

Binocular Microscope Descriptions of Broken Hand Specimens of a Suite of Rocks from the Sue-Dianne IOCG Deposit Area, NWT for Isabelle McMartin, GSC, by Stuart Averill, July 16-26, 2009

- 09-CQA-1010A MONZOGRAHITE. Pale grey-pink, massive, porphyritic, weakly magnetic, unaltered and unmineralized rock consisting of 30% large (10-15 mm), perthitic K-spar phenocrysts in a coarse-grained (1-5 mm) groundmass of perthitic (dominant) + plagioclase (SEM = albite) feldspar, 10% quartz, 10-15% biotite with trace fine-grained (0.1-0.2 mm) magnetite inclusions, and trace titanite.
- 09-CQA-1014C MONZONITE. Red-stained, massive but extensively microfractured and locally mylonitized, porphyritic, weakly altered but unmineralized, nonmagnetic rock consisting of 20% large (10-15 mm), perthitic K-spar phenocrysts in a coarse-grained (1-5 mm) groundmass of mixed perthite and plagioclase feldspar, 3% quartz, 15-20% chlorite (after biotite), trace titanite (mostly altered to leucoxene) and trace fracture-hosted pyrite.
- 09-CQA-1011A4 MONZONITE. Red-stained, massive, porphyritic, unaltered and unmineralized, moderately magnetic rock consisting of 15% large (10-15 mm), perthitic K-spar phenocrysts in a coarse-grained (1-3 mm) groundmass of mixed perthite and plagioclase feldspar, 1% quartz and 10% biotite with 0.3% fine-grained (0.1-0.2 mm) magnetite inclusions and 0.2% titanite as 0.5-1.0 mm crystal wedges.
- MOB2009-15 DACITE. Red-stained, massive but extensively fractured with local mylonitic seams, porphyritic, weakly altered but unmineralized, nonmagnetic lava flow consisting of abundant (15%), medium-sized, (1-2 mm), aligned (flow-foliated) feldspar (SEM = 3:1 oligoclase versus K-spar) and sparse (1%), similar-sized quartz phenocrysts in a near-aphanitic (0.05 mm), quartzofeldspathic groundmass with only 2% visible chlorite. Fractures are of three generations: 1) early, probably flow-related, irregular to pervasive microfractures rotated into the foliation plane with fine-grained (0.1-0.2 mm) chlorite-epidote alteration concentrated in patches (5-10% of rock) at fracture intersections; 2) foliation-crosscutting seams of mylonitic microbreccia (2% of rock) up to 2 mm wide with aphanitic epidote alteration; and 3) rare (<1%), straighter, fractures lined with specular to earthy red hematite and black biotite.
- 09-CQA-1012A4 FELSITE + QUARTZ-FELDSPAR PORPHYRY. Sample is heterolithic, strongly fractured to mylonitized, and red-stained throughout, precluding a detailed lithologic description. Main phases are aphyric aplite and quartz-feldspar porphyry, suggesting a zoned dyke on several cross-cutting dyklets. Aplite is uniformly fine-grained (0.1 mm) and leucocratic (<1% chlorite). Porphyry appears similar to that in other, monolithic specimens except feldspar (10%) and quartz (1%) phenocrysts are smaller (0.5-1 versus 1-3 mm). Groundmass is fine-grained (0.1-0.2 mm), quartzofeldspathic (3% visible chlorite), and dusted with 1% hematite. Fractures are concentrated in porphyry phase and are of two types: 1) early, pervasive, infilled with black, Fe-rich biotite + dark green chlorite (1-2% of sample), grading into silicified shears; and 2) later, cross-cutting epidote-altered mylonite seams.

- 09-CQA-1012B4 SILTSTONE/GREYWACKE. Dark grey, graded-bedded, well-foliated, clastic but metamorphically recrystallized, weakly magnetic sediment. Graded beds are 5-10 mm thick. Basal part of beds consists of up to 30% feldspar (mainly) + quartz of fine sand-size (0.1-0.3 mm) in a matrix of recrystallized quartzofeldspathic silt (0.05 mm) with 25% biotite as coarser, 0.1-0.3 mm flakes and 1% magnetite. Middle and upper parts of beds consist entirely of similarly recrystallized silt with no sand grains. Trace fracture-hosted pyrite. Local 1-2 mm thick, bedding-parallel zones contain up to 20% calcite + chlorite (SEM confirmed; <1% of sample overall) as 0.3-1 mm blue-green spots; these occur in close association with 5 mm thick chert beds containing up to 5% magnetite.
- 09-CQA-0003A4 QUARTZ FELDSPAR PORPHYRY. Grey-pink, weakly foliated, glomerophytic, strongly altered but unmineralized, strongly magnetic, taxitic (varitextured) breccia consisting of 60% chaotically distributed, 5-15 mm leucocratic patches of irregular outline in a finer-grained mesocratic matrix. Leucocratic patches consist of 60% subhedral, agglomerated, sodic plagioclase (SEM = anorthoclase or antiperthite) and 3% quartz phenocrysts of 0.5-3 mm size set in a red-stained, aphanitic, quartzofeldspathic (SEM = 30% quartz, 60% K-spar and 10% albite) groundmass. Mesocratic matrix is more equigranular (0.4-0.7 mm) and consists of highly altered plagioclase, 20% chlorite, 0-50% epidote (average 5%), 1% dolomite and 10% magnetite. Also present are 1% epidotized mylonite seams up to 5 mm wide.
- 09-CQA-0003D4 QUARTZ-FELDSPAR PORPHYRY. Red stained, weakly foliated, glomerophytic, strongly altered but unmineralized, nonmagnetic, taxitic breccia varying chaotically from leucocratic to mesocratic in 5-15 mm patches of irregular outline. Leucocratic patches dominate (60%) and consists of 30 to 90% disseminated to agglomerated, 1-2 mm phenocrysts in an aphanitic, quartzofeldspathic groundmass with <5% chlorite. Phenocrysts are 90% feldspar (highly altered, mainly plagioclase) and 10% quartz. Mesocratic patches have <20% of the same aphanitic groundmass, smaller phenocrysts (0.5-0.8 mm) and contain 30% chlorite and 10% leucoxene. The leucoxene probably represents former ilmenite as it is extensively intergrown with specular hematite. 3% anastomosing, 1-2 mm wide, epidote-lined mylonite seams.
- MOB2009-17 QUARTZ-FELDSPAR-CHLORITE PORPHYRY. Red-stained, massive, slightly glomerophytic, negligibly altered (chloritic) and unmineralized, very weakly magnetic rock consisting of 10-50%, disseminated to weakly agglomerated, varizised (0.5-3 mm) phenocrysts in an aphanitic groundmass containing <5% chlorite and 0.1% magnetite. Average phenocryst content is 1% quartz, 15% cloudy white plagioclase, 3% fresh K-spar and 8% chlorite.
- 09-CQA-1015A4 QUARTZ-FELDSPAR PORPHYRY. Pale grey-pink, unweathered, massive but weakly fractured, sparsely porphyritic, unmineralized and essentially unaltered, very weakly magnetic rock consisting of 5% fresh feldspar (includes both visibly perthitic K-spar and albite-twinned plagioclase) and 0.5% quartz as 1-2 mm phenocrysts in an aphanitic, quartzofeldspathic groundmass with 3% disseminated ilmenite, 5% chlorite and trace magnetite as slightly coarser (0.1-0.5 mm) grains. Ilmenite is partly altered to leucoxene and locally replaced by specular hematite. 0.5% epidote-lined fractures.

