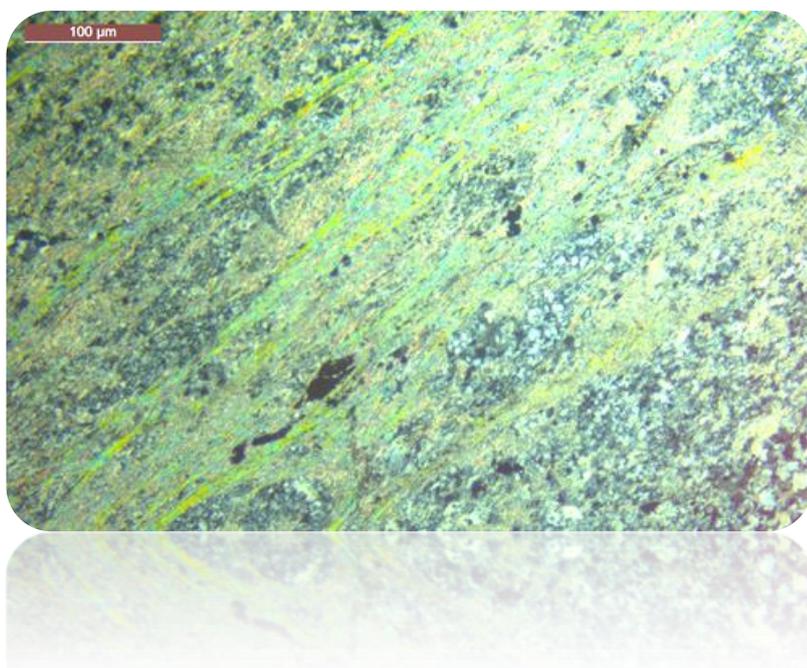


Mineral Resources Tasmania

Laboratory Report

LJN2016-060

PETROLOGICAL AND MINERALOGICAL ANALYSES, FOR HYLOGGER PROJECT: MT JULIA



An unpublished Mineral Resources Tasmania Report for:

D Green

By: R S Bottrill & R Wooley

Date: 7 September 2022

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SUMMARY

The Hylogger, XRD and optical petrology indicate these rocks are highly silicified and argillised acid volcanic rocks, now represented by variably schistose and brecciated cherts with abundant dickite. The lack of XRD support for the presence of any topaz, fluorite and pyrophyllite and most of the baryte in the drillcore is disturbing and requires follow up analyses.

INTRODUCTION & BACKGROUND

The Hylogger IR spectroscopic analyses of drillcore being conducted by various Geological Surveys in Australia routinely return analyses indicating various minerals that often cannot be readily confirmed in the hand specimens and require XRD (X-ray diffraction) or other methods for confirmation.

The objective of this study was to confirm the identity of some samples of drillcore from the Mt Julia deposit, Henty Gold Mine, Tasmania, by XRD and by microscopic petrology, to validate Hylogger results, particularly for topaz, baryte, fluorite and phyllosilicates.

SAMPLES

The details of the samples submitted are given in Table 1 below. They are from drillcore stored in the Mineral Resources Tasmania (MRT) Core Library in Mornington.

Table 1: Sample details

MRT Reg. No.	Field No.	Location	Description
G407333	MJ021/999.9-1000.0	Mt Julia deposit	qtz-baryte-phyllosilicates
G407334	MJ021/1009.45-1009.55	Mt Julia deposit	qtz-topaz-musc-dickite
G407335	MJ021/1016.7-1016.8	Mt Julia deposit	fluorite-qtz-topaz-musc-dickite
G407336	MJ021/1018.6-1018.7	Mt Julia deposit	qtz-baryte-muscovite-dickite
G407337	MJ021/1022.3-1022.4	Mt Julia deposit	kaolin-pyroph-dickite
G407338	MJ021/1039.1-1039.3	Mt Julia deposit	muscovite-baryte-dickite

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SAMPLE TREATMENT

The samples were prepared, and analysed in the MRT Hylogger laboratories, Mornington, Tasmania. They were run using Short-wave IR spectrometers only. They were also analysed by XRD and Optical petrology.

