasional fracture filling
- weak foliations throughout at 40° to CA
- clasts very distinct - clear xxxxxxx

157.3-159.5 - sheared at 40° to CA
- moderately foliated
- sericite altered
- muscovite as or "healed" shears filled with sericite
- trace pyrite

159.5-162.1 - moderately altered (50% "talc" altered)
- 5-8% pyrite feltic
- 10% matrix
- shears at 60° to CA
- occasional zones of "ghosted" fragments

- 159.6-155.2, 161.7-162.0 gouge zones

162.1-182.3 Rhyolite
10% chlorite bleached fragments - pale
- occasional glassy looking shears
- 1% pyrite
- weak foliations at 50° to CA
- 177.7-178.0 sheared consolidated rubble zone (fault)
- shears at 35° to CA
- 182.0 shear at 50° to CA

182.3-184.8 3-5% pyrite in matrix
185.1-189.5 fault
- rubble zone
- 15-20% mud (clay)

184.8-198.6 Rhyolite Breccia
- autobreccia - very little movement of clasts
- flow banding at 50° to CA
- 1% pyrite

198.6-211.1 siliceous xxxxxxxx - LT occasion
- 15-20% matrix
- 3-5% fine grained pyrite
- 1% sphalerite, 1% galena
- a fine grained dissemination in matrix and as occasional blebs and fracture
- 202.9-203.1 40% pyrite, 10% sphalerite, 5% galena - BMMS
- as dissemination along shear direction of 40° to CA

206.7-209.1 autobreccia
- flow banded fragments contorted

209.1-211.1 banded x brecciated - moderately altered - sulfide
- 208.1-211.1 lime siliceous then 198.6-208.1

211.1-214.6 Rhyolite
- moderately altered
- wispy, blotchy, fragments
- 3-5% pyrite, 1% sphalerite, trace galena
- foliations at 40° to CA

214.6-215.1 DATUM UNIT-UPPER ARGILLITE
- sheared intensely altered argillite
- shears (fxxx) at 20° to CA
- relict laminated fragments
- 3-5% pyrite, trace galena, trace sphalerite
- 215.0-215.1 quartz 20%, xxxxxx 10% as fracture filling

215.1-217.5 DATUM UNIT-DATUM DACITE
- grey-beige aphanitic, vesicular
- vesicles filled with quartz and sulfides 215.1-217.9 BMMS

- 50% pyrite, 20% galena, 5% chalcopyrite, 15% quartz

217.5-251.5 Datum Unit-Datum Dacite/Datum Unit-Lithic Tuff
- different lithic tuff - not pale green dacitic matrix
- beige/grey matrix
- 20% angular to subangular, lapilli, sized lithic fragments, dacite fragments, ?rhyolite? fragments
- 5-8% pyrite - fine grained euhedral disseminations, trace galena, trace sphalerite
QV- 3-5% quartz veining (fracture filling) at 40° to CA

quartz vein

251.5 EOH

CA89-74

0 6.0 CASING

6.0 100.1 HANGINGWALL ANDESITE

6.0-20.2 Andesite-Pillow Breccia
- occasional pillow breccia zones
- 1% pyrite, trace pyrrhotite in matrix of grey carbonate, trace chlorite, trace pyrobitumen, trace white calcite (#)
- rubble from 6.0-8.8, 40% recovery
- oxidized fractures throughout
- 5 to <2 microveinlets of cc at 45° to CA

20.2-22.5 Mudstone-Debris Flow
- bleached andesite fragments (subrounded to subangular) in calcareous matrix, xxxx matrix
- occasional argillite clasts and bands, 0.05 to <0.5 micro veins of calcite at 45° to CA

22.5-24.9 Mudstone-Laminated/Mudstone-Debris Flow
- layers at 50° to CA
- 1-3% pyrite in layers
- 50% limestone mud

24.9-25.3 Andesite Breccia
- 20% mudstone/limestone matrix
- cr present (10%) in matrix
- 5% pyrite in matrix
- andesite - olive green (pale) aphanitic with darker altered chill margins

25.3-25.8 Mudstone-Undivided
- cr 1-3%
- strong shearing at 25° to CA
- graphite along shear planes
- 1-3% pyrite in relict layers

25.8-26.2 Andesite Breccia
- as in 24.9-25.3

26.2-29.8 Mudstone-Laminated
- cr 10%
- 1-3% pyrite in layers at 70° to CA
- LI - 10%
- CV 0.5 to <2% at 40 to 70° to CA
- microveinlets
- gouge zone ±28.0-±28.3

29.8-33.0 Andesite-Crackle Breccia
- 10-20% breccia matrix of grey calcite, chlorite, trace pyrrhotite, trace pyrite, trace pyrobitumen
- occasional argillite fragments in matrix