- MOB2009-25 QUARTZ-FELDSPAR PORPHYRY. Deeply red-stained, unfoliated but pervasively microbrecciated at 1 to 5 mm scale, distinctly porphyritic, strongly altered but unmineralized, locally (where most brecciated) very weakly magnetic rock consisting of 20% large (2-3 mm) feldspar (includes visibly perthitic K-spar, especially the largest crystals, and albite-twinned plagioclase) and <1% smaller (1-2 mm) quartz phenocrysts in a near-aphanitic (0.05-0.1 mm), quartzofeldspathic groundmass containing 3-5% finely disseminated specular hematite (no surviving chlorite) and 0.5% coarser ilmenite crystals which have been completely replaced by finer-grained leucoxene + specular hematite. Breccia is cemented by dark green-black Fe-chlorite + Fe-biotite (SEM confirmed; 3% of sample), minor specular hematite and trace magnetite.
- 09-CQA-0007A4 QUARTZ-FELDSPAR-CHLORITE PORPHYRY. Pale grey, unweathered, massive but extensively fractured, porphyritic, unmineralized and essentially unaltered, nonmagnetic rock consisting of varisized (0.5-2.5 mm) phenocrysts of feldspar (25%; includes both visibly perthitic K-spar and albite-twinned plagioclase), quartz (<1%) and chlorite (5%) in a grey, aphanitic, quartzofeldspathic groundmass containing negligible chlorite and no FeTi-oxides. 1-2% epidote-lined hairline fractures.
- 09-CQA-0008A3 FELSITE. Red-stained, massive, weakly microporphyritic, weakly altered and unmineralized, very weakly magnetic rock consisting of 1% small (0.5-1.5 mm), visibly perthitic K-spar phenocrysts in an aphanitic, quartzofeldspathic groundmass containing negligible chlorite and 2% finely disseminated magnetite (SEM confirmed).
- 09-CQA-0004A ANDESITE. Pale grey-brown, unweathered, massive, hackly fractured, slightly porphyritic, unaltered and unmineralized, nonmagnetic lava flow consisting of 3% small (1-2 mm), euhedral feldspar (no quartz) phenocrysts, and 1% each of smaller (0.3-0.5 mm) chlorite and ilmenite (mostly altered to leucoxene) microphenocrysts in an extremely aphanitic, quartzofeldspathic groundmass (too fine-grained to resolve any chlorite) containing rare (<1%) small (1-3 mm) autoliths of a slightly coarser (0.1 mm) grain size with 10% visible chlorite.
- 09-CQA-0005A4 DACITE (IGNIMBRITE). Medium-grey, unweathered, strongly foliated, unaltered and unmineralized, welded, crystal and fiamme-rich, very weakly magnetic, volcanoclastic rock consisting of: a) 25% large (5-25 mm), dark grey, glassy, flattened fiamme containing 20% epidote-filled vesicles; and b) 10% medium-sized (1-2 mm) feldspar phenocrysts in c) a matrix containing 20% similar but smaller (1-3 mm fiamme), 10% plagioclase and rare quartz crystals of 1-2 mm size, 2% chlorite as visible 0.5-1 mm flakes, 0.1% ilmenite (partly altered to leucoxene) and trace magnetite, all welded by aphanitic buff glass.
- 09-CQA-0006A4 DACITE. Buff-brown, slightly weathered, massive, strongly porphyritic, hackly fractured, unaltered and unmineralized, nonmagnetic lava flow consisting of 25% varisized (0.5-2 mm) feldspar, 3% quartz and 2% chlorite phenocrysts in a buff-coloured, aphanitic groundmass with no FeTi-oxides. Also present are 3% small (mostly 0.5-2 mm, rarely 5 mm) vesicles infilled with a graphic-textured mixture of quartz+ pink K-spar (SEM confirmed) + dolomite (SEM confirmed) with biotitic rims, a mineral assemblage suggestive of recrystallized zeolites.

- MOB2009-39 ANDESITE. Red-stained, strongly foliated, weakly microporphyritic, moderately altered but unmineralized, weakly magnetic lava flow consisting of 1% small (0.5-1 mm) feldspar (no quartz) phenocrysts in a near-aphanitic (0.05 mm), quartzofeldspathic (<5% visible chlorite) groundmass with 10% grey-green streaks containing more (15%) pale-green chlorite and 1-2% ilmenite (altered to leucoxene). "Primary" chlorite and especially ilmenite have been partially replaced by 2% specular hematite (dominant) + magnetite and locally by dark green Fe-chlorite.
- 09-CQA-1007A4 QUARTZ-FELDSPAR-CHLORITE PORPHYRY. Deeply red-stained, moderately foliated, porphyritic, strongly brecciated, stockwork-veined and altered but unmineralized, nonmagnetic rock consisting of medium-sized (1-2 mm) quartz (3%), feldspar (10%) and chlorite (10%; includes aggregates of smaller flakes as well as some large flakes) phenocrysts and 1% leucoxene grains (altered ilmenite; closely associated with chlorite) in a near-aphanitic (0.05 mm), quartzofeldspathic groundmass. Both chlorite and the Fe component of ilmenite were variably replaced by specular to earthy red hematite (2%) prior to brecciation. Breccia cement (25% of sample) consists subequally of barren quartz and epidote.
- 09-CQA-1006D4 QUARTZ-FELDSPAR-CHLORITE PORPHYRY. Deeply red-stained, moderately foliated with attendant, foliation-parallel brecciation and younger cross-cutting fracturing, porphyritic, strongly altered but unmineralized, strongly magnetic rock consisting of varisized (0.5-2 mm) feldspar (15%), quartz (2%) and chlorite (10%) phenocrysts (chlorite includes aggregates of small flakes as well as some larger flakes) and 1-2% leucoxene (altered ilmenite) in an aphanitic quartzofeldspathic groundmass. Chlorite and ilmenite are partly to wholly replaced by and early breccia is cemented by magnetite (average 5% of sample). Late fractures are infilled by epidote (2-3% of sample) plus barren quartz; epidote also locally replaces feldspar phenocrysts.
- 09-CQA-1006A4 QUARTZ-FELDSPAR-APATITE PORPHYRY. Deeply red-stained, weakly foliated, extensively shatter-fractured to semi-brecciated, locally mylonitized, porphyritic, moderately altered but unmineralized, nonmagnetic rock consisting of medium-sized (1-2 mm) feldspar (15%) and quartz (3%) phenocrysts and smaller (0.5-1 mm) apatite grains (5%, SEM-confirmed) in a near-aphanitic (0.05 mm), quartzofeldspathic groundmass with negligible chlorite. Apatite is complexly intergrown with albite; it visually resembles leucoxene but is not accompanied by Fe-bearing minerals like leucoxene-altered ilmenite. Fractures are lined with dark green-black Fe-biotite (SEM confirmed) + quartz. Fractured rock is crosscut by a younger, unaltered, mylonitic crush zone >2 cm wide.
- 09-CQA-1009B5 ANDESITE. Deeply red-stained, unfoliated but highly fractured to brecciated, weakly porphyritic, strongly altered and weakly mineralized but otherwise texturally intact, very strongly magnetic lava flow consisting of, sparse, small (0.3-0.5 mm) microphenocrysts of feldspar (3%) and leucoxene (3%; closely associated with magnetite indicating an ilmenite precursor) and negligible chlorite (almost completely replaced by magnetite) in an aphanitic, quartzofeldspathic groundmass. Alteration and associated mineralization occur as: 1) broad disseminations (replacing primary chlorite and ilmenite); 2) fracture-