SAMPLE DESCRIPTION & PETROLOGY

G407333 MJ021/999.9-1000.0

In hand specimen this is a fine grained, sheared, quartz-white mica schist (Fig. 1). Thin sections reveal anastomising bands of what look to be white micas (XRD indicates dickite) interspersed with fine grained, cherty, siliceous rock (Fig. 2). It may be an argillised and silicified acid volcanic rock.



Fig. 1. G407333. MJ021/999.9-1000.0 sheared, quartz-muscovite schist -

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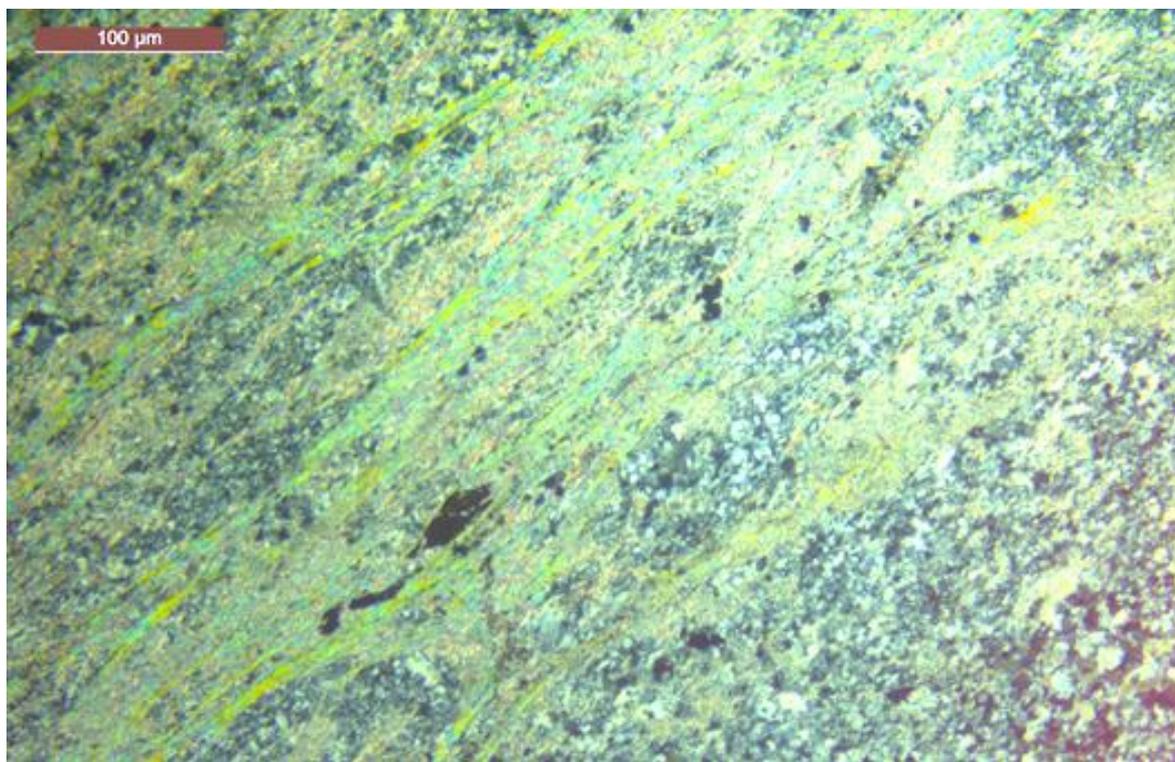


Fig. 2. G407333 MJ021/999.9-1000.0 Cherty rock cut by micaceous layers and lenses. Cross polarised transmitted light.

