

*DRILLHOLE REPORT - NS2  
NORTH SCAMANDER PROSPECT  
EL 12/78, TASMANIA*

<u>Location:</u>	567W 1492N (Local NS Grid)	<u>Commenced:</u>	6 August 1980
<u>Depression:</u>	64° at collar	<u>Completed:</u>	16 August 1980
<u>Bearing:</u>	230°	<u>Rig:</u>	Jacro Top Drive
<u>R.L.:</u>	N.D.	<u>Drillers:</u>	A Walker, I McCallum
<u>Depths:</u>	212.0m	<u>Depth of Oxidation:</u>	24.0m
<u>Surveys:</u>	100m (57° ); 150m (50° )	<u>Depth of Water Table:</u>	
	200m (53° )	<u>Core Size:</u>	NQ

Nature of Target:

Magnetite - sulphide body in fractured sequence of Mathinna Beds quartzites, siltstones and slates.

Reasons for Drilling:

To test magnetic/E.M. and Sn-in-rock geochemical anomalies along strike from structures drilled in NS1.

Technical Data:

Overburden, loose and broken rock to 18m; 12m NW casing (left in hole); cemented to 21m.

<u>Interval</u>	<u>NS2</u>	<u>CORE LOG</u>
0.00-2.13		Not cored.
2.13-5.60		Pale grey qzte, red and yellow limonite staining; pervasive locally; 50-100/m wispy, discont qtz vnlt <sub>s</sub> to 3mm, mostly 10-30° LCA with orange limonite after carb? or S <sup>2-</sup> ; hairlike Fe ox coated mfracs numerous; complete oxid <sup>n</sup> ; some brecciated/oxidized shale bands locally; core is broken all sticks <25m.
5.60-6.91		Black shale, dark grey slst; finely laminated; mostly broken and sheared; some thin bleached envelopes about Fe oxide filled vnlt <sub>s</sub> /m vnlt <sub>s</sub> ; complete oxidation; bedding is 40° LCA where not dislocated by fracs.
6.91-14.90		Mostly grey qtz; interbedded black shale, grey slst; bedding 60-65° LCA (13.7m); 60° LCA (14.2m); facings uphole; most S <sup>2-</sup> oxidized to orange/red limonite; trace pyr in hard qzte (13.0m); cut by 50-100/m wispy qtz vnlt <sub>s</sub> as above; locally 4-5mm wide "gossanous" vnlt <sub>s</sub> in fracs (20° LCA).
14.90-16.47		Mostly brecciated shale with limonite; some broken qzte in run, complete oxidation; broken core.
16.47-17.95		Fractured qzte c̄ qtz vnlt <sub>s</sub> , complete oxidation; intense qtz vnlt <sub>s</sub> mostly 0-20° LCA and with orange limonite; minor fractured shale; limonite coated fracs 0-80° LCA mostly 0-20? 17.95 is base of complete oxidation; minor oxid <sup>n</sup> on some fracture surfaces persists to 21.76m.
17.95-24.04		Interbedded dark grey qzte and siltstone with sheared shale bands; <u>laced with irreg wispy qtz vnlt</u> mostly 20-45° LCA, offset on fracs, 100/m+ locally; minor sph-gal-qtz-(chl) vnlt <sub>s</sub> ~20° LCA offset qtz vnlt <sub>s</sub> ; bedding 30° LCA shearing between units present, facing uphole? poor grading; minor pyrite in vnlt <sub>s</sub> c̄ sph/gal; Fe-ox coated fracs (5/m) often on thin carb-qtz vnlt <sub>s</sub> at 60-80° LCA; low total S <sup>2-</sup> (less 1%); qtz vnlt <sub>s</sub> 150/m 23.2-24.04m mostly 75° LCA or 15° LCA offset on chl-qtz-(sph) vnlt <sub>s</sub> at 0-10° LCA; silic'd/chloritized matrix.
24.04-27.75		Shale, siltstone, minor qzte; locally bedded (30° LCA) facings inlet; mostly sheared and brecciated (mylonite?) numerous shear planes predom 30° LCA, laced c̄ v. irreg set of lt brown qtz-siderite vnlt <sub>s</sub> , 1mm thick, minor S <sup>2-</sup> mineralization; trace sphalerite rare 3-4m qtz vnlt <sub>s</sub> fractured and broke <sub>2</sub> , c̄ trace pyrite; these with pinite locally (30° LCA, <5/m); v. low S <sup>2-</sup> overall.
27.75-31.35		Massive qzte with minor shale/slst bands; pale grey, early set of irreg qtz vnlt <sub>s</sub> 1-2mm+ with indistinct margins - mostly 30-45° LCA, large ones c̄ carb(?), pinite, minor pyrite; offset on fracs up to 2cm; chloritic m vnlt <sub>s</sub> c̄ trace sph-gal cut former (~ 50/m) bedding 60° LCA, facing uphole(?); 1cm shale band c̄ qtz-carb vnlt parallel; qtz-carb vnlt <sub>s</sub> late stage 5/m 45-80° LCA (mostly 45° ), 203mm, qtz cores no sulphides; overall v. low S <sup>2-</sup> content this interval.