33.0-36.8 Andesite-Massive
- weak breccia (oxidized fractures)
- sub porphyrite to aphanitic chill margins
- trace pyrite
calcite vein — CV - microveinlets at 40 to 65° CA, 0.05 to <0.5%

36.8-40.0 Mudstone-Laminated
- layers at 70° to CA
- 5% pyrite in layers
- cr 10%
- 1% - LI
calcite vein — cv - microveinlets at 20° to CA (0.5 to <2%)
- fracture filling at 45° to CA (0.5 to <2%) from 36.8-37.7

40.0-41.8 Andesite-Massive
- vesicular
- trace pyrite in calcite breccia matrix (minor matrix)
calcite vein — CV at 20° to CA microveinlets (0.5 to <2%)

41.8-43.1 Mudstone-Laminated
- LI 50%
- layers at 65° to CA
- CR 5%
- 1-3% pyrite in layers

43.1-51.0 Andesite-Massive
- mxxxx CB - trace pyrite, trace pyrrhotite
- sub porphyritic with aphanitic, vesicular chill margins
calcite vein — CV 0.5 to <2% veins to microveinlets at 20 to 30° to CA

51.0-56.5 Mudstone-Laminated
- layers at 75° to CA
- 3-5% pyrite in pyrite rich layers
- LI - 10% 51.0-53.5
- FO - trace (53.5)

51.5-58.7 Andesite-Massive
- rubbly oxidized fault gouge
- vesicular andesite fragments
- trace pyrite

58.7-60.3 Mudstone-Laminated
- layers at 75° to CA
- 3-5% pyrite
- well fractured

60.3-66.1 Andesite-Massive
- 60.3-61.5 oxidized rubble
- intensely oxidized fractures from 61.5-65.7
- 65.7-66.1 intensely oxidized rubble
- sub porphyritic to aphanitic vesicular chill margins, trace pyrite
- 2 to <5% calcite as veinlet filling and fracture filling

66.1-67.3 Mudstone-Laminated
- layers at 75° to CA
- 1-3% pyrite in layers

67.3-68.2 Andesite-Breccia
- 25% matrix
- occasional argillite fragments
- bleached andesite fragments

68.2-68.6 Mudstone-Laminated
- as in 66.1-67.3

68.6-71.5 Andesite-Massive
- weakly brecciated
- 1% pyrite

71.5-72.9 Mudstone-Carbonate Rich
- layers at 75° to CA
- 1-3% pyrite
- 72.2-72.9 brecciated, 5% calcite xx matrix

72.9-73.2 Andesite-Breccia
breccia
- 10% BR matrix of grey calcite, chlorite, pyrite

73.2-74.3 Mudstone-Carbonate Rich
- brecciated (broken up)
- 1% pyrite in layers at 80° to CA, 0.5 to <2% xx as contorted microveinlets

74.3-74.6 Andesite-Breccia
- rubbly (fault)
- 20% matrix

74.6-75.6 Mudstone-Carbonate Rich
- broken up
- 1% pyrite in layers at 80° to CA

75.6-76.2 Andesite-Massive
calcite vein
- 0.05 to <0.5% CV microveinlets at 20 to 40°
- aphanitic vesicular
- weak breccia

76.2-76.9 Mudstone-Carbonate Rich
- massive
calcite vein
- 0.05 to <0.5% CV microveinlets (contorted)

76.9-77.9 Andesite-Massive
- black alteration as dendritic growths along fracture planes
- 0.5 to <2% calcite filled fractures

77.9-79.5 Mudstone-Carbonate Rich
- minor argillite
- 1-3% pyrite in layers at 80° to CA
- 1-3% CR

79.5-81.3 Andesite-Massive
- 15% mottled black alteration
- vesicular
- weakly brecciated
- 1% pyrite in microveinlets

81.3-81.6 Mudstone-Carbonate Rich
- layering at 85° to CA
- 1-3% pyrite in layers
- 10% black argillite (mudstone) layers
- 1% crystallites (cr)

81.6-82.1 Andesite-Breccia
- aphanitic, vesicular, bleached
- weakly brecciated
- 1% pyrite in breccia matrix

86.0-95.8 Andesite-Massive
- dark green
- xxx pseudo authitic texture
- trace pyrrhotite
- oxidized fracture throughout
- very black CR
calcite vein — cv 2 to 5%, microveinlets and fracture filling

95.8-97.0 Mudstone-Laminated
- rubbly
calcite vein - 5% cv at 40° to CA
- fracture filling up to 2cm wide
- layering at 40° to CA
- 1-3% pyrite layers

97.0-100.1 Andesite-Massive
- xxxxx xxxx - pale green
- weak cr
calcite vein = 0.05 to <0.5% cv as microveinlets and fracture filling
- brecciated power contact 1% pyrite