G407334 MJ021/1009.45-1009.55

In hand specimen this is a fine grained, mottled and brecciated chert (Fig. 3). Thin sections reveal an unfoliated, fine grained, cherty, siliceous, sericitic rock with sparse microphenocrysts of quartz (to about 0.1mm), with secondary overgrowths. There are some very fine grained, (dickite?) replacements of feldspar (?) microphenocrysts (<0.1mm) (Fig. 4). It is a silicified acid volcanic rock.

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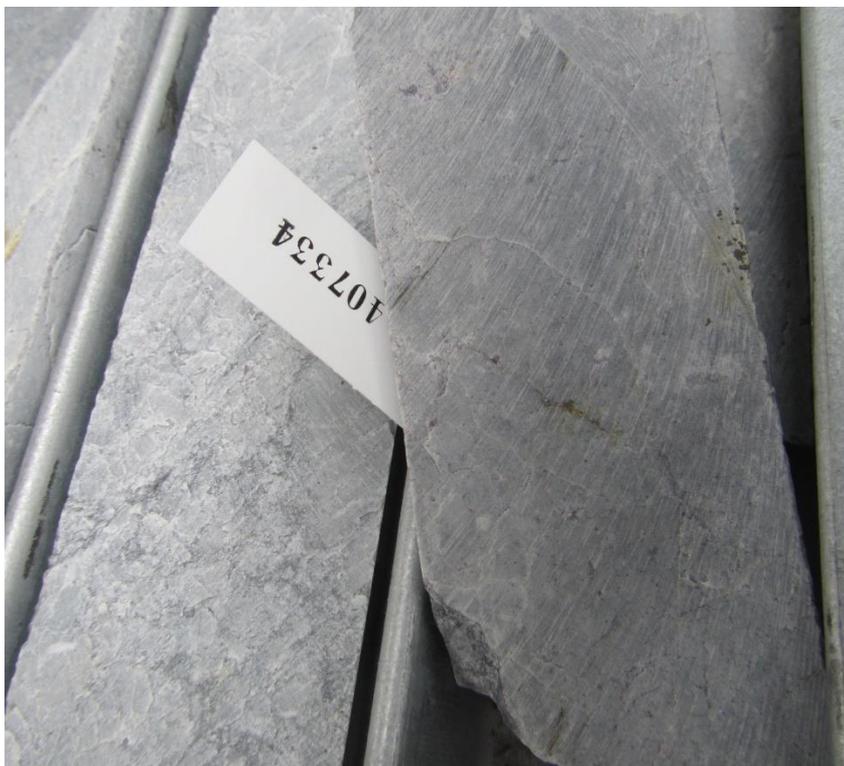


Fig. 3. G407334 MJ021/1009.45-1009.55 Fine grained siliceous rock.