- 31.35-34.25 Interbedded, sheared shale, slst and qzte, bedding is 45° LCA at 31.45m, 45° at 32.4 facing uphole (scour and grading); near 90° at 32.95m, sheared and c̄ kink folds?, facing uphole at top of interval; 50/m pyrite stringers parallel to bedding to 3-4mm, minor sphal in top of interval fall off to 10-20/m to 33.3m occupy irreg mfracs 0-20° LCA or along bedding; 3cm qtz vein 30° LCA at 32.7m with 20% pinite or chlorite, minor fspar (albite?) and up to 10% pyrite near margins as coarse aggregates; chloritic-sph rich envelopes; 33.3 to 33.7 is fractured qzte c̄ 10% S<sup>2-</sup> sph-pyr (2:1) in vnltts to 5mm 45-50° LCA mostly c̄ patchy lt brown carbonate; 33.7 to 34.25 as for top of interval with S<sup>2-</sup> dropping off to 1-2% pyr+sph in vnltts as above.
- 34.25-34.70 Hard, fractured black shale c̄ 2-5% S<sup>2-</sup> total; pyr-sph (3:1) as irreg fracture fillings, some vugs, 5-30° LCA early network of v. fine qtz-pyrite vnltts offset by later vnltts; bedding 30-40° LCA offset/disrupted.
- 34.70-42.40 Interbedded qzte, shale, slst; qzte beds to 40cm; bedding 45° LCA 36.3m uphole? facing; 55° at 37.4m facing uphole, 65° at 39.3; 45° at 40.6m uphole facing; qtz vnltts to 50/m predom 30-45° LCA in qzte beds, some with pyrite-(sph) mostly barren; pyr-sph (1-3%) mostly in fine stringers 5-30° LCA or parallel to bedding some thicker vnltts and stringer "zones" to 2cm thick c̄ vuggy areas; trace blue-grey, dull lustre, glauconite? assoc'd c̄ pyrite locally; pale green fluorite? in vnltts c̄ qtz ~38.0m, also possibly a gangue phase in S<sup>2-</sup> vnltts through interval, 2-3/m late (qtz) 2 brown carbonate vnltts ~80° LCA c̄ minor pyrite; overall most S<sup>2-</sup> in qzte beds (70% of interval is qzte), 1-5% total S<sup>2-</sup>; fine tm? in vnltts 38.2m-38.9m.
- 42.40-44.30 Mostly dark grey qzte, with minor frac'd/sheared shale including 3cm wide sph-pyr vein from 43.8-44.3m; med gnd qzte is fspathic sheared contact c̄ slst 42.7m 30° LCA, brecciated 43.0-43.5m; 20-40/m pyr-sph vnltts 45° LCA to 5° LCA with minor po, galena; larger vein pyr-sph 3:2, no galena, vuggy and with trace of blue-grey clay? mineral; 2- vein is unusual in that cuts sharp qtz-carb-pyr vnlt; 5% total S<sup>2-</sup>; po comes in approx 43.4m as vnlt phase.
- 44.30-46.93 Mostly shale, siltst and qzte sheared and mineral'd as above bedding 30° LCA at 45.6m disrupted on fracs, brecciated elsewhere; network of v. fine black tm? - lt brown carb vnltts esp in shaly beds 0-45° LCA follow bedding locally, ~50/m; pyr-sph-po in vnltts 0-30° LCA or following bedding; more po 46.4-46.9m variable pyr:po ratio, 5:1 to 2:1, traces galena assoc'd c̄ po aggregates; locally 5-10% S<sup>2-</sup> 1-2% sph; some vugs assoc'd c̄ pyr vns.
- 46.93-48.32 Mineralized breccia; host shale/slst minor qzte; no recognizable bedding; "matrix" network of pyr-sph-po + galena stringers c̄ chl/tm and crushed rock; dark matrix, light grey subrounded fragments to 2-3mm across most <1cm; total S<sup>2-</sup> 5-10%; vuggy locally throughgoing S<sup>2-</sup> stringers 15-20° LCA v. irreg; pyr:po~5:1 po+pyr:sph~10:1; no qtz vnltts.