100.1 118.6 CONTACT ZONE ARGILLITE-LAMINATED
- layering from 60 to 80° to CA
- 5% xx mud layers
- qc fracture filling 1-3% also as br (breccia) matrix - xxxx weakly brecciated
- 105.4-107.5 trace stibnite/arsenopyrite needles
- 108.7-116.7 2 to 5% sphalerite, 1-3% galena
- 5-8% pyrite as "blebs" of minerlization (wispy semi-massive, medium crystallite bands) from wispy patches to bands 3cm wide
- 113.1-113.7 30% quartz as aphanitic to chlorite blotches isolated with sphalerite/galena mineralization
- xxx gouge 105.9-106.4, 108.4-108.9, 109.3-109.6, 110.0-110.3
- 111.9-116.9 intense gypsum-talo alteration (80%) - grey/black, soft (hardness - 3)

- intense foliation at 50° to CA
- possibly an altered tuff

118.6-126.3 CONTACT ZONE TRANSITION-UNDIVIDED
- siliceous, blotchy at 120.2 also 121.8 to xx
- occasional rhyolite fragments in intensely altered ash matrix
- 5-8% feltic pyrite concentrated in matrix
- trace sphalerite, trace galena from 121.8-127.3
- intensely foliated from 30 to 45° to CA occasional gouge zones 125.6-126.3

126.3 240.3 RHYOLITE-UNDIVIDED

126.3- Rhyolite-Lapilli
- 10-15% matrix
- clasts subangular to subrounded
- average of 1.7cm across
- occasional flow banded fragments

126.3-134.3 "ghosted" fragments, wispy intensely "talc"-muscovite altered
- 15% matrix, intensely dissemination
- 2-3% quartz veinlets - no preferred orientation
- occasional silicified fragments (5%)
- 135.7-136.1, 138.4-139.4 gouge zones

134.3-154.5 "xxxxxxx" texture
- weakly altered (talc xxxxxxx)
- 1-3% pyrite overall (feltic)
- 147.1-149.8 0.8% feltic pyrite in matrix

154.5-166.7 Rhyolite
- siliceous xxxxxxxxx unaltered
- 158.3-159.5 of 15% quartz, 5% feldspar as fracture filling with no preferred orientation
- overall 1-3% QF (FQ microveinlets and fracture filling-xxxxxxxxxx
- 154.2 trace sphalerite, trace galena
- 164.6-166.7 1% sphalerite, trace galena
- as fracture filling
- 161.6-166.3 40% feldspar 10% quartz as fracture filling

166.7-168.2 intense tall-muscovite alteration
- 10% feltic pyrite - wispy blebs
- 1-3% sphalerite, trace galena
- foliations at xx to CA - moderately wide rhyolite fragments-40% relict fragments

168.2-169.6 as above 80% relict fragments
- intensely altered
- 1-3% feltic pyrite

169.6-173.9 intensely altered matrix

- 3-5% feltic pyrite trace galena as matrix

173.9-174.5 ⋔ pale grey green ghosted rhyolite fragments is dark grey pyrite rich (3-5%) matrix, intensely altered
- foliations at 40° to CA - intend

174.5-174.9 Rhyolite Breccia
- 5% matrix
- pale grey green rhyolite clasts
- trace pyrite

174.9-182.8 LT - light grey
- 1-3% pyrite in matrix
- rhyolite breccia from 177.7-178.1
- 178.3-178.4, 178.6-178.9, 182.0-182.2
- black medium grained ash tuff, 3-5% fine grained pyrite

182.8-199.9 Coarse Ash Tuff
- altered - sheared - intense
- 183.1 shears at 75° to CA
- 187.0 shears at 30° to CA
- 191.5 shears at 50° to CA
- 183.6-184.6 5-8% fine grained pyrite
- trace sphalerite, trace galena
- 1-3% pyrite overall
- 193.6-193.9 10% pyrite, trace sphalerite
- 187.9-198.7 weakly consolidated gouge
- 198.6-198.7 gouge zone
- shears at 60° to CA

199.9-214.6 Massive Rhyolites
- pale grey with darker flow banding
- 201.2⋔ flow banding at 40° to CA
- 202.1-203.8 1% sphalerite, 1% galena
- 1-3% pyrite as blebs along fractures between 30 and 50° to CA
- 203.6-204.0 rubble
- 205.2 flow banding at 30° to CA

206.5-208.9 trace sphalerite, trace galena, 1-3% pyrite concentrated along fractures and flow banding
- flow banding contorted

208.9-213.6 weakly contorted flow banding, 1% pyrite overall
- 212.0-213.6 trace sphalerite, trace galena, 1-3% pyrite along fractures
- 214.5 flow banding at 50° to CA
- 215.8 flow banding at 15° to CA
- 217.0 flow banding at 60° to CA