hosted thin (<1 mm) veinlets; and 3) patchy breccia cement. Alteration minerals include magnetite (7-10%), epidote (5%) and black Fe-biotite/chlorite (1%; mainly in veinlet phase). Mineralization is essentially restricted to chalcopyrite (0.5%; variably altered to malachite by recent weathering); pyrite is negligible, reflecting highly oxidizing, S-deficient (low-sulphidization) environment. Epidote is directly associated with magnetite and chalcopyrite, not restricted to younger veins and mylonite zones as in altered but unmineralized samples.

- 09-CQA-1008B4 QUARTZ-FELDSPAR PORPHYRY. Deeply red-stained, massive but extensively crush-fractured/brecciated and foliated, strongly porphyritic, strongly altered but unmineralized, nonmagnetic rock consisting of abundant, medium to large (1-3 mm) feldspar (15%; probably mostly K-spar; no visible albite twinning) and quartz (5%) phenocrysts in an inequigranular (0.1-0.5 mm), quartzofeldspathic groundmass with 1% leucoxene and no chlorite. Brecciation and alteration are of two types; 1) early with attendant foliation, including 0.5% foliation-parallel black biotite veinlets and 3-5% specular hematite occurring as 1-2 mm foliated disseminations that have probably replaced former chlorite phenocrysts; and 2) later, cross-cutting, calcite-cemented (5% of sample) zones.
- 09-CQA-1008A4 QUARTZ-FELDSPAR-CHLORITE PORPHYRY. Deeply red-stained, moderately foliated and weakly micro-fractured, strongly porphyritic, moderately altered but unmineralized, nonmagnetic rock consisting of abundant, varisized (0.5-3 mm) feldspar (25%, often fractured), quartz (5%) and chlorite (2%; often with significant intermixed leucoxene) phenocrysts in a similarly inequigranular (0.05-0.3 mm), quartzofeldspathic groundmass with 1% leucoxene. Alteration consists of 2% specular hematite occurring both as fine disseminations in groundmass and in micro-fractures.
- 09-CQA-1024A4 ANDESITE. Deeply red-stained, massive, sparsely microporphyritic, strongly brecciated, altered and stockwork-veined but unmineralized, nonmagnetic lava flow consisting of sparse (2%), small (mostly 0.3-0.5 mm; maximum 1 mm), lath-shaped feldspar (no quartz) microphenocrysts in an aphanitic, quartzofeldspathic, chlorite-free groundmass spotted with 0.5% leucoxene. Fracturing/alteration is of two successive types: 1) incipient, early-stage microfracturing accompanied by pervasive dusting of the groundmass by specular hematite (3%; probably replacing former chlorite) and formation of rare veinlets of dark green Fe-chlorite; and 2) pervasive brecciation at 1-5 mm scale and cementing of the breccia by barren quartz (20% of sample).
- 09-CQA-1027A4 ANDESITE. Deeply red-stained, massive, sparsely microporphyritic, strongly altered and stockwork-veined but unmineralized, very weakly magnetic lava flow consisting of sparse (2%), small (mostly 0.3-0.5 mm; still intact despite extreme alteration) feldspar (no quartz) microphenocrysts in an aphanitic, quartzofeldspathic, chlorite-free groundmass spotted with 0.2% leucoxene (primary features are almost identical to those of Sample 09-CQA-1024A4). Fracturing/alteration is of two successive types: 1) pervasive brecciation at 1-10 mm scale accompanied by dusting of breccia fragments by finely disseminated hematite and cementing of breccia matrix by coarser-grained hematite (20% hematite overall + trace magnetite); and 2) narrow (0.5-2 mm), often anastomosing, cross-cutting, epidote-filled (2% of sample) veinlets and vein-breccia zones.

09-CQA-1025A3 QUARTZ-FELDSPAR PORPHYRY. Patchily red-stained to green, porphyritic, massive but strongly fractured, dislocated and altered (although unmineralized), nonmagnetic, matrix-supported breccia. Relict porphyry fragments (40% of sample) are 5-20 mm across and consist of large (1-5 mm) feldspar (20%; often fractured) and quartz (<1%) phenocrysts in a fine-grained (0.1-0.2 mm), quartzofeldspathic (negligible chlorite, 1% leucoxene) groundmass dusted with 1% specular hematite. Breccia matrix (60% of sample) consists of crushed, medium-grained (0.3-1 mm) quartz, feldspar and leucoxene (3%) grains cemented by dark green to black Fe-chlorite/biotite (20%) and specular hematite (5%). Breccia is cross-cut by 3% barren, epidotized mylonite seams.

09-CQA-1026A3 MYLONITIC HYDROTHERMAL BRECCIA. Black, red-streaked, strongly tectonized, foliated and altered but unmineralized, strongly magnetic rock consisting of 20% small (mostly 0.2-2 mm, rarely 10 mm), red-stained, negligibly feldspar-phyric (probably andesitic), semi-aphanitic (0.05 mm), quartzofeldspathic, tectonically aligned fragments in a dark grey to black, semi-aphanitic matrix consisting subequally of mylonitized rock of the above composition and secondary specular hematite (~40% overall) + magnetite.

Binocular Microscope Description of Broken Hand Specimens of a Suite of Rocks from the
Great Bear Magmatic Zone, NWT (Including the Sue-Dianne and NICO Deposits)
for Isabelle McMartin, GSC, September-October, 2009 by S.A. Averill