- 48.32-51.35 Mineralized breccia; mostly qzite  $\bar{c}$  minor shale, 48.3-49.1 ~2% sulphides, pyr-po-sph-(gal) in network of stringers low angle to LCA; 49.1-51.35 up to 20% po-sph-pyr-(gal) in irreg stringers to 45° LCA and also matrix filling, pyr:po  $\approx$  1:4; 50.9-51.35 up to 50% po + sph, galena (minor) as matrix to breccia\*  $\bar{c}$  rotated banded shales frag; sheared lower contact 10° LCA; 51.0m unidentified bladed xtals; H<sub>2</sub>, white streak- gypsum?, blue tinge; as frac coating; some late stage through going carb? vnlt v. thin rare, wispy set of <1mm qtz vnlt in qzite virtually obliterated by S<sup>2-</sup> min \* could also be 5° LCA + 3cm thick vein.
- 51.35-51.54 Laminated shale/slst with minor qzite; minor fold 51.3m?, 30-45° LCA most bedding; facing indeterminate, 2-5%+ po in stringers to 3mm 0-60° LCA most ~45° many follow bedding 100/m+ locally; offset bedding, minor gal-sph assoc'd  $\bar{c}$  po, v. minor pyrite; po:pyr = 10:1+.
- 51.54-52.75 Mineralized qzite, overall 5-10% S<sup>2-</sup> in stringers and pods to 1cm across except at 52.4m where 50% S<sup>2-</sup> in breccia matrix, po-sph-(gal)-(cp) most abundant S<sup>2-</sup>; thin CO<sub>2</sub>- vnlt parallel to LCA (10-20/m?) crosscut S<sup>2-</sup> stringers, gypsum? as above, large pyr blebs to 1cm diam with vuggy reaction? haloes marked by po.
- 52.75-66.36 Qzite with minor 5-10cm shale bands at 61.3m (bedding 60° LCA) 63.05m (bedding 70° LCA uphole facing), 65m (bedding 80° LCA facing uphole); sporadic network of S<sup>2-</sup> throughout falls off below 59.4m; thin wispy qtz vnlt 5-10/m mostly barren, po-pyr-sph-gal in stringers po:pyr >5:1, 5-45° LCA, <1-4mm thick most ~45° LCA; total S<sup>2-</sup> 2-5% or less, cross cutting 4-10mm qtz-siderite-(pyr)-(sph)-(gal) vnlt 45-60° LCA up to 10/m; earlier qtz vnlt offset on min'd mfrac carb vnlt network v. fine in shale band at 61.3m, chl-marm vnlt below this; 2-3mm qtz-carb vnlt 0-5° LCA 50/m+ (61.5-62.5); more sph rel to po and chl in vnlt below 63m; possibly chloritized matrix of qzite.
- 66.36-66.68 Interbedded slst/shale, green-grey, bedding 65° LCA, facing uphole, well developed grading in coarse units, minor po in stringers 1-2% total S<sup>2-</sup>.
- 66.68-67.69 Qzite, minor shale with po-pyr-sph stringers, 0-80° LCA; thin late stage irreg carb vnlt 10-20° LCA, total S<sup>2-</sup> 2-5%.
- 67.69-69.25 Shale/slst minor qzite, bedding 60° LCA facing uphole; po-sph-chl-(gal) in network of vnlt, 15-60° LCA, thin carb vnlt parallel to bedding plane, 2-4% total S<sup>2-</sup>.
- 69.25-74.58 Interbedded qzite, shale, siltstone, well devel grading scour locally, facing uphole, bedding 35° LCA (71.0m), 50° (72m), 45° (74m), to 30/m wispy qtz vnlt in qzite  $\bar{c}$  indistinct margins 30° LCA barren or with later mfrac'd (?) sph-po 20/m po rich stringers in top 1.5m of interval falls off below this; mainly po-sph, minor pyr, trace galena. overall ~1% total S<sup>2-</sup>.
- 74.58-76.07 Qzite, grey, laced  $\bar{c}$  100/m qtz vnlt, these  $\bar{c}$  pyr-sph-po mineralization mostly 30-60° LCA; 1-2% total S<sup>2-</sup>, some thin qtz-carb vnlt 0° LCA in qzite but not shale bed, bedding 55° LCA, uphole facing.

