

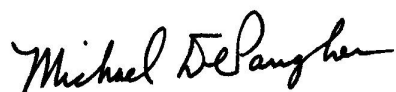
Petrographic Report # M0P

January 15, 2023

for

Alex Steely
Washington Geological Survey
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Olympia, WA 98501

by

A handwritten signature in black ink that reads "Michael DePangher". The signature is written in a cursive, flowing style.

Michael DePangher, Ph.D.
Spectrum Petrographics, Inc.

Key to Petrographic and Photomicrographic Descriptions - v. 220205

Clay minerals common in altered rocks must often be identified by X-ray diffraction either because their optic properties are not diagnostic or because they are too fine grained to be reliably identified by optical methods. The term "clay" is used herein to denote fine grained phyllosilicates in general. Under ideal conditions, it is often possible to optically discriminate between 4 major groups: kaolinite, smectite, mica (including illite), and chlorite. This is done whenever conditions permit.

The term "sericite" is applied to fine grained colorless phyllosilicates that show upper 2nd order maximum interference colors. These could include muscovite, illite, paragonite, lepidolite, margarite, clintonite, pyrophyllite, and talc. The term "intermediate clay" is applied to fine grained very pale or colorless phyllosilicates that show upper 1st order maximum interference colors. These are probably dominated by chlorite, smectite, and mixed-layer illite/smectite.

The term "opaques" is used to refer to all materials opaque (and sometimes semi-opaque) to transmitted light. The term "FEOH" is herein used to indicate fine grained, yellowish to reddish brown, earthy materials of varying opacity in transmitted light. FEOH is probably mostly Fe oxy-hydroxides but may sometimes include sphalerite, realgar, orpiment, jarosite, a number of Mn oxy-hydroxides, and organic matter.

A question mark after a rock or mineral name in a petrographic description means that there is uncertainty about the identification of that rock or mineral.

Particle size distributions are given as (A-B μ m), where A and B are the median and largest particle sizes, respectively, in microns. A question mark (?) in the position of A or B indicates that the value of A or B was indeterminate, probably because of excessively large or small particle size or statistically insignificant numbers of particles.

Mineral abundances are visual estimates for an entire slide. For multi-lithologic materials (cuttings, etc...), mineralogy, textures, and alteration are described only for the dominant lithology.

Section preparation codes are as follows: (1) Format: 27 x 46 mm; 51 x 76 mm; or 1" round; (2) Finish: standard lapping (STD); or polished (POL); (3) Stains: sodium cobaltinitrite (SCN); alizarin red S + potassium ferricyanide (ARSPF); and barium chloride + potassium rhodizonate (BCPR); and (4) Cover: none; permanent Loctite acrylic (PLA); or permanent Norland acrylic (PNA).

Photomicrograph captions contain the following items of information in consecutive order separated by forward slashes: (1) sample identifier; (2) JPG image file name composed of concatenated [job identification code + sequence number]; (3) illumination type; and (4) field of view (FOV). For illumination types: "PPL" indicates plane-polarized light; "XPL" indicates cross-polarized light; "R" indicates reflected light. "550" means that a 550 nanometer wavelength plate was inserted in the light path. "C" indicates that the substage condenser was in (sometimes used for Fe-oxides). "O" indicates oblique incident illumination. These various illuminations can be combined. "CON" indicates conoscopic illumination. POL means that a polarizing filter was used with the lens, and DAY means the sample was photographed in diffused daylight. Unless otherwise noted, sequential images are taken in XPL and PPL of a single field of view.

Features on photomicrographs are indicated by the number of the feature in the ALTERATION section of the text or by a mineral name abbreviation, e.g., **Q**uartz, **Pl**agioclase, **K**-feldspar, **ser**icite, **bio**tite, **ferroan calc**ite, **act**inolite.

Igneous rock classifications are according to IUGS (1973; 1979); sandstones are classified according to McBride (1963); mudrocks are classified according to Picard (1971); carbonates are classified according to Folk (1959); and metamorphic rocks classified according to IUGS (Fettes and Desmons, 2011).

The term "protolith" is used for the interpreted primary lithology. The term "precursor" is used for a secondary lithology from which the current rock was derived.

SAMPLE # **7J22-1**

January 15, 2023

ROCK NAME ALTERED QUARTZ LATITE PORPHYRY -- probably formed by alteration (secondary chlorite + actinolite + opaques + leucoxene + clinozoisite + tourmaline) of a quartz latite porphyry extrusive (?) protolith.

MINERALS Plagioclase (70%) + K-feldspar (10%) + biotite (9%) + quartz (8%) + chlorite (1%) + actinolite (1%) + opaques (1%) + leucoxene (<1%) + apatite (<1%) + clinozoisite (<1%) + tourmaline (<1%).

TEXTURES Extrusive (?) igneous protolith; non-directed fabric.