QUARTZ BLANK

- 09-CQA-1012B3 SILTSTONE. Medium grey-brown, strongly foliated, very weakly magnetic, unaltered and unmineralized, clastic metasediment consisting of 80% recrystallized silt-sized (0.05-0.1 mm) feldspar (mainly) + quartz, 20% biotite and trace magnetite.
- MOB2009-148 SILTSTONE. Slate grey, nonmagnetic, porphyroblastic, crenulated, schistose, clastic metasediment consisting of very fine-grained (<0.05 mm), recrystallized, undifferentiable quartz-feldspar (70%) and slightly coarser-grained (0.1-0.2 mm) biotite (30%) with 2% coarser grey quartz (SEM confirmed) as 1-2 mm augen porphyroblasts and 0.1% pyrite as foliation-parallel wisps.
- MOB2009-151 GREYWACKE. Medium grey, nonmagnetic, weakly foliated to semi-gneissic clastic metasediment consisting of completely recrystallized, medium-grained (0.3-1 mm) quartz (20%), feldspar (50%), biotite (25%) and hornblende (5%) with trace finer-grained ilmenite and pyrite.
- 09-CQA-1170E5 IRON FORMATION. Mottled brown and metallic black, massive, very strongly magnetic, unaltered and unmineralized, oxide-silicate facies chemical metasediment consisting of fine-grained (0.1-0.2 mm) to mostly coarsely recrystallized (0.5-1.5 mm) magnetite (50%), quartz (chert; 30%), plagioclase (20%) and Fe-chlorite (3%; SEM-confirmed).
- 09-CQA-1170D3 IRON FORMATION. Metallic black, massive to weakly foliated, very strongly magnetic, unaltered, faintly bedded, oxide-sulphide facies chemical metasediment consisting of mostly fine-grained (0.05-0.1 mm) to locally coarsely recrystallized (0.5-2 mm) magnetite (80%), quartz (chert; 10%), plagioclase (5%) and pyrite (2%; occurs as wispy beds/stringers).
- 09-CQA-1173B4 IRON FORMATION. Metallic black, massive, very strongly magnetic, unaltered, oxide-sulphide facies chemical metasediment consisting of >99% fine grained (0.05 mm) to coarsely recrystallized (0.5 mm) magnetite with 0.2% disseminated to fracture-hosted pyrite and 1% biotite.
- MOB2009-12b CLINOPYROXENITE. Dark green-black, massive, moderately magnetic, ultramafic intrusive rock consisting of coarse-grained (1-3 mm) pervasively urilitized and partly chloritized augite (90%) and saussuritized plagioclase (10%) with 1% finely disseminated magnetite, 0.1% interstitial pyrrhotite and trace chalcopyrite.

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- MOB2009-140 PORPHYRITIC MONZONITE. Pink, massive, weakly magnetic, essentially unaltered, porphyritic intrusive rock consisting of 10% large (10-15 mm), anhedral, fresh, perthitic K-spar (SEM confirmed) phenocrysts in a medium to coarse grained, inequigranular (1-5 mm), essentially quartz-free (<5%) groundmass consisting subequally of subhedral saussuritized white plagioclase (SEM = albite + sericite) and near-colourless, anhedral, perthitic K-spar (SEM confirmed) crystals with 8% chlorite, 0.5% epidote, 0.2% interstitial magnetite and trace chalcopyrite.
- 09-CQA-1045E4 SKARNIFIED PORPHYRITIC SYENITE. Mottled green and brick red, brecciated and altered, weakly magnetic, distinctly porphyritic intrusive rock consisting of 5% large (5-10 mm) albite (SEM-confirmed) phenocrysts in a medium-grained (1-2 mm), hematite-stained groundmass composed almost entirely of feldspar (SEM = 100% albite) with negligible quartz or primary mafic minerals. Porphyry is hydrobrecciated (not sheared) and extensively replaced (50%) by irregular 0.5-2.0 mm, green patches consisting of finer-grained (0.3-0.5 mm) hedenbergite (80%; SEM confirmed), titanite (20%) and magnetite (1%).
- 09-CQA-1045C8 SKARNIFIED SYENITE. Pink, brecciated and altered, nonmagnetic, equigranular intrusive rock consisting essentially of medium-grained feldspar (mostly albite-twinned) with negligible quartz or mafic minerals. Syenite is hydrobrecciated (not sheared) and locally replaced (5%) by irregular, 0.5-5 mm patches of epidote and more extensively (15%) by later (cross-cutting), smaller (0.5-2 mm) patches of actinolite (SEM confirmed; not ferroactinolite) + 1% titanite. Still younger, hairline fractures are filled with 3% calcite.
- 09-CQA-0037A3 BASALT. Dark green (but extensively yellow-ochre limonite and black Mn-stained), massive but extensively brittle-fractured/brecciated, nonmagnetic, unquenched volcanic consisting subequally of fine-grained (0.1-0.15 mm), interlocking actinolite (variably chlorite) and saussuritized plagioclase with 1% finely disseminated ilmenite. Contains 15% breccia cement consisting of pyrite (10%) and dark green (Fe-rich) chlorite (5%).
- MOB2009-88 BRECCIATED QUARTZ PORPHYRY. Mottled orange-brown and dark grey, nonmagnetic breccia consisting of 40% small (1-5 mm) quartz porphyry fragments (orange-brown phase) cemented by a secondary hydrothermal matrix (grey phase). Porphyry consists of 1-2% medium-sized (1-2 mm) quartz phenocrysts in a finer-grained (0.3-0.5 mm) groundmass of orange-stained feldspar, 10-20% quartz and 5% biotite. Some breccia fragments consist of single quartz phenocrysts. Small feldspar phenocrysts may also be present but indiscernible due to the small size of the porphyry fragments and pervasive orange staining of these fragments. Breccia cement consists of finer-grained (0.1-0.2 mm) grey silica, 30% chlorite (variably biotite), and 1-2% disseminated pyrite. Also present are 2% narrow (1-2 mm), younger (cross-cutting), stockwork-type quartz veinlets. Geiger counter test indicates minimal radioactivity.

Binocular Microscope Descriptions of Broken Hand Specimens of a Suite of Rocks from the Great Bear Magmatic Zone, NWT, for Isabelle McMartin, GSC, April-May 2011

- 10CQA1585F3 HYDROTHERMAL BRECCIA. Dark grey-red (hematite-stained), strongly magnetic, hard, aphanitic, leucocratic feldspathic or quartzofeldspathic (probably trachytic) volcanic rock pervasively brecciated at 0.2-2 cm scale and cemented to veined with 30% fine-grained (<0.05-0.1 mm) magnetite (variably hematitized) and trace dark brown tourmaline.
- 10CQA1593 PORPHYRITIC TRACHYTE. Dark grey, moderately magnetic, strongly porphyritic volcanic rock consisting of 30% flow-aligned, varisized (0.3-1.5 mm) euhedral plagioclase phenocrysts in a semi-aphanitic feldspathic or quartzofeldspathic groundmass containing 20% biotite and 2% magnetite with 0.1% coarser-grained (0.5-1 mm) tourmaline and trace pyrite and chalcopyrite.
- 10CQA2005B1 PORPHYRITIC TRACHYTE. Dark grey, strongly magnetic, moderately fractured, vaguely porphyritic volcanic rock consisting of 20% varisized (0.3-1 mm), hazy (metasomatized) feldspar phenocrysts in a semi-aphanitic, feldspathic or quartzofeldspathic groundmass containing 20% biotite (variably chlorite) and 10% magnetite. Fractures are 2-20 mm apart, 0.5-2 mm wide and infilled with aphanitic quartz-feldspar and coarser-grained (0.3-1 mm) pyrite (2% of sample) and chalcopyrite (0.1%).
- 10CQA2006B1 TRACHYTE. Dark grey, strongly magnetic, fractured, hard, variably aphyric to porphyritic volcanic rock consisting of 0 to 10% feldspar phenocrysts of 0.5-3 mm size in an aphanitic feldspathic (SEM = alkali feldspar with K>Na, probably anorthite or perthite; no quartz) groundmass containing ~10-20% biotite (SEM = K-rich celadonite) and 10% magnetite. Fractures constitute 10% of sample, are 1-5 mm wide and are infilled with aphanitic alkali feldspar (SEM = anorthite or perthite).
- 10CQA2006B3 PORPHYRITIC TRACHYTE. Dark grey, moderately magnetic, weakly fractured, strongly porphyritic volcanic rock consisting of 2% euhedral hornblende and 10% euhedral plagioclase phenocrysts of 0.5-2 mm size in a semi-aphanitic feldspathic or quartzofeldspathic groundmass containing 10% hornblende and 5% biotite. Fractures constitute 2% of sample, are 1-5 mm wide and are lined with aphanitic feldspar + quartz.
- 10CQA2013B1 HYDROTHERMAL VEIN. Dark green, massive, strongly magnetic, pegmatitic rock consisting of very coarse-grained (1-2 cm) ferroactinolite (SEM confirmed) with 2-10% (variable; average 3%) magnetite inclusions and <5% quartz patches locally mineralized with trace chalcopyrite.