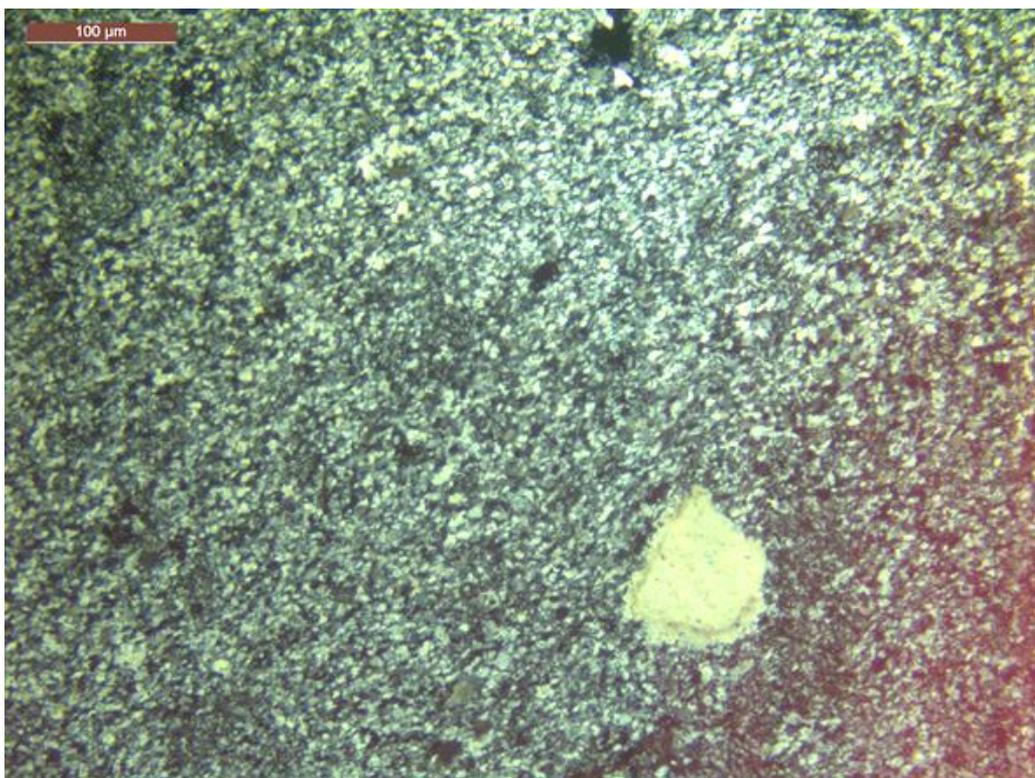


Fig. 4. G407334 MJ021/1009.45-1009.55 Cherty rock with sparse microphenocrysts of quartz, and fine grained, cherty replacements of feldspar(?) phenocrysts. Cross polarised transmitted light.

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G407335 MJ021/1016.7-1016.8

In hand specimen this is a fine grained, mottled and brecciated chert (Fig. 5). Thin sections reveal an unfoliated, fine grained, cherty, siliceous, sericitic rock with some very fine grained, sericitised (dickite?) replacements of feldspar (?) phenocrysts (<0.2mm, Fig. 4). There are some platy sericitic bands possibly representing altered slate clasts? It is a highly silicified acid volcanic breccia.



Fig. 5. G407335 MJ021/1016.7-1016.8 Fine grained siliceous rock.

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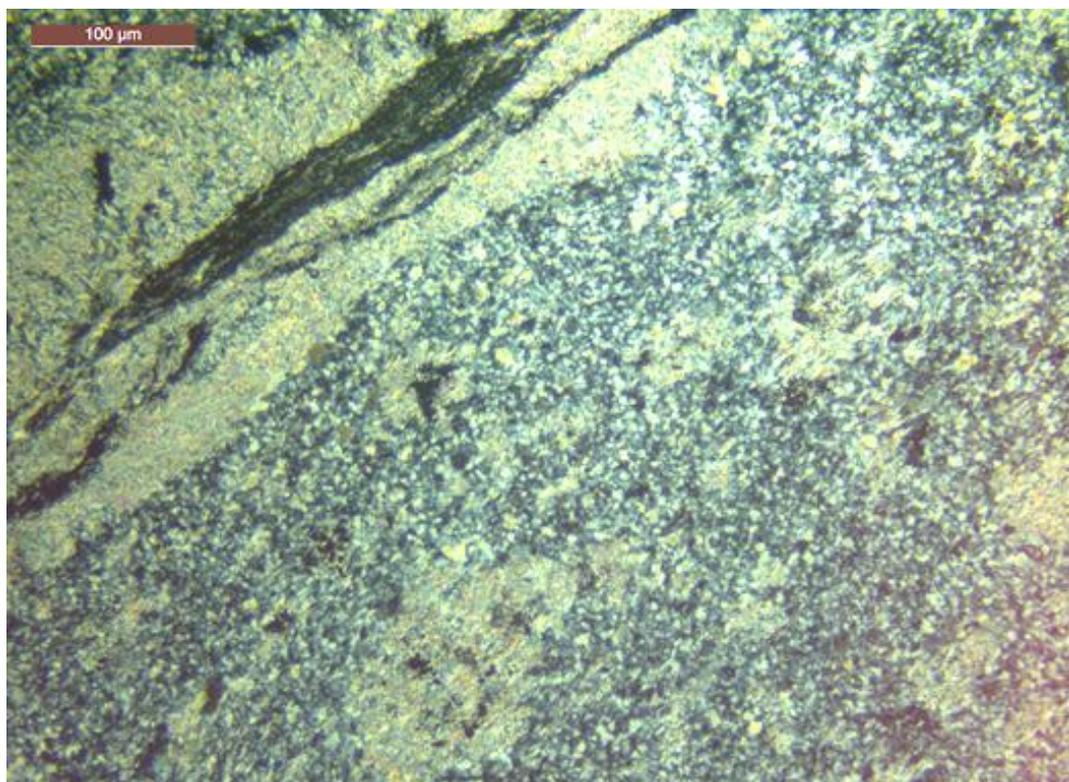