- 76.07-77.96 Interbedded shale, qzte, slst, bedding 55° LCA at 77m 20cm qzæ bed 77.1-77.3m  $\bar{c}$  150/m qtz vnlt mostly 30° LCA but irreg network; po dominated vnlt network as above,  $\bar{c}$  sph.
- 77.96-81.4 Dark grey to black laminated shale and slst  $\bar{c}$  v. minor qzte; bedding 65° LCA (79.4m), 70° (80.4m), 60° (81.4m) all facings uphole; 5-15/m pyr+ po -sph stringers  $\bar{c}$  chl-carb?, mostly 50° LCA; 1-2% total  $S^{2-}$  rare thin carb vnlt; no qtz vnlt; py>po.
- 81.4-82.95 Alternating qzte and shale; bedding 50° LCA at 82m 85° LCA at 82.5m, 70° (84.2m), 70° (85.2m); all facings uphole, brecciated/sheared parallel to bedding last 0.5m of section; qtz vnlt to 50/m in qzte units only; 1-2% total  $S^{2-}$  all in stringers of pyr-po-sph,  $\bar{c}$  chl-carb some  $\bar{c}$  black envelopes (v. fine chl or tm?), qtz stringers 90° to bedding  $S^{2-}$  stringers 0-45° LCA or parallel to bedding.
- 82.95-95.30 Massive and fractured, mineralized qzte with minor shale beds (5-10cm at 0.5 to 1.5m spacing);  $S^{2-}$  in stringers to 1cm wide dom po-pyr-sph with chl gangue, magnetite-chl-sph vn at 87.9m chl-magnetite in vnlt; pyr-sph veinlet 88.2m  $\bar{c}$  large vugs; 89.0-90.4m po rich section locally 20% po in mass of anastomosing stringers, trace pyr, sph po:sph (5:1 to 10:1); qzte has chloritized matrix(?); late(?) 2mm carb vnlt parallel to bedding in shale band at 90.1m  $\bar{c}$  sph; scour and fill uphole facings, grading well devel locally bedding 75-90° LCA in general; vuggy coarse aggregate of pyr + po at 92.2m; most m po stringers  $\bar{c}$  in 15° LCA; original qzte texture locally obliterated by min'n; 5% total  $S^{2-}$ , range 2-20%; 1cm wide vuggy pyr-po vein\* at 94.3m 20° LCA, prominent qtz vnlt 5-15° LCA 94.8-95.3m 100/m  $\bar{c}$  po; cut by rare thin qtz-siderite vnlt  $\bar{c}$  sph 60° LCA (5/m); \* pyr  $\bar{c}$  reaction rims?
- 95.30-97.05 Mostly laminated shale/slst  $\bar{c}$  two qzte beds of 30cm each, bedding 55° LCA, facing uphole; overall ~10% po in network of vnlt to 1cm thick 30-45° LCA and parallel to bedding; trace gal-sph assoc'd  $\bar{c}$  po, minor pyrite in blebs ass'd  $\bar{c}$  po, some aggregates  $\bar{c}$  vuggy rims surrounded by po.
- 97.05-104.04 Qzte with minor slst/shale bands, bedding 30-40° LCA, facing uphole, flame structures - scour, grading; total 5%  $S^{2-}$  (?) range 1-20%; mostly po in stringers to 3cm thick; veins locally brecciated; sph rest most abundant to po; pyrite as rare aggregate 1-2cm across surrounded by vugs and po (may be marcasite?) eg 103.6m po stringer density up to 200/m 5-30° LCA, min 20/m; 5mm qtz-pinite-siderite vnlt  $\bar{c}$  po, sph (~98.6m) 15° LCA, sulphides could be superimposed; rare thin siderite-qtz vnlt (70° LCA, <1/m).
- 104.04-108.14 Laminated shale/slst and interbedded qzte; bedding 50-55° LCA; facing uphole; sheared - kink folds(?) 106m; 2-10% total  $S^{2-}$  as po in vnlt; v. irreg, 1mm-10mm, 5-45° LCA or parallel to bedding, trace sph, rare pyr blebs as above; 10cm  $S^{2-}$  bleb at 107.7m consists of coarsely xtaline marcasite aggregates in vugs surrounded by po.
- 108.14-110.50 Dark grey green fractured qzte,  $\bar{c}$  minor shale; apparent intense chloritz of matrix; 2-5% total  $S^{2-}$ , marc-po + magnetite vnlt  $\bar{c}$  sph as above; magnetite-chl+sph stringers becoming prominent 110-110.5m; locally 10%+ magnetite in pods  $\bar{c}$  sph-gal to 2cm across 10-20/m thin siderite vnlt 110-110.5m; irreg cp aggregates assoc'd  $\bar{c}$  magnetite 110.2m.