Phenocrysts (18%)

Plagioclase (10%) are compositionally zoned with cores moderately altered to actinolite + chlorite ± tourmaline.

Quartz (6%)

Biotite (2%) + strongly altered to chlorite + leucoxene + opaques ± clinozoisite

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (82%) is dominated by [plagioclase weakly altered to actinolite + chlorite] + K-feldspar + biotite + quartz + opaques.

Vesicles (0%) were not observed.

ALTERATION No other alteration features were observed.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 7J22-1 M0P-001.jpg/XPL/FOV = 27x46 mm ALTERED QUARTZ LATITE PORPHYRY showing typical appearance.

7J22-1 M0P-002.jpg/PPL/FOV = 27x46 mm Same.

7J22-1 M0P-057.jpg/XPL/FOV = 4.00x5.83 mm ALTERED QUARTZ LATITE PORPHYRY showing typical appearance.

7J22-1 M0P-058.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE # **9J22-2**

January 15, 2023

ROCK NAME ALTERED GRANODIORITE -- probably formed by alteration (secondary K-feldspar + smectite + chlorite + actinolite + sphene + opaques + clinozoisite + carbonate) of a granodiorite intrusive protolith.

MINERALS Plagioclase (50%) + quartz (22%) + K-feldspar (15%) + biotite (5%) + smectite (3%) + hornblende (1%) + chlorite (1%) + actinolite (1%) + sphene (1%) + opaques (1%) + clinozoisite (<1%) + carbonate (<1%) + apatite (<1%).

TEXTURES Extrusive (?) igneous protolith; equigranular; non-directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) is dominated by euhedral [plagioclase + hornblende + biotite] surrounded by anhedral [quartz + K-feldspar].

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite + smectite + actinolite ± K-feldspar; (2) hornblende strongly altered to smectite + chlorite + sphene + clinozoisite + carbonate + opaques; (3) biotite weakly altered to chlorite ± clinozoisite; and (4) opaques weakly altered to sphene.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 9J22-2 M0P-003.jpg/XPL/FOV = 27x46 mm ALTERED GRANODIORITE showing typical appearance.

 9J22-2 M0P-004.jpg/PPL/FOV = 27x46 mm Same.

 9J22-2 M0P-059.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANODIORITE showing typical appearance.

 9J22-2 M0P-060.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE #	10J22-3	January 15, 2023
ROCK NAME	ALTERED RHYODACITE -- probably formed by alteration (secondary sericite) of a weakly porphyritic rhyodacite extrusive (?) protolith.	
MINERALS	Quartz (32%) + K-feldspar (32%) + plagioclase (30%) + sericite (5%) + biotite (1%).	
TEXTURES	Weakly porphyritic, extrusive (?) igneous protolith; non-directed fabric.	
	Phenocrysts (4%) Quartz (2%) K-feldspar (1%) Plagioclase (1%) are weakly altered to sericite. Biotite (<1%)	
	Xenoliths/Xenocrysts (0%) were not observed.	
	Groundmass (96%) is dominated by quartz + K-feldspar + [plagioclase weakly altered to sericite] + [biotite moderately altered to sericite].	
	Vesicles (0%) were not observed.	
ALTERATION	No other alteration features were observed.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	10J22-3 M0P-005.jpg/XPL/FOV = 27x46 mm ALTERED RHYODACITE showing typical appearance. 10J22-3 M0P-006.jpg/PPL/FOV = 27x46 mm Same. 10J22-3 M0P-061.jpg/XPL/FOV = 4.00x5.83 mm ALTERED RHYODACITE showing typical appearance. 10J22-3 M0P-062.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE # **3A22-4** January 15, 2023

ROCK NAME ALTERED GRANITE -- probably formed by alteration (secondary smectite) of a granite intrusive protolith.

MINERALS Quartz (50%) + K-feldspar (46%) + plagioclase (3%) + biotite (1%) + smectite (<1%) + zircon (<1%) + opaques (<1%).

TEXTURES Intrusive igneous protolith; equigranular; non-directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) is dominated by graphically intergrown [quartz + K-feldspar] + graphically intergrown [quartz + plagioclase] + biotite.

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to smectite.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 3A22-4 M0P-007.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance.

 3A22-4 M0P-008.jpg/PPL/FOV = 27x46 mm Same.

 3A22-4 M0P-063.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance.

 3A22-4 M0P-064.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE # **4A22-2** January 15, 2023

ROCK NAME MASSIVE K-FELDSPAR -- possible granite or syenite pegmatite origin.

MINERALS K-feldspar (100%) + chlorite (<1%) + smectite (<1%) + rutile (<1%) + opaques (<1%).

TEXTURES Equigranular; non-directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) is dominated by anhedral K-feldspar.

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) plagioclase (?) completely altered to smectite; (2) biotite (?) completely altered to chlorite + smectite + rutile; and (3) sphene (?) completely altered to rutile.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 4A22-2 M0P-009.jpg/XPL/FOV = 27x46 mm MASSIVE K-FELDSPAR showing typical appearance.