- 10CQA2013B2 **PORPHYRITIC TRACHYTE.** Hematite-stained red-pink, variably weakly to strongly magnetic, weakly fractured, strongly porphyritic volcanic rock consisting of 10% euhedral, distinctly flow-aligned, 0.5-2 mm alkali feldspar phenocrysts (SEM = anorthoclase) and <1% similar-sized green hornblende phenocrysts in a uniformly very fine-grained (0.05-0.15 mm), leucocratic, feldspathic groundmass (SEM = 90% K-spar, 10% plagioclase, no quartz) containing <1% each of hornblende and magnetite except patches representing ~20% of groundmass contains 10% magnetite accounting for variable magnetism. Fractures constitute 2% of sample, are 1-5 mm wide and are infilled with coarse-grained (0.5-2 mm) green hornblende and 2% magnetite with trace titanite, pyrite and chalcopyrite.
- 10CQA2014B1 **GRANITE.** Pink to brick red (hematite-stained), massive, nonmagnetic, very coarse-grained (3-8 mm) granitoid rock consisting of 30% quartz 65% euhedral, distinctly perthitic (string type) alkali feldspar, 3% biotite (variably chlorite), low trace pyrite and no Fe-Ti oxides.
- 10CQA2017B1 **PORPHYRITIC TRACHYTE.** Dark grey, very weakly magnetic, strongly porphyritic, flow-foliated, pervasively fractured and locally crushed volcanic rock consisting of 25% varisized (0.3-2 mm; locally crushed to <0.3 mm) euhedral, flow-oriented K-spar (SEM confirmed) phenocrysts and 5% biotite phenocrysts in a leucocratic, feldspathic or quartzofeldspathic groundmass containing 1% finely disseminated pyrite and 0.2% biotite-associated magnetite.
- 10CQA2018B1 **PORPHYRITIC TRACHYTE.** Brick red (weakly hematite stained), weakly magnetic, massive, strongly porphyritic volcanic rock consisting of 20% euhedral, saussuritized 0.5-3 mm plagioclase (SEM confirmed) phenocrysts and 5% similar-sized hornblende phenocrysts in a fine-grained (0.15-0.25 mm) groundmass of 10% quartz (SEM confirmed), 10% white, saussuritized plagioclase, 80% visibly perthitic alkali feldspar (SEM confirmed) and 2% biotite. Magnetism is due to 10-25% magnetite inclusions in hornblende phenocrysts (~1% magnetite overall).
- 10CQA2020B1 **PORPHYRITIC TRACHYTE.** Brick red (weakly hematite-stained), moderately magnetic, weakly porphyritic, moderately but pervasively fractured volcanic rock consisting of 5% euhedral, lath-shaped, distinctly flow-foliated, 1-3 mm long K-feldspar phenocrysts in a semi-aphanitic (0.05-0.1 mm) feldspathic or quartzofeldspathic groundmass containing 3% biotite and 2% magnetite. Early fractures are 0.1-3 mm wide and altered/mineralized (especially their intersections) with 10% coarse-grained (up to 1 mm) biotite (potassic alteration), 5% magnetite (iron oxide alteration), 0.2% pyrite and trace chalcopyrite. Late, cross-cutting fractures are 0.1-0.5 mm wide and completely infilled by epidote (1% of rock).

- 10CQA2038B1 QUARTZ MONZONITE. Pink to white, black-speckled, weakly magnetic, massive, coarse-grained (1-4 mm), granitoid rock consisting of 15% quartz, 40% subhedral, white, saussuritized plagioclase, 30% anhedral, colourless to pink, fresh, distinctly perthitic (string type) K-feldspar, 10% biotite and 5% hornblende containing 5% primary magnetite inclusions (0.2% of rock).
- 10CQA2040B1 MYLONITIZED "GRANODIORITE". Medium grey, pink-speckled, strongly foliated to compositionally banded, very weakly magnetic, weakly fractured granitoid rock consisting of abundant (55%), medium-grained (0.4-2 mm), streaky to locally rounded feldspar (plagioclase:K-spar ratio indeterminate) porphyroclasts and 15% biotite (locally hornblende) in a grey patchy, finely crushed and recrystallized, chert-like quartzose matrix (30% of sample). Biotite and hornblende contain 3% primary magnetite inclusions (0.5% of rock) and 0.5% pyrite occurs mainly as a film on fracture surfaces.
- 10CQA2044B1 LEUCOGRANITE. Pink, leucocratic, non-magnetic, massive to weakly fractured granitoid rock consisting of 35% quartz with local graphic texture, 60% perthitic (banded type) K-feldspar, 3% biotite and 2% fracture-filling epidote.
- 10CQA2044B2 MYLONITIZED "GRNODIOIRITE". Similar to 10CQA2040B1. Medium grey-green to pink, moderately foliated, weakly magnetic, xenolith-bearing, weakly fractured granitoid rock consisting of abundant (60% of sample), mostly streaky to diffuse, 0.5-2 mm feldspar (plagioclase:K-spar ratio indeterminate) porphyroclasts and 10% chlorite in a finely crushed, chert-like, quartzose matrix (30% of sample) with a large, 2 cm xenolith of a finer-grained grey but otherwise similar granitoid rock, 3% epidote lining 1-3 mm wide fractures, 0.5% disseminated primary magnetite and 0.1% finely disseminated pyrite (1% pyrite in xenolith).
- 10CQA2045B1. DACITE. Buff grey, nonmagnetic, hackly-fractured, aphyric, aphanitic, moderately hard, quartzofeldspathic rock with 10% visible chlorite and 10% breccia patches cemented with barren quartz.
- 10CQA2047B1 DIORITE. Dark red-grey (hematite-stained), massive, strongly magnetic, slightly porphyritic plutonic rock consisting of sparse (<1%), 3 mm euhedral plagioclase phenocrysts in a medium-grained (0.5-1 mm) groundmass of 70% euhedral feldspar (SEM = exclusively albite), 30% interstitial biotite (variably chloritized), no quartz, 2% magnetite and trace chalcopyrite.
- 10CQA2047B2 HEMATITIZED DACITE. Dark brick red (pervasively hematitized), non-magnetic, hackly-fractured, weakly porphyritic volcanic rock consisting of 2% randomly oriented, 0.5-2 mm euhedral feldspar phenocrysts in a highly altered (moderately soft), aphanitic, quartzofeldspathic groundmass dusted with 10-20% specular hematite with 0.5% white dolomite occurring as coarse (3-8 mm), vug-filling crystals.