- 110.50-111.71 Mag rich lode 70-80% mag 5-10% sph minor galena and chalcopyrite; chloritic matrix 20 per metre thin carb vnlt 25-70° LCA 40 per metre 1-10mm wide chlorite/carbonate vnlt 60-70° LCA c̄ vugs; very fine network chlorite vnlt c̄ sph. Bx'd locally host fine quartzite c̄ chlorite-mag-sphalerite, minor chalop in matrix, galena and chal-cop in vnlt c̄ chlorite 50° LCA 10 per metre.
- 111.71-113.03 Laminated fine siltstone and qzite brecciated and minz'd c̄ locally 10% marc and minor po c̄ sph and gal in vnlt. Network numerous LSA 111.8m 2cm wide chlorite-carbonate? vein 25° LCA c̄ coarse pods sph gal and pyr trace cp locally 1cm offsets on bedding at 112.46m.
- 113.03-117.50 Interbedded fine qzite and black shales strongly fractured locally vx'd; 3-4% total sulphides mainly sph gal and marc rich patches sph locally throughout interval and chloritized host rocks throughout 40 per metre fine x-cutting carb vnlt mostly 60° LCA locally 5-10% mag; also qzite vnlt c̄ network fine chlorite vnlt.
- 117.50-119.19 Interbedded qzite light grey/green siltstone c̄ 2-3% S<sub>2</sub>- and vnlt mainly po minor pyr gal and sph. Traces fine black mineral in micro vnlt locally bedding 55° LCA facing uphole. S<sub>2</sub>- vnlt parallel bedding or predominantly 30° LCA perpend to bedding in qzite beds.
- 119.19-125.71 Massive qzite c̄ minor shale bands dark grey silicified? bedding 55° LCA facing uphole. Fractured upper .4m of interval c̄ 3-4% sph in vnlt c̄ chlorite minor po gal late carb vnlt as above; chloritized matrix. Remainder c̄ 40-40 per metre wispy 1-3mm quartz + chl, pin and siderite. 30° LCA. Offset on sulphide mfracs c̄ chlorite, sphalerite minor po and marcasite; 40 per metre S<sub>2</sub>- stringers 0-20° LCA. Some larger marc, po veinlets vuggy c̄ marc blebs rimmed by po to 1cm wide - e.g. 123.50-124.0m. Core here 20% sulphide c̄ numerous 200 per metre, irregular microfracs c̄ po/marc c̄ stringers fine black mineral have carb vnlt as above; chloritized matrix, mag free trace chalcopyrite locally, sulphide veins predom 0-5° LCA.
- 125.72-128.01 Interbedded shale slst and qzite fractured and bx'd c̄ po stringers bedding 65° LCA facing uphole range 1-4% S<sub>2</sub>- all in stringers v. irreg mostly po minor marcasite on pyr c̄ chl locally bedding offset to several cm on heated mfracs.
- 128.01-129.35 Med grained grey-green qzite total S<sub>2</sub>- less than 2% chl'zed matrix and chl in stringers, no mag to 20 per metres; fine siderite vnlt 45-60° LCA. Slickensides on chl/carbonate fracture at 129.1m c̄ gal sphalerite.
- 129.35-130.38 Interbedded black shale in qzite bedding 40° LCA locally offset on mfracs 1cm facing uphole, 3-5% po marc in vnlt; most <4mm; fine network 0-60° LCA to 2 per metre thin siderite vnlt as above chl stringers locally 45° LCA.
- 130/.38-136.37 Fractured mineralized qzite 5-30% sulphides in network stringers 0-45° LCA. Mostly 0-20° po rich section from 130.4-133.4m; c̄ marc or pyr stringers to 2cm across; marc nodules as above. Vnlt density 200 per metre + siderite + or - qzt 1-2mm vnlt mostly 45-60° LCA 15-20 per m; low sphalerite content chl'zed matrix.