213.6-214.2, 214.8-215.0, 217.5-218.0 blotchy broken texture to layers (bc-bb-sh)
- 222.6-223.5 ⋔ rubbly gouge zone
- 3-5% fine grained pyrite

214.6-228.6 Ash Tuff
- weakly foliated
- fine to coarse grained
- 1-3% pyrite, fine grained disseminated

228.6-239.5 Lapilli Tuff
- subrounded clasts
- 1-3% pyrite in matrix disseminated
- weak foliations at 35° to CA
- 234.0 foliations at 50° to CA
- 234.0-234.2 gouge
- 234.1-239.5 talc-sericite alterations of clasts (moderated) and matrix (foliated)
- clasts are mottled pale grey/green
- matrix (20%) dark grey/green
- 10% glass fragments from 238.0-239.5

239.5 240.3 DATUM UNIT-UPPER ARGILLITE
- laminated
- layering at 75° to CA
- 3-5% pyrite in layers
- lower contact very contorted

240.3 247.7 DATUM UNIT-DATUM DACITE
- vesicular brecciated
- dendritic alteration
- pale beige, aphanitic

240.3-241.2 1-3% sphalerite, 1% galena, 5-8% pyrite
- as fine grained disseminations, vesicle filling and along fractures

241.2-247.7 trace sphalerite, trace galena, 3-5% pyrite as above
- weakly brecciated
- 1% quartz as vesicle filling with sulfides

247.7 264.4 DATUM UNIT-UPPER ARGILLITE
-dark grey black, mudstone/argillite
- pyrite rich xxxxxx from 70 to 75° to CA
- 3-5% pyrite in layers
- 255.0-264.4 trace sphalerite (dark red) trace galena, associated with, pyrite as fracture filling and as blebs
- 258.0-260.0 grey quartz larger - mottled

264.4 265.7 DATUM UNIT-DATUM DACITE
- brecciated, sulfide bleached
- 5% galena, 5% sphalerite, 10-15% pyrite overall
- 254.4-264.8 15% sphalerite, 10% galena, 40% pyrite - semi-massive BMM
- occasional argillite fragments

- gouge from 264.8-265.0
- rubble to 265.7

265.7 272.7 DATUM UNIT-ASH FLOW TUFF
- massive sucrosic
- coarsely crystalline, pale green ash tuff
- trace sphalerite, trace galena overall as BMVD mostly as vein filling and xxxx
- 268.5-272.7 gouge zone or fractures rubble zone (fault)
- shearing at 45° to CA - main orientation
- 269.4-269.7 60% quartz (feldspar xxxx) (5% feldspar)

272.7 287.1 RHYOLITE-UNDIVIDED

272.7-272.8 black mud gouge

272.8-272.9 pyrite rich (possibly Dacite datum) gouge - mud - 50% pyrite

272.9-276.1 Rhyolite-Lapilli
- 1-3% pyrite
- 272.9-275.6 gouge (fault)
- occasional blotches of rubble
- shearing at 45° to CA - main orientation
- weak alteration of rhyolite lapilli

276.1-272.2 Rhyolite-Flow
- flow banding at 65° to CA
- 3-5% pyrite in xxxxxx layers

272.2-287.1 Rhyolite-Lapilli
- 3-5% pyrite overall
- pale grey fragments (angular-subangular) in 10% matrix (darker grey)
- weakly altered
- foliation at 45° to CA

280.8-281.1, 282.3-282.5, 283.7-283.9, 286.7-287.0 gouge zones, minor fine grained rubble
- foliations at 45° to CA - main orientation

287.1 288.3 DATUM UNIT-UPPER ARGILLITE
- layers at 60° to CA
- 3-5% pyrite
- 287.1-287.5 weakly brecciated, 10% xxxxx

288.3 292.5 DATUM UNIT-UPPER ARGILLITE
- 10% pyrite (BMVD), trace sphalerite, trace galena
- quartz + base metal vesicle filling
- 288.7-288.8, 289.0-289.1 broken-up lots (angular-up to 1cm across) of crust form pyrite - 40%
- 1-3% quartz veining at 45° to CA

292.5 297.5 DATUM UNIT-MIDDLE ARGILLITE
- layering at 70° to CA
- 1-3% pyrite in layers
- 295.5-297.5 1% sphalerite, trace galena as blebs and vein filling
- 297.4-297.6 sheared contact
- shears at 50° to CA

297.5 298.6 DATUM UNIT-DATUM DACITE
- weakly mineralized, squished, vesicular
- foliations at 40° to CA
- 5-8% pyrite - fine grained disseminations

298.6 310.0 DATUM UNIT-MIDDLE ARGILLITE
- pale grey - weakly foliated
- 10% glassy shards
- 5% felsic fragments
- 3-5% fine grained disseminated pyrite
- 308.3-310.0 trace sphalerite, trace galena as fracture filling and minor blebs

310.0 EOH