- 10CQA2048B1 HEMATITIZED DACITE. Dark brick red (pervasively hematitized), non-magnetic, hackly-fractured, aphyric, moderately hard, quartzofeldspathic volcanic rock pervasively dusted with 10-20% specular hematite.
- 10CQA2049B1 DACITIC CRYSTAL-LAPILLI TUFF. Streaked dark grey and pink, strongly magnetic, crystal-bearing fragmental volcanic rock consisting of 60% pink, leucocratic, diffusely-bounded, 1-10 mm (mostly 1-3 mm), flattened, aphanitic to feldspar-phyric lapilli, 20% greyer, more mafic, aphanitic matrix and 20% large, 1.5-2 mm, equant, euhedral, randomly oriented, fresh, greenish-white, visibly albite-twinned plagioclase phenocrysts. Lapilli are finely dusted with 1% magnetite. Matrix (the formerly permeable component of the tuff) is patchily replaced with coarser-grained (0.2-0.3 mm) jet black hydrothermal biotite (i.e. potassic alteration; 10% of sample; SEM = Fe-rich) and 5-10% magnetite and mineralized with trace chalcopryite.

Binocular Microscope Descriptions of Broken Hand Specimens of a Suite of Rocks from the
Great Bear Magmatic Zone, NWT, for Isabelle McMartin, GSC, August 2011

- 10CQA2050B1 **PORPHYRITIC TRACHYTE.** Dark grey-pink, weakly hematite-stained, moderately magnetic, strongly porphyritic volcanic rock consisting of 30% euhedral, 0.3-3 mm, flow-aligned, lath-shaped, cloudy white, saussuritized to locally fresher and perthitic (lamellar type; SEM indicates equal K and Na) phenocrysts, 10% smaller, 0.3-1.5 mm, stubby hornblende phenocrysts and 3% finer-grained (0.5-0.5 mm), primary (closely associated with hornblende) magnetite in an aphanitic, leucocratic, feldspathic (SEM = entirely K-spar, no quartz) groundmass. 1% epidote (saussurite) alteration, low trace pyrite.
- 10CQA2051B1 **SYENITE.** Dark grey-pink, weakly hematite-stained, weakly magnetic, massive to weakly foliated, weakly porphyritic hypabyssal intrusive rock consisting of 1% subhedral, 1-3 mm feldspar (mainly perthitic K-spar) phenocrysts in a medium-grained, 0.4-0.5 mm groundmass consisting of 75% subhedral feldspar (mainly K-spar), 25% biotite, no quartz and 0.5% finely disseminated magnetite. Also present is 0.1% chalcopyrite occurring with coarser-grained magnetite in 1-1.5 mm "spots".
- 10CQA2054B1 **APLITE.** Dark grey-pink, moderately foliated, moderately magnetic, weakly quartz-phyric, hypabyssal intrusive rock consisting of <1% quartz phenocrysts of 1-1.5 mm size in a sugary, semi-aphanitic (0.05-0.1 mm) quartzofeldspathic groundmass containing 15% biotite (partly as coarser flakes) and 3% magnetite. 10% of sample consists of 1-2 cm wide biotite-magnetite-chalcopyrite-pyrite veins (chalcopyrite content of 10-20 percent) that crosscut the foliation of the host rock with no visible alteration effects.
- 10CQA2059B1 **PORPHYRITIC TRACHYTE OR ANDESITE.** Hematite-stained pale brick red, massive, very weakly magnetic, strongly porphyritic volcanic rock consisting of 40% euhedral, 0.5-3 mm, saussuritized to locally fresher and albite-twinned or lamellar-perthitic feldspar phenocrysts and 10% similar-sized and extensively epidote-altered green hornblende phenocrysts in a semi-aphanitic, 0.05-0.1 mm feldspathic groundmass containing 10% hornblende, negligible quartz, 0.1% magnetite and trace pyrite.
- 10CQA2062B1 **MINERALIZED QUARTZ VEIN.** Hematite and limonite-stained brick red to yellow-ochre with patchy green malachite stain. Vein consists primary of fine-grained, 0.1-0.5 mm sugary quartz with 20% breccia cavities ranging up to 3 cm with an outer lining of cockscomb quartz and an inner core of dolomite and chalcopyrite (3% of sample; extensively oxidized to malachite).
- 10CQA2063B1 **GRANITE.** Pink, massive, non-magnetic, very coarse-grained (5-15 mm), fresh, felsic plutonic rock consisting of 55% perthitic (string type) K-spar, 40% quartz, 5% biotite and trace fluorite.

- 10CQA2067B1 TONALITE. Pink, green-flecked, massive, very weakly magnetic felsic plutonic, rock consisting of 60% coarse-grained (1-5 mm), saussuritized plagioclase, 20% quartz, 10% hornblende (mostly retrograded to chlorite), 10% fresh, white, highly cleavable anorthoclase (SEM confirmed) and 0.1% fine-grained (0.1 mm) magnetite (as primary inclusions in hornblende).
- 10CQA2068B1 HYDROTHERMAL BRECCIA. Brick red, pervasively brecciated with black metallic vein network, unfoliated, nonmagnetic. Breccia fragments range from 5 to 15 mm, constitute 80% of sample, consists of an aphanitic volcanic rock with 1% vestiges of 0.5-1 mm feldspar phenocrysts, are dusted with 10-20% fine-grained hematite and stained brick red. Early breccia cement constitutes <5% of sample and consists of 5-10 mm patches of massive, aphanitic, brown sericite (SEM confirmed). Later cement constitutes 15-20% of sample and consists of a complex network of 0.2-3 mm wide veinlets of specular hematite that crosscut the earlier sericite alteration.
- 10CQA2071B1 HYDROTHERMAL ALTERATION ZONE. Altered rock is texturally and mineralogically similar to the aphanitic breccia fragment phase of 2068B1 but is neither significantly brecciated nor veined, lacks any vestiges of feldspar phenocrysts and has a higher (30% versus 10-20%) proportion of finely disseminated specular hematite. Only evidence of brecciation is 1-2% small, 1-5 mm rounded to angular patches of red chert that are not dusted with specular hematite and probably infilled minor open, post-mineralization cavities.
- 10CQA2072B2 DACITIC TUFF. Weakly hematite-stained grey-pink, weakly foliated, nonmagnetic volcanoclastic rock consisting of 50% aphanitic, leucocratic, wispy 0.5-5 mm lapilli in a fine to medium-grained (0.1-0.5 mm), recrystallized matrix containing 20% biotite and 5-10% disseminated pyrite. Also present are 1% amygdules of 2-5 mm sized with quartz cores and pyrite-bearing biotite rims.
- 10CQA2078B1 MINERALIZED VEIN. Variegated black to brass yellow, massive, nonmagnetic vein consisting of coarse-grained (1-3 mm) crystals of quartz (10%), specular hematite (50%) and chalcopyrite (40%).
- 10CQA2079B1 CONGLOMERATE. Variegated brick red (hematite-stained) to metallic black, unmetamorphosed, crudely bedded, coarse clastic sedimentary rock consisting of 30% well-rounded, 2-4 mm granules and 4-40 mm pebbles of aphanitic to feldspar-phyric felsic to intermediate volcanics in a well-sorted matrix of medium to coarse-grained (0.5-2 mm), subarkosic sand composed of 20% quartz, 40% feldspar and 40% felsic to intermediate volcanic grains tightly cemented with specular hematite (35% of sample) of probable diagenetic origin.