- 136.37-137.79 Interbedded shale siltstone qzite strongly fractured and sheared. Direction of shear 0-10° LCA 5-15% po minor marc as above minor sphal assoc c̄ po stringers. Ch'izn assoc c̄ shearing. Some fluorite in frac? bedding orientation indeterminate.
- 137.79-141.40 Breccia po rich average 20% po but includes massive po (138.12m-138.45m); mostly consists ½ to 2cm qzite frags. angular to sub-rounded in po rich matrix. Locally some fine siltstone carbonaceous? replaced by po. Locally 5% + sph 1-2% gal; locally 40% sph. Overall po to sph 3:1.
- 141.40-142.42 Mag/chl rich breccia vein host rock texture obliterated. Locally 30% + sphalerite; 10 per metre fine siderite vein as above through going locally massive magnetite well exposed lower contact 5° LCA.
- 142.42-148.90 Fractured and sheared interbedded qzite and shale mostly qzite shale bands strongly sheared matrix chloritized silicified? network wispy qzt vnlt in qzite beds intensely broken on healed frac; locally 50-100 per metre chlorite-mag filled microfrac irreg pods of magnetite to 5%. Generally low sulphide minor po stockwork 144.4-144.9m in qzite traces chalcopryrite late stage thin brown carbonate vnlt as above. Dominant shear planes 5-45° LCA; 10cm mag-vein 148.2m c̄ 1-2% chalco intense chlor'zn 30° LCA; qzite/chlorite/siderite vein in sheared rock at 148.4m; minor tm? Trace galena in qzt/siderite vnlt. Trace sph.
- 148.90-154.15 Breccia mag/chlorite/sphalerite rich qzite sub-rounded frags; generally less ½cm in mag/chl rich matrix locally 90% mag. Patchy stringers galena and sphalerite locally 2% galena 5% sphalerite +; traces chalco pyr assoc c̄ mag some small vugs on chlorite-filled shears mostly 10-20° LCA. Some late x-cutting qzt/siderite vnlt c̄ marcossite 20-70° LCA generally 60-70; 10 per metre. Po rich patch 152.6-153.4 po in vein 10° LCA c̄ sphalerite and chalco locally 5% chalco plus marcossite Prominent shears 40° LCA at 153.2m c̄ bands sphalerite-po-chalco in chlorite rich matrix; 4cm wide mag rich vein 45° LCA at 153.55m. Overall high mag to sulphide ratio. Sphalerite >po.
- 154.15-156.05 Sheared and brecciated qzite and siltstone c̄ shale locally. No recognizable bedding shearing intense 5-20% po in stringer network. Shears predom 35° LCA. Trace to 1% chalco locally chl'zed matrix in qzite. Irreg qzt muscovite veinlets 5-20° LCA 155.6m c̄ patchy po and chalco. Fine grain muscovite rich selvages. Traces chalco no visible cassiterite. Also some chlorite in these veins. Minor sph. No mag detected.
- 156.05-160.57 Fractured and bx'd dominantly fine grained light green-grey siltstone and fine qzite poss calcareous. Bedding lightly disrupted dominant shears 10-45° LCA c̄ network of po stringers discontinuous <1 to 15mm multiple orientations. Overall 5%-10% po minor qzt chl' and chalco locally. Qtz-muscovite stringers, rare, as above c̄ dark grey envelopes c̄ po 5-20° LCA.
- 160.57-164.60 Fractured qzite c̄ minor interbedded shale strongly sheared and bx'd. Matrix locally intensely chloritized; qzite c̄ 100 per metre 1-2mm qzt vnlt; rare qzt chlorit muscovite vnlt 0° LCA pinch cut in shaley units. 3-20% po in stockwork as above; c̄ chlorite and minor chalco marcossite blebs to 2cm in vugs rimmed by po. Siderite coated frac rare 30° LCA chloritiz'n intense in last metre of interval. c̄ minor po and chalco mag not detected.