 4A22-2 M0P-010.jpg/PPL/FOV = 27x46 mm Same.

 4A22-2 M0P-065.jpg/XPL/FOV = 4.00x5.83 mm MASSIVE K-FELDSPAR showing typical appearance.

 4A22-2 M0P-066.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE #	5A22-7	January 15, 2023
ROCK NAME	ALTERED GRANITE -- probably formed by alteration (secondary clinozoisite + sericite + smectite + chlorite + opaques) of a granite intrusive protolith.	
MINERALS	Quartz (34%) + K-feldspar (30%) + plagioclase (26%) + clinozoisite (6%) + biotite (1%) + sericite (1%) + smectite (1%) + chlorite (1%) + apatite (<1%) + zircon (<1%) + axinite (?) (<1%) + opaques (<1%).	
TEXTURES	<p>Intrusive igneous protolith; seriate; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by quartz + K-feldspar + plagioclase + biotite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite + sericite + smectite; and (2) biotite moderately altered to chlorite ± sericite ± clinozoisite ± leucoxene ± opaques.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>5A22-7 M0P-011.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance.</p> <p>5A22-7 M0P-012.jpg/PPL/FOV = 27x46 mm Same.</p> <p>5A22-7 M0P-067.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance.</p> <p>5A22-7 M0P-068.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE # **6A22-8**

January 15, 2023

ROCK NAME ALTERED GRANITE -- probably formed by alteration (secondary chlorite + carbonate + opaques + sericite + smectite + leucoxene) of a granite intrusive protolith.

MINERALS Quartz (30%) + K-feldspar (29%) + plagioclase (29%) + biotite (6%) + chlorite (2%) + carbonate (2%) + opaques (2%) + sericite (<1%) + smectite (<1%) + sphene (<1%) + leucoxene (<1%) + apatite (<1%) + zircon (<1%).

TEXTURES Intrusive igneous protolith; equigranular; non-directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) is dominated by quartz + K-feldspar + plagioclase + biotite.

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to smectite ± carbonate ± sericite; (2) biotite weakly altered to chlorite + opaques ± carbonate; and (3) hornblende completely altered to carbonate + chlorite + leucoxene + opaques.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 6A22-8 M0P-013.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance.

 6A22-8 M0P-014.jpg/PPL/FOV = 27x46 mm Same.

 6A22-8 M0P-069.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance.