Binocular Microscope Descriptions of -1 cm Jaw Crusher Rejects of a Suite of Rocks from the Great Bear Magmatic Zone, NWT, for Isabelle McMartin, GSC, December 2011

- 09CQA-1209B3 **PORPHYRITIC DACITE.** Dark maroon-grey (hematite-stained), nonmagnetic, massive to weakly foliated, weakly porphyritic rock consisting of <1% each of 0.5-2 mm quartz and feldspar phenocrysts in a semi-aphanitic (0.03-0.05 mm), quartzofeldspathic groundmass containing 20% biotite and 5% specular hematite.
- 10CQA-0284A3 **PEBBLE CONGLOMERATE.** Brick red (hematite-stained), nonmagnetic, moderately foliated, unaltered, well-sorted clastic sediment consisting of 10% pebbles >10 mm in diameter of mostly quartz and feldspar-phyric dacite similar to Sample 1209B3 in a matrix of medium sand to granule-sized particles (mostly 0.2-3 mm) consisting of 20% quartz, 20% feldspar and 60% aphanitic, leucocratic felsic to intermediate volcanic grains with 3% finely disseminated specular hematite and no mafic minerals.
- 10CQA-0284B3 **BRECCIATED, METASOMATIZED PEBBLE CONGLOMERATE.** Conglomerate is texturally and compositionally similar to Sample 2084A3 but is pervasively brecciated and cemented with 70% veinlets and patches consisting of coarse-grained (1-5 mm), perthitic K-spar (40%) and specular hematite (40%) with 20% finer-grained, buff-coloured sericite.
- 09CQA-1196A3 **GABBRO.** Dark grey-green, nonmagnetic, massive, weakly retrograde-metamorphosed, coarse-grained, ophitic-textured mafic intrusive rock consisting of 20% pale brown clinopyroxene (SEM = augite) as 3-5 mm oikocrysts enclosing 60% saussuritized, 0.5-1.5 mm plagioclase chadacrysts and 20% chlorite (altered augite) with 1% interstitial ilmenite (mostly altered to leucoxene) and trace finely disseminated pyrite.
- 09CQA-1158D3 **HYDROTHERMAL VEIN.** Dark green-black, strongly magnetic, massive, medium to coarse-grained (variable 0.5-3 mm), essentially monomineralic rock consisting of 90% dark green amphibole (SEM = common actinolite; not Fe-rich), 5% quartz (SEM confirmed), 3% interstitial magnetite and local trace titanite. Combination of major actinolite with significant quartz and no plagioclase excludes a clinopyroxenite protolith.
- 09CQA-1158A3 **PORPHYRITIC TRACHYTE.** Red-brown (hematite-stained), moderately magnetic, weakly but rather pervasively fractured, distinctly flow-foliated, strongly porphyritic volcanic rock consisting of 15% fresh, pink, 1-2 mm long, pilotaxitic K-spar phenocryst laths, 3% pale green, larger (2-3 mm) and more equant, saussuritized plagioclase phenocrysts and 1% similar-sized hornblende phenocrysts (variably aggregated in clots with finer-grained magnetite and titanite) in a semi-aphanitic (0.05-0.15 mm) groundmass consisting mainly of K-feldspar (SEM confirmed) with no quartz, 10% biotite/chlorite and 3% finely disseminated magnetite. Fractures are 1-10 mm apart, 0.2-0.5 mm wide, constitute 5% of sample and are variably lined with magnetite (2% of sample), epidote (<1%) and chlorite.

- 09CQA-1026A2 BRECCIATED, METASOMATIZED DACITE. 20% of sample consists of brick-red (hematite-stained), 0.2-2 mm, jigsaw-fit breccia fragments of a leucocratic, nonmagnetic, aphanitic, aphyric, unfoliated felsic or intermediate volcanic rock, probably dacite. Remaining 80% is a darker grey-brown, strongly magnetic cement, mostly aphanitic, consisting mainly of alkali feldspar (SEM confirmed; Na=K) with 10% finely disseminated magnetite. Also present are 5% younger, coarser-grained (0.3-1 mm) fracture-filling veinlets and patches variably consisting of crystalline magnetite and perthitic K-spar.
- 09CQA-0027B3 SYENITE. Dark green-pink, nonmagnetic, massive to weakly foliated, sparsely porphyritic, hypabyssal intrusive rock consisting of 2% subhedral to euhedral, 1-2 mm pink, perthitic K-spar phenocrysts in a uniformly fine-grained (0.1-0.2 mm) groundmass visibly consisting mainly of K-spar with 20% biotite (variably chloritized) and negligible quartz.
- 09CQA-1024A3 STOCKWORK-VEINED DACITE. Brick-red (hematite-stained), nonmagnetic, jigsaw-brecciated, sparsely porphyritic, stockwork-veined, felsic to intermediate volcanic rock, probably dacite, consisting of 40% breccia fragments and 60% white, coarse-grained (1-3 mm) quartz veins. Breccia fragments measure 1 to >10 mm and consist of 1% euhedral, 0.3-1 mm, visibly perthitic K-spar phenocrysts in an aphanitic, leucocratic, quartzofeldspathic groundmass with 3% finely disseminated specular hematite and no mafic minerals.
- 10CQA-0230B3 FELDSPAR PORPHYRY. Speckled pink and dark green, moderately magnetic, massive, strongly porphyritic, hypabyssal intrusive rock consisting of 50% crowded, subhedral to euhedral, 0.5-1 mm saussuritized feldspar (mainly plagioclase) phenocrysts in a very fine-grained (0.05-0.15 mm), compositionally heterogeneous (variably chloritic to sugary, quartzose; 20% chlorite overall) groundmass with 1% each of finely disseminated and phenocrystal (primary) magnetite, 2% fracture-controlled epidote veinlets and patches and 0.2% finely disseminated pyrite.
- 09CQA-0144B2 FRACTURED, MINERALIZED BASALT. Dark green, nonmagnetic to patchily brick red and strongly magnetic, massive but extensively fractured and metasomatized, fine-grained (0.2-0.4 mm), quartz-free mafic volcanic rock consisting of 60% chlorite and 40% epidote-altered plagioclase with 0-20% (average 5%) patchily disseminated, fracture-controlled magnetite, 1% associated chalcopyrite, mostly oxidized to secondary malachite, and 1% fracture-hosted calcite.
- 09CQA-0136A3 BRECCIATED, MINERALIZED BASALT. Bleached pale buff-grey, nonmagnetic, aphyric, aphanitic, mafic volcanic rock brecciated at 0.5 to >1 cm scale. Large (>1 cm) breccia blocks constitute 60% of sample, while smaller (<2 mm), crowded fragments constitute ~20% and are cemented with chlorite and 5% sulphides (1% of overall sample), mainly chalcopyrite with trace pyrite. Aphanitic protolith of breccia has been completely bleached of its primary mafic minerals but appears to be quartz-free and contains 30-40% finely disseminated and variably limonitized ankerite, indicating a basaltic composition.