Irreg chlorite stringers abundant this zone - over 100 per metre.  
Pervasive chl'zn of frags in matrix.

- 164.6-169.8 Bx'd sheared qzte and shale intensely chlor'd mag rich breccia 168.2-169.6m; trace mag; remainder of interval predom shears 40° LCA 165.4 metres and chlorite carbonate? qtz sph + galena marcosite more abundant 166.1-167.7m; mostly as irreg pods or stringers assoc c̄ chlorite and po minor chalco. Marcosite to po 1:2. Irreg pods chlorite enclosing frags in shaley beds; 1cm qtz-siderite-chlorite vein at 165.6m 5-10° LCA c̄ minor galena. Qtz-siderite-marcosite veinlet 1cm at 166.3m 45° LCA cut§ chlorite rich vein some wispy qtz-muscovite vnlt§ as above. Increase sphalerite and chalco content in mag rich section. Intense chl'zn some core loss in mag rich section. Locally po and chalco infilling breccia matrix. Bright green chlorite? and carbonate on some fracture surfaces.
- 169.8-177.44 Fractured qzte and siltstone locally brecciated. Mostly qzte. Siltstone units bx'd 2-30% po overall 5% po in blebs and fine stringers <1mm to 10mm + patchy blebs chalco assoc c̄ po <1% chalco; qtzite silicified c̄ minor chlorite. Irreg qtz po vnlt§ offset on microfracs filled c̄ chlorite and po; most vnlt§ <45° LCA. Traces dissem fine \*black mineral. Tends to be more po in pale green siltstone beds as for 156.05-160.57.
- 177.44-181.11 Mostly bx'd green/grey siltstone c̄ grey qzte and some laminated black shale. Bedding 65° LCA at 181m offset on sulphide filled mfracs facing uphole. 5-10% po in irreg stringers as above 200 per metre irreg 1-2mm stringers. Mostly <45° LCA some 0° LCA wispy qtz veins in qzte beds only mostly c̄ bx'd contacts; minor marcosite surrounded by po as above blebs and fine ntwk v. fine chl/tourmaline in siltstone units. 0-30° LCA. Hairlike stringers on 1-2cm breccia veins c̄ po. Minor to trace chalco/sphalerite. Generally lower S<sub>2</sub>- than above interval.
- 181.11-184.20 Qzte with minor interbedded, brecciated green-grey slst; facing uphole bedding approx 70-80° LCA, dislocated; 10/m 2-4mm qtz-po vnlt§ c̄ pinite? or chlorite (5/m?) 20-40° LCA; ~5% po in stringers and blebs, <1 to 3mm c̄ minor ep; predom 40° LCA 100/m irreg discont; chl in matrix and stringers c̄ po;
- 184.20-185.03 Laminated green grey shale and slst; bedding 80° LCA; facing uphole; 3-5% po in stringers to 100/m, <1 to 3mm; c̄ trace ep, minor marcosite; mostly as pods along curved fracs 0-20° LCA; with chlorite gangue.
- 185.03-189.95 Qzte c̄ interbedded and locally brecciated shale bands as above; bedding 75° LCA at 189.2m facing uphole; min'n essentially as above; wispy qtz vnlt§ c̄ minor po in qtz cut by po + ep vnlt§ 0-25° LCA to 8mm; discont; early set of po vnlt§ offset on partly po filled mfracs; 10-15mm pyr-(qtz)-(chl) veinlet at 187.3m 15° LCA assoc'd c̄ sheared shale 10cm pod of red massive po at 188.4m with po in breccia stock-work. 5-10% 188.4-187.8m.
- 189.95-194.50 Interbedded black shale, green grey slst and graded qzte; bedding 75° LCA (190.4m); 75° LCA (191.6m); 60° LCA (194.4m); all facings uphole; mineralization variable - overall 3-4% po, in stringers, locally 10-15% po (eg 191.9-192.3m in qzte) 2-4mm frac'd qtz vnlt§ 60° LCA gen, to 20/m+; po vnlt§ to 150/m to 10mm wide (gen 1-3mm) most 30-60° LCA; minor ep in stringers c̄ po; chl-(carb?) coats fracs locally; most S<sub>2</sub>- in lower part of interval.