 6A22-8 M0P-070.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE #	12A22-1	January 15, 2023
ROCK NAME	ALTERED GRANITE -- probably formed by alteration (secondary sericite + smectite + chlorite + clinozoisite + leucoxene + tourmaline) of a granite intrusive protolith.	
MINERALS	Quartz (40%) + plagioclase (40%) + K-feldspar (16%) + biotite (2%) + sericite (2%) + smectite (<1%) + chlorite (<1%) + clinozoisite (<1%) + leucoxene (<1%) + apatite (<1%) + zircon (<1%) + tourmaline (<1%).	
TEXTURES	<p>Intrusive igneous protolith; seriate; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by quartz + plagioclase + K-feldspar + biotite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to sericite ± smectite ± tourmaline; and (2) biotite weakly altered to chlorite + leucoxene ± sericite ± clinozoisite ± opaques.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>12A22-1 M0P-015.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance.</p> <p>12A22-1 M0P-016.jpg/PPL/FOV = 27x46 mm Same.</p> <p>12A22-1 M0P-071.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance.</p> <p>12A22-1 M0P-072.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	12A22-7A	January 15, 2023
ROCK NAME	ALTERED GRANITE -- probably formed by alteration (secondary K-feldspar + sericite + chlorite + leucoxene + clinozoisite) of a weakly porphyritic granite intrusive (?) protolith.	
MINERALS	Quartz (31%) + K-feldspar (30%) + plagioclase (25%) + biotite (8%) + sericite (5%) + chlorite (1%) + leucoxene (<1%) + clinozoisite (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	Weakly porphyritic, igneous protolith; non-directed fabric.	
	Phenocrysts (6%) Quartz (4%) K-feldspar (<1%) Plagioclase (2%) Biotite (<1%) Hornblende (<1%) Xenoliths/Xenocrysts (0%) were not observed. Groundmass (94%) is dominated by quartz + K-feldspar + plagioclase + biotite. Vesicles (0%) were not observed.	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase moderately altered to sericite ± K-feldspar; (2) biotite weakly altered to chlorite + leucoxene ± clinozoisite; and (3) hornblende completely altered to [[biotite moderately altered to chlorite ± clinozoisite] + quartz].	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	12A22-7A M0P-017.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance. 12A22-7A M0P-018.jpg/PPL/FOV = 27x46 mm Same. 12A22-7A M0P-073.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance. 12A22-7A M0P-074.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE #	12A22-9	January 15, 2023
ROCK NAME	ALTERED GRANODIORITE -- probably formed by alteration (secondary K-feldspar + smectite + chlorite + actinolite + sphene + opaques + clinozoisite + carbonate) of a granodiorite intrusive protolith.	
MINERALS	Plagioclase (58%) + quartz (22%) + K-feldspar (10%) + biotite (10%) + sericite (<1%) + chlorite (<1%) + leucoxene (<1%) + smectite (<1%) + actinolite (<1%) + opaques (<1%) + apatite (<1%) + zircon (<1%) + axinite (?) (<1%).	
TEXTURES	<p>Intrusive igneous protolith; equigranular; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by euhedral [plagioclase + hornblende + biotite] surrounded by anhedral [quartz + K-feldspar].</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite + smectite + actinolite ± K-feldspar; (2) hornblende strongly altered to smectite + chlorite + sphene + clinozoisite + carbonate + opaques; (3) biotite weakly altered to chlorite ± clinozoisite; and (4) opaques weakly altered to sphene.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>12A22-9 M0P-019.jpg/XPL/FOV = 27x46 mm ALTERED GRANODIORITE showing typical appearance.</p> <p>12A22-9 M0P-020.jpg/PPL/FOV = 27x46 mm Same.</p> <p>12A22-9 M0P-075.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANODIORITE showing typical appearance.</p> <p>12A22-9 M0P-076.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	13A22-1	January 15, 2023
ROCK NAME	ALTERED GRANITE PORPHYRY -- probably formed by alteration (secondary smectite + sericite) of a granite porphyry intrusive (?) protolith.	
MINERALS	Quartz (34%) + plagioclase (32%) + K-feldspar (27%) + biotite (5%) + hornblende (2%) + smectite (<1%) + sericite (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Porphyritic, intrusive (?) igneous protolith; non-directed fabric.</p> <p>Phenocrysts (20%)</p> <p>Quartz (7%)</p> <p>Plagioclase (6%)</p> <p>Biotite (5%)</p> <p>Hornblende (2%)</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (80%) is dominated by quartz + plagioclase + K-feldspar + biotite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase very weakly altered to smectite + sericite; and (2) hornblende magmatically jacketed by biotite.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>13A22-1 M0P-021.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE PORPHYRY showing typical appearance.</p> <p>13A22-1 M0P-022.jpg/PPL/FOV = 27x46 mm Same.</p> <p>13A22-1 M0P-077.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE PORPHYRY showing typical appearance.</p> <p>13A22-1 M0P-078.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	13A22-5	January 15, 2023
ROCK NAME	ALTERED GRANODIORITE -- probably formed by alteration (secondary clinozoisite + sericite + chlorite + smectite) of a granodiorite intrusive protolith.	
MINERALS	Plagioclase (40%) + quartz (34%) + K-feldspar (17%) + biotite (7%) + clinozoisite (2%) + hornblende (<1%) + sericite (<1%) + chlorite (<1%) + smectite (<1%) + sphene (<1%) + opaques (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Intrusive igneous protolith; equigranular; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by plagioclase + quartz + K-feldspar + biotite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite + sericite + smectite; and (2) biotite weakly altered to chlorite ± clinozoisite.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>13A22-5 M0P-023.jpg/XPL/FOV = 27x46 mm ALTERED GRANODIORITE showing typical appearance.</p> <p>13A22-5 M0P-024.jpg/PPL/FOV = 27x46 mm Same.</p> <p>13A22-5 M0P-079.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANODIORITE showing typical appearance.</p> <p>13A22-5 M0P-080.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE # **13A22-6** January 15, 2023

ROCK NAME ALTERED DIORITE -- probably formed by alteration (secondary K-feldspar + sphene + clinozoisite + chlorite + leucoxene) of a diorite intrusive protolith.

MINERALS Actinolite (59%) + plagioclase (30%) + K-feldspar (5%) + sphene (2%) + opaques (2%) + clinozoisite (1%) + biotite (<1%) + chlorite (<1%) + leucoxene (<1%) + apatite (<1%).

TEXTURES Intrusive igneous protolith; equigranular; non-directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) is dominated by actinolite + plagioclase.

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) hornblende completely altered to actinolite; (2) plagioclase moderately altered to actinolite + clinozoisite + K-feldspar; (3) opaques moderately altered to sphene; and (4) biotite strongly altered to chlorite + leucoxene.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 13A22-6 M0P-025.jpg/XPL/FOV = 27x46 mm ALTERED DIORITE showing typical appearance.

 13A22-6 M0P-026.jpg/PPL/FOV = 27x46 mm Same.

 13A22-6 M0P-081.jpg/XPL/FOV = 4.00x5.83 mm ALTERED DIORITE showing typical appearance.