- 09CQA-0128B2 MASSIVE IRON OXIDE-APATITE MINERALIZATION. Metallic black, red-flecked, very strongly magnetic, coarsely crystalline (0.5-1.5 mm), Kiruna-type mineralization consisting of magnetite (80%) and red, hematite-stained apatite (15%; SEM confirmed) with 5% cherty quartz patches.
- 09CQA-0055F6 OXIDE-SILICATE FACIES IRON FORMATION. Black with rusty, limonite-stained fractures, strongly foliated and lineated metamorphic rock consisting of subequal proportions of 0.5-10 mm thick, fine-grained (0.1-0.2 mm) and coarser-grained (0.5-1.5 mm) bands of slightly different mineralogy, reflecting original bedding. Fine-grained bands consist of hornblende (SEM confirmed) with 30% magnetite, which is foliated with the hornblende and thus clearly pre-metamorphic, whereas coarse-grained bands are more hornblende rich, averaging only 10% magnetite for 20% overall. Also present are 3% epidote segregations or bands. Fractures are mineralized with trace pyrite and locally stained with malachite.
- 10CQA-0233A3 PORPHYRITIC BASALT. Speckled white and dark green-black, patchily brick-red (hematite-stained), weakly magnetic, extensively fractured and locally brecciated, weakly flow-foliated, strongly porphyritic mafic volcanic rock consisting of 20 to 50% (average 40%), visibly albite-twinned plagioclase phenocryst in a soft, aphanitic, chlorite-rich groundmass dusted with 2% magnetite. Rock is weakly brecciated in diatreme fashion and cemented with 10% irregular, 3-10 mm patches of hard, aphanitic albite (SEM confirmed) containing scattered, unaltered, 0.3-3 mm basalt fragments and relict plagioclase phenocrysts retaining their primary albite twinning. Breccia zones and incipient fractures are mineralized with 1% chalcopyrite.
- 09CQA-1085A2 SILICATE FACIES IRON FORMATION. Dark green-black, nonmagnetic, massive to moderately foliated, unaltered, nonmineralic metamorphic rock consisting of mostly medium-grained (0.2-0.4 mm) to locally coarse-grained (1.5 mm), dark green actinolite (SEM confirmed; not ferroactinolite). Isolated trace chalcopyrite.
- 09CQA-0055F5 OXIDE-SILICATE FACIES IRON FORMATION. Similar to No. 0055F6. Black with strongly magnetic, rusty, limonite-stained fractures, strongly foliated and lineated, essentially unaltered metamorphic rock consisting of coarse and fine-grained bands, mostly >10 mm thick, of slightly different mineralogy reflecting original bedding. Coarse-grained bands dominate and consist of 80% hornblende grains of 1-3 mm size, 10% similarly coarse-grained, green-brown epidote (SEM confirmed) segregations, 1% stilpnomelane (SEM confirmed) segregations and 10% disseminated magnetite. Fine-grained bands are subordinate and consist of 0.1-0.3 mm hornblende grains with 30% magnetite. Overall magnetite content is 15%. Also present is trace chalcopyrite associated with post-metamorphic sericitic shear seams.
- 09CQA-0055B2 SILICATE FACIES IRON FORMATION. Black, nonmagnetic, unaltered, amphibolite facies metamorphic rock consisting of coarse-grained (0.5-5 mm) dark green-black hornblende (SEM confirmed) crystals with <1% brown epidote (SEM confirmed) veinlets and trace pyrite.

09CQA-1009B4 FRACTURED, METASOMATIZED DACITE. Hematite-stained brick red, variably moderately to strongly magnetic, pervasively fractured at 1-5 mm scale and extensively stockwork veined and hydrothermally altered, leucocratic, aphyric, aphanitic volcanic rock, probably dacite, consisting mainly (95%) of very pure K-spar; (SEM confirmed; Na-free indicating metasomatic paragneiss). Visible hydrothermal alteration consists of 10% magnetite (variably altered to specular hematite), 3% leucoxene and 0.2% chalcopyrite variably occurring as hairline fracture fillings, irregular spots (commonly at all fracture intersections) and veinlets up to 1 mm wide. Also present are 2% younger, cross-cutting, aphanitic silica veinlets that are mineralized with chalcopyrite but not magnetite or hematite, indicating chalcopyrite mineralization is relatively late.

09CQA-1009B2 MASSIVE IRON OXIDE MINERALIZATION. Metallic black with 20% brick red, hematite-stained patches. Metallic zones are very strongly magnetic and consist entirely of crystalline magnetite. Brick red zones consist of an aphanitic, leucocratic volcanic rock similar to that of Sample 1009B4, probably K-metasomatized dacite, varying from pervasively fractured at <5 mm scale and stockwork veined with magnetite to jigsaw-brecciated at the same scale and cemented with magnetite.

Binocular Microscope Descriptions of -1 cm Jaw Crusher Rejects of a Suite of Rocks from the Great Bear Magnetic Zone, NWT, for Isabelle McMartin, GSC, May 8, 2012, by S.A.Averill.

- 10CQA-0627C2 BRECCIATED< METASOMATIZED METAPELITE. Brick red (hematite-stained), nonmagnetic, moderately foliated metasediment consisting of 70% very fine-grained (0.05-0.3 mm), pervasively hematite-stained biotite flakes with a pseudometallic reflectance resembling specular hematite and 30% unstained, colourless quartz-feldspar. Rock is weakly and irregularly brecciated and cemented with quartz (20% of sample) containing 1% very coarse-grained (5 mm) chalcopyrite.
- 09CQA-1092A2 METAPELITE AND OXIDE-SILICATE FACIES IRON FORMATION. Black, nonmagnetic to locally strongly magnetic, strongly foliated and lineated to semi-schistose, amphibolite-facies metasediment consisting mostly of fine-grained (0.1-0.2 mm) to locally more coarsely crystallized biotite (80%) and feldspar (20%) with a 5 mm thick chert lamination containing disseminated to thinly (<0.5 mm) bedded magnetite (1% of sample) and trace loellingite (SEM confirmed). Almandine garnet occurs as 0.5-1 mm metacrysts at concentrations up to 20% (5% of overall sample) in localized bands (Fe-rich beds).
- 09CQA-1114D3 METAPELITE. Black, nonmagnetic, strongly foliated metasediment consisting of 40% (variably 20 to 60%) biotite flakes of 0.1-0.5 mm size and 60% finer-grained (0.05 mm), sugary, metamorphically recrystallized, undifferentiable quartz and colourless feldspar with trace arsenopyrite and chalcopyrite as isolated, 0.5 mm crystals and crystal clusters.
- 09CQA-1174A2 METAGREYWAKE. Dark grey to pale buff-grey, nonmagnetic, faintly bedded at 2 mm to >10 mm scale, well sorted, sandy metasediment consisting of very fine-grained (0.1-0.2 mm), mostly recrystallized and sugary, undifferentiable quartz and colourless feldspar sand grains with <10% (in buff-grey beds) to 30% (in dark grey beds) biotite and trace coarse-grained (up to 0.8 mm), fracture-associated pyrite.