Fig. 6. G407335 MJ021/1009.45-1009.55 Cherty rock with sparse microphenocrysts of quartz, and fine grained, cherty replacements of feldspar(?) phenocrysts and slate clasts (top left). Cross polarised transmitted light.

G407336 MJ021/1018.6-1018.7

In hand specimen this is a sericitised chert with mica veining (Fig. 7). Thin sections reveal thick bands of sericite, sometimes with open fractures, in a fine grained, mottled sericitic (+dickite?) chert matrix (Fig. 8). There are medium grained quartz-sericite (+dickite?) aggregates that appear to be altered lithic fragments of perhaps highly altered and recrystallised feldspars. It may be an argillised and silicified breccia containing acid volcanic rock.

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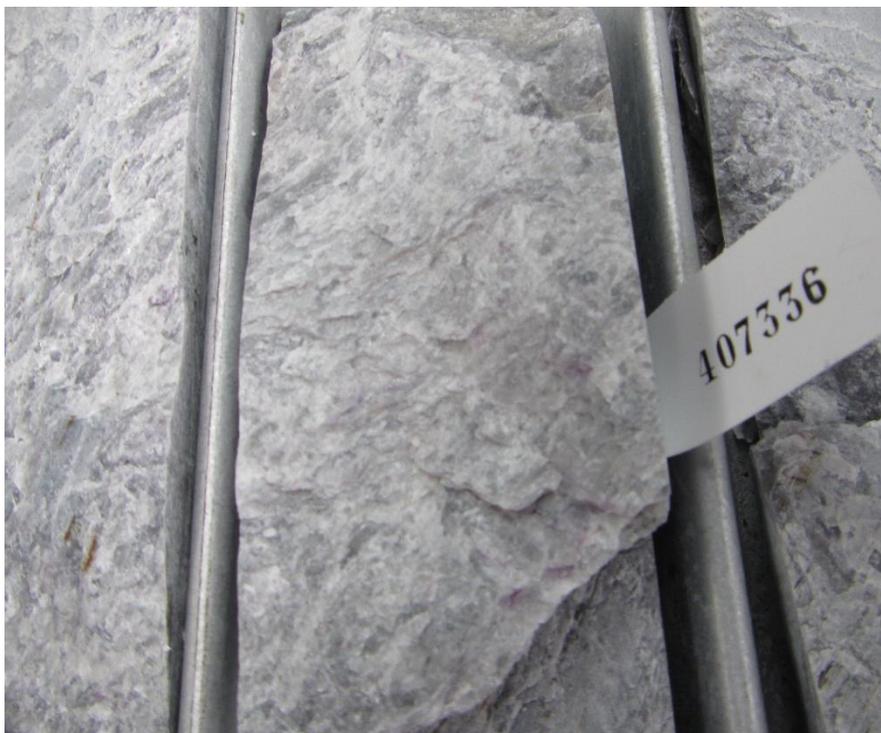


Fig. 7. G407336 MJ021/1018.6-1018.7 *Fine grained siliceous rock.*