 13A22-6 M0P-082.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE #	14A22-6	January 15, 2023
ROCK NAME	ALTERED RHYODACITE -- probably formed by alteration (secondary sericite + FEOH) of a weakly porphyritic rhyodacite extrusive (?) protolith.	
MINERALS	Quartz (35%) + plagioclase (35%) + K-feldspar (20%) + sericite (10%) + FEOH (<1%).	
TEXTURES	Weakly porphyritic, extrusive (?) igneous protolith; non-directed fabric.	
	Phenocrysts (<1%) <p>Quartz (<1%)</p> <p>Plagioclase (<1%)</p> <p>K-feldspar (<1%)</p>	
	Xenoliths/Xenocrysts (0%) were not observed.	
	Groundmass (80%) is dominated by quartz + plagioclase + K-feldspar + sericite.	
	Vesicles (0%) were not observed.	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to sericite; and (2) opaques completely altered to FEOH.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	14A22-6 M0P-027.jpg/XPL/FOV = 27x46 mm ALTERED RHYODACITE showing typical appearance. 14A22-6 M0P-028.jpg/PPL/FOV = 27x46 mm Same. 14A22-6 M0P-083.jpg/XPL/FOV = 4.00x5.83 mm ALTERED RHYODACITE showing typical appearance. 14A22-6 M0P-084.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE #	14A22-8	January 15, 2023
ROCK NAME	ALTERED RHYODACITE -- probably formed by alteration (secondary K-feldspar + sericite + FEOH) of a weakly porphyritic rhyodacite extrusive (?) protolith.	
MINERALS	Quartz (30%) + plagioclase (30%) + K-feldspar (30%) + sericite (10%) + FEOH (<1%) + opaques (<1%) + apatite (<1%).	
TEXTURES	Weakly porphyritic, extrusive (?) igneous protolith; non-directed fabric.	
	Phenocrysts (1%) Quartz (1%) Plagioclase (<1%) K-feldspar (<1%) Biotite (<1%)	
	Xenoliths/Xenocrysts (0%) were not observed.	
	Groundmass (80%) is dominated by quartz + plagioclase + K-feldspar + sericite.	
	Vesicles (0%) were not observed.	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase moderately altered to K-feldspar + sericite; (2) opaques moderately altered to FEOH; and (3) biotite completely altered to sericite + FEOH.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	14A22-8 M0P-029.jpg/XPL/FOV = 27x46 mm ALTERED RHYODACITE showing typical appearance. 14A22-8 M0P-030.jpg/PPL/FOV = 27x46 mm Same. 14A22-8 M0P-085.jpg/XPL/FOV = 4.00x5.83 mm ALTERED RHYODACITE showing typical appearance. 14A22-8 M0P-086.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE #	14A22-9	January 15, 2023
ROCK NAME	ALTERED GRANITE -- probably formed by alteration (secondary K-feldspar + smectite + chlorite + clinozoisite + leucoxene + sphene) of a granite intrusive protolith.	
MINERALS	Quartz (31%) + plagioclase (30%) + K-feldspar (30%) + biotite (6%) + opaques (2%) + smectite (1%) + chlorite (<1%) + clinozoisite (<1%) + leucoxene (<1%) + sphene (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Intrusive igneous protolith; seriate; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by quartz + plagioclase + K-feldspar + biotite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to smectite; (2) biotite weakly altered to chlorite + leucoxene ± K-feldspar; and (3) opaques weakly altered to sphene.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>14A22-9 M0P-031.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance.</p> <p>14A22-9 M0P-032.jpg/PPL/FOV = 27x46 mm Same.</p> <p>14A22-9 M0P-087.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance.</p> <p>14A22-9 M0P-088.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	16A22-3	January 15, 2023
ROCK NAME	ALTERED GRANODIORITE -- probably formed by alteration (secondary sericite + chlorite + smectite + clinozoisite) of a granodiorite intrusive protolith.	
MINERALS	Plagioclase (52%) + quartz (21%) + K-feldspar (21%) + biotite (3%) + hornblende (1%) + sphene (1%) + opaques (1%) + sericite (<1%) + chlorite (<1%) + smectite (<1%) + clinozoisite (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Intrusive igneous protolith; equigranular; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by plagioclase + quartz + K-feldspar + biotite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite + sericite + smectite; and (2) biotite weakly altered to chlorite ± clinozoisite.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>16A22-3 M0P-033.jpg/XPL/FOV = 27x46 mm ALTERED GRANODIORITE showing typical appearance.</p> <p>16A22-3 M0P-034.jpg/PPL/FOV = 27x46 mm Same.</p> <p>16A22-3 M0P-089.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANODIORITE showing typical appearance.</p> <p>16A22-3 M0P-090.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	29A22-4	January 15, 2023
ROCK NAME	ALTERED RHYODACITE -- probably formed by alteration (secondary sericite + leucoxene) of a rhyodacite extrusive (?) protolith.	
MINERALS	Quartz (33%) + K-feldspar (33%) + plagioclase (29%) + sericite (5%) + leucoxene (<1%).	
TEXTURES	<p>Aphyric, extrusive (?) igneous protolith; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by quartz + plagioclase + K-feldspar + sericite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase moderately altered to sericite; and (2) biotite completely altered to sericite + leucoxene..	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>29A22-4 M0P-035.jpg/XPL/FOV = 27x46 mm ALTERED RHYODACITE showing typical appearance.</p> <p>29A22-4 M0P-036.jpg/PPL/FOV = 27x46 mm Same.</p> <p>29A22-4 M0P-091.jpg/XPL/FOV = 4.00x5.83 mm ALTERED RHYODACITE showing typical appearance.</p> <p>29A22-4 M0P-092.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	13S22-6	January 15, 2023
ROCK NAME	ALTERED ANDESITE -- probably formed by alteration (secondary phlogopite + opaques + leucoxene + smectite + FEOH) of a weakly porphyritic andesite extrusive (?) protolith.	
MINERALS	Plagioclase (92%) + hornblende (5%) + phlogopite (2%) + opaques (1%) + biotite (<1%) + clinopyroxene (<1%) + leucoxene (<1%) + smectite (<1%) + FEOH (<1%) + apatite (<1%).	
TEXTURES	Weakly porphyritic, extrusive (?) igneous protolith; non-directed fabric.	
	Phenocrysts (6%) Plagioclase (3%) Hornblende (3%) Biotite (<1%) Xenoliths/Xenocrysts (0%) were not observed. Groundmass (94%) is dominated by plagioclase. Vesicles (0%) were not observed.	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to smectite; (2) biotite strongly altered to phlogopite + leucoxene; and (3) clinopyroxene strongly altered to smectite + opaques.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	13S22-6 M0P-037.jpg/XPL/FOV = 27x46 mm ALTERED ANDESITE showing typical appearance. 13S22-6 M0P-038.jpg/PPL/FOV = 27x46 mm Same. 13S22-6 M0P-093.jpg/XPL/FOV = 4.00x5.83 mm ALTERED ANDESITE showing typical appearance. 13S22-6 M0P-094.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE # **14S22-10** January 15, 2023