- 194.50-198.67 Dark grey-green qzite  $\bar{c}$  brecciated shale/slst units; to 40/m 1-12mm qtz vnltls, offset on fracs; predom 30-40° LCA = minor pyr+po, chloritic selvadges; 2-5% po in vnlt stockwork as above; po free 194.7-195.5 and 196.5-198.0m with 20-40/m 1-3mm discon, magnetite stringers  $\bar{c}$  assoc'd chlorite, - these cut qtz vnltls; trace cp assoc'd  $\bar{c}$  po; 5/m thin siderite vnltls 45-70° LCA, v. minor po-pyr assoc'd  $\bar{c}$  magnetite stringers; 5-30° LCA offset on chlorite filled fracs.
- 198.67-204.25 Dark grey qzite, with minor brecciated slst trace po, chlorite vnltls 20-50° LCA, 1-2mm, 15-20/m, locally 100/m in stockwork; qtz-po vnltls cut by former 0-30° LCA (<40/m), blackened haloes about vnltls in brecciated slst 202.4m with qtz-carb? m vnlt stockwork; no magnetite detected; minor total  $S^{2-}$  1-2%; chloritized qzite matrix.
- 204.25-205.30 Interbedded grey green slst and black shale; bedding 50° LCA; facing uphole; 1% po overall in vnltls parallel or 90° to bedding; 1-3mm  $\bar{c}$  minor qtz; vnlt density 2-5/m.
- 205.30-212.0 Interbedded qzite (graded); slst and shale; bedding 60° LCA (206.4m); 60° (210.2m); 45° (211.4m) facings uphole - flame structures; grading; 5-10/m 1-3mm qtz vnltls  $\bar{c}$  indistinct margins in qzite, 1-2% po in 5-10/m stringers  $\bar{c}$  qtz and trace cp locally; some po vnltls parallel to bedding in shaly units, low total  $S^{2-}$ , low vnlt density, no extensive alteration; core wedging on smooth (chlorite?) fracs; 45° LCA; 30 and 20° LCA - 3 sets at 212m -  $\bar{c}$   $S^{2-}$  slickensides.

Termination of drilling 212.0m.