ROCK NAME TREMOLITE-DOLOMITE-DIOPSIDE-CALCITE SKARN -- probably formed by metasomatism of a carbonate protolith.

MINERALS Calcite (55%) + diopside (37%) + dolomite (6%) + tremolite (2%) + opaques (<1%).

TEXTURES Equigranular; non-directed fabric.

Porphyroblasts (0%) were not observed.

Porphyroclasts (0%) were not observed.

Matrix (100%) is dominated by calcite + diopside + dolomite + tremolite.

Cement (0%) was not observed.

ALTERATION Alteration features in relative chronological order from oldest to youngest are:
(1) contact metamorphism.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (none) + ARSPF (right 80%) Cover: PLN

IMAGES 14S22-10 M0P-039.jpg/XPL/FOV = 27x46 mm TREMOLITE-DOLOMITE-DIOPSIDE-CALCITE SKARN showing typical appearance.

 14S22-10 M0P-040.jpg/PPL/FOV = 27x46 mm Same.

 14S22-10 M0P-095.jpg/XPL/FOV = 4.00x5.83 mm TREMOLITE-DOLOMITE-DIOPSIDE-CALCITE SKARN showing typical appearance.

 14S22-10 M0P-096.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE #	14S22-18	January 15, 2023
ROCK NAME	ALTERED BASALT (?) -- probably formed by extreme alteration (secondary K-feldspar + biotite + actinolite + diopside) of an aphyric (?) basalt (?) extrusive (?) protolith.	
MINERALS	K-feldspar (22%) + biotite (22%) + actinolite (22%) + diopside (22%) + plagioclase (8%) + opaques (3%) + sphene (1%) + quartz (<1%).	
TEXTURES	Aphyric (?), extrusive (?) igneous (?) protolith; non-directed fabric.	
	Phenocrysts (0%) were not observed.	
	Xenoliths/Xenocrysts (0%) were not observed.	
	Groundmass (100%) has been extremely altered to [K-feldspar + biotite + actinolite + diopside].	
	Vesicles (0%) were not observed.	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase strongly altered to biotite + K-feldspar + diopside; (2) groundmass completely altered to [K-feldspar + biotite + actinolite + diopside]; and (3) opaques weakly altered to sphene.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	14S22-18 M0P-041.jpg/XPL/FOV = 27x46 mm ALTERED BASALT (?) showing typical appearance.	
	14S22-18 M0P-042.jpg/PPL/FOV = 27x46 mm Same.	
	14S22-18 M0P-097.jpg/XPL/FOV = 4.00x5.83 mm ALTERED BASALT (?) showing typical appearance.	
	14S22-18 M0P-098.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE # **15S22-1** January 15, 2023

ROCK NAME ALTERED QUARTZ MONZODIORITE -- probably formed by alteration
(secondary K-feldspar + sphene + smectite + chlorite + actinolite + clinozoisite)
of a quartz monzodiorite intrusive protolith.

MINERALS Plagioclase (66%) + quartz (13%) + K-feldspar (13%) + biotite (5%) +
hornblende (1%) + sphene (1%) + opaques (1%) + smectite (<1%) + chlorite
(<1%) + actinolite (<1%) + clinozoisite (<1%) + apatite (<1%) + zircon (<1%).

TEXTURES Intrusive igneous protolith; equigranular; non-directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) is dominated by plagioclase + quartz + K-feldspar +
biotite + hornblende

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) plagioclase weakly
altered to smectite ± clinozoisite ± K-feldspar ± actinolite; and (2) biotite weakly
altered to chlorite ± sphene.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 15S22-1 M0P-043.jpg/XPL/FOV = 27x46 mm ALTERED QUARTZ
MONZODIORITE showing typical appearance.

 15S22-1 M0P-044.jpg/PPL/FOV = 27x46 mm Same.

 15S22-1 M0P-099.jpg/XPL/FOV = 4.00x5.83 mm ALTERED QUARTZ
MONZODIORITE showing typical appearance.

 15S22-1 M0P-100.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE # **15S22-11** January 15, 2023

ROCK NAME ALTERED BASALT (?) BRECCIA -- probably formed by deformation and extreme alteration (secondary actinolite + FEOH + smectite + quartz) of a basalt (?) extrusive (?) protolith.

MINERALS Actinolite (85%) + opaques (8%) + FEOH (2%) + smectite (<1%) + quartz (<1%).

TEXTURES Brecciated extrusive (?) igneous (?) protolith; deformation has produced a weakly directed fabric.

Phenocrysts (0%) were not observed.

Xenoliths/Xenocrysts (0%) were not observed.

Groundmass (100%) has been extremely altered to actinolite.

Vesicles (0%) were not observed.

ALTERATION Alteration features of indeterminate relative ages: (1) plagioclase strongly altered to actinolite; and (2) veinlets of FEOH + actinolite ± quartz.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN

IMAGES 15S22-11 M0P-045.jpg/XPL/FOV = 27x46 mm ALTERED BASALT (?) BRECCIA showing typical appearance.

 15S22-11 M0P-046.jpg/PPL/FOV = 27x46 mm Same.

 15S22-11 M0P-101.jpg/XPL/FOV = 4.00x5.83 mm ALTERED BASALT (?) BRECCIA showing typical appearance.

 15S22-11 M0P-102.jpg/PPL/FOV = 4.00x5.83 mm Same.

SAMPLE #	27S22-1	January 15, 2023
ROCK NAME	ALTERED QUARTZ MONZODIORITE -- probably formed by alteration (secondary K-feldspar + clinozoisite + sphene + smectite + chlorite) of a quartz monzodiorite intrusive protolith.	
MINERALS	Plagioclase (54%) + K-feldspar (20%) + quartz (15%) + biotite (5%) + clinozoisite (3%) + hornblende (1%) + sphene (1%) + opaques (1%) + smectite (<1%) + chlorite (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Intrusive igneous protolith; equigranular; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by plagioclase + K-feldspar + quartz + biotite + hornblende.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite ± smectite ± K-feldspar; (2) biotite weakly altered to chlorite ± clinozoisite; and (3) opaques weakly altered to sphene.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>27S22-1 M0P-047.jpg/XPL/FOV = 27x46 mm ALTERED QUARTZ MONZODIORITE showing typical appearance.</p> <p>27S22-1 M0P-048.jpg/PPL/FOV = 27x46 mm Same.</p> <p>27S22-1 M0P-103.jpg/XPL/FOV = 4.00x5.83 mm ALTERED QUARTZ MONZODIORITE showing typical appearance.</p> <p>27S22-1 M0P-104.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	14A22-10	January 15, 2023
ROCK NAME	ALTERED QUARTZ MONZODIORITE -- probably formed by alteration (secondary K-feldspar + sphene + chlorite + clinozoisite + actinolite) of a quartz monzodiorite intrusive protolith.	
MINERALS	Plagioclase (75%) + K-feldspar (7%) + quartz (7%) + biotite (4%) + hornblende (3%) + opaques (3%) + clinopyroxene (1%) + sphene (<1%) + chlorite (<1%) + clinozoisite (<1%) + actinolite (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Intrusive igneous protolith; equigranular; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by plagioclase + K-feldspar + quartz + biotite + hornblende.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	<p>Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to clinozoisite + actinolite; (2) biotite weakly altered to chlorite ± K-feldspar ± clinozoisite; and (3) opaques weakly altered to sphene. Clinopyroxene has been moderately altered to hornblende + opaques by magmatic processes (?)</p>	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>14A22-10 M0P-049.jpg/XPL/FOV = 27x46 mm ALTERED QUARTZ MONZODIORITE showing typical appearance.</p> <p>14A22-10 M0P-050.jpg/PPL/FOV = 27x46 mm Same.</p> <p>14A22-10 M0P-105.jpg/XPL/FOV = 4.00x5.83 mm ALTERED QUARTZ MONZODIORITE showing typical appearance.</p> <p>14A22-10 M0P-106.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	14A22-12	January 15, 2023
ROCK NAME	ALTERED GRANITE -- probably formed by alteration (secondary K-feldspar + phlogopite + opaques + sericite + chlorite + smectite + FEOH) of a granite protolith.	
MINERALS	Plagioclase (43%) + quartz (25%) + K-feldspar (25%) + phlogopite (4%) + opaques (2%) + sericite (1%) + hornblende (<1%) + chlorite (<1%) + smectite (<1%) + FEOH (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	<p>Seriate intrusive (?) igneous protolith; non-directed fabric.</p> <p>Phenocrysts (0%) were not observed.</p> <p>Xenoliths/Xenocrysts (0%) were not observed.</p> <p>Groundmass (100%) is dominated by plagioclase + quartz + K-feldspar + phlogopite.</p> <p>Vesicles (0%) were not observed.</p>	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase weakly altered to sericite + K-feldspar; (2) biotite completely altered to phlogopite + opaques; (3) phlogopite weakly altered to chlorite; and (4) veinlets of smectite + FEOH.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	<p>14A22-12 M0P-051.jpg/XPL/FOV = 27x46 mm ALTERED GRANITE showing typical appearance.</p> <p>14A22-12 M0P-052.jpg/PPL/FOV = 27x46 mm Same.</p> <p>14A22-12 M0P-107.jpg/XPL/FOV = 4.00x5.83 mm ALTERED GRANITE showing typical appearance.</p> <p>14A22-12 M0P-108.jpg/PPL/FOV = 4.00x5.83 mm Same.</p>	

SAMPLE #	14A22-13	January 15, 2023
ROCK NAME	ALTERED ANDESITE -- probably formed by alteration (secondary phlogopite + actinolite + clinozoisite + K-feldspar) of a weakly porphyritic andesite extrusive (?) protolith.	
MINERALS	Plagioclase (67%) + phlogopite (25%) + actinolite (5%) + hornblende (2%) + clinozoisite (1%) + K-feldspar (<1%) + opaques (<1%) + apatite (<1%) + zircon (<1%).	
TEXTURES	Weakly porphyritic, extrusive (?) igneous protolith; non-directed fabric.	
	Phenocrysts (10%) Plagioclase (5%) Hornblende (5%) Xenoliths/Xenocrysts (0%) were not observed. Groundmass (90%) is dominated by plagioclase + phlogopite. Vesicles (0%) were not observed.	
ALTERATION	Alteration features of indeterminate relative ages: (1) plagioclase phenocrysts moderately altered to actinolite ± K-feldspar; and (2) hornblende moderately altered to actinolite + clinozoisite + phlogopite.	
SECTIONING	Format: 27 x 46 mm Finish: STD Stains: SCN (top 2/3) + ARSPF (none) Cover: PLN	
IMAGES	14A22-13 M0P-053.jpg/XPL/FOV = 27x46 mm ALTERED ANDESITE showing typical appearance. 14A22-13 M0P-054.jpg/PPL/FOV = 27x46 mm Same. 14A22-13 M0P-109.jpg/XPL/FOV = 4.00x5.83 mm ALTERED ANDESITE showing typical appearance. 14A22-13 M0P-110.jpg/PPL/FOV = 4.00x5.83 mm Same.	

SAMPLE # **28S22-5** January 15, 2023

ROCK NAME DIOPSIDE-ACTINOLITE-GARNET-CALCITE SKARN -- probably formed by metasomatism of a carbonate protolith.

MINERALS Calcite (80%) + garnet (13%) + actinolite (5%) + diopside (2%) + sphene (<1%).

TEXTURES Equigranular; non-directed fabric.

Porphyroblasts (0%) were not observed.

Porphyroclasts (0%) were not observed.

Matrix (100%) is dominated by calcite + diopside + dolomite + tremolite.

Cement (0%) was not observed.

ALTERATION Alteration features in relative chronological order from oldest to youngest are:
(1) contact metamorphism.

SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (none) + ARSPF (right 80%) Cover: PLN

IMAGES 28S22-5 M0P-055.jpg/XPL/FOV = 27x46 mm DIOPSIDE-ACTINOLITE-GARNET-CALCITE SKARN showing typical appearance.

 28S22-5 M0P-056.jpg/PPL/FOV = 27x46 mm Same.

 28S22-5 M0P-111.jpg/XPL/FOV = 4.00x5.83 mm DIOPSIDE-ACTINOLITE-GARNET-CALCITE SKARN showing typical appearance.

 28S22-5 M0P-112.jpg/PPL/FOV = 4.00x5.83 mm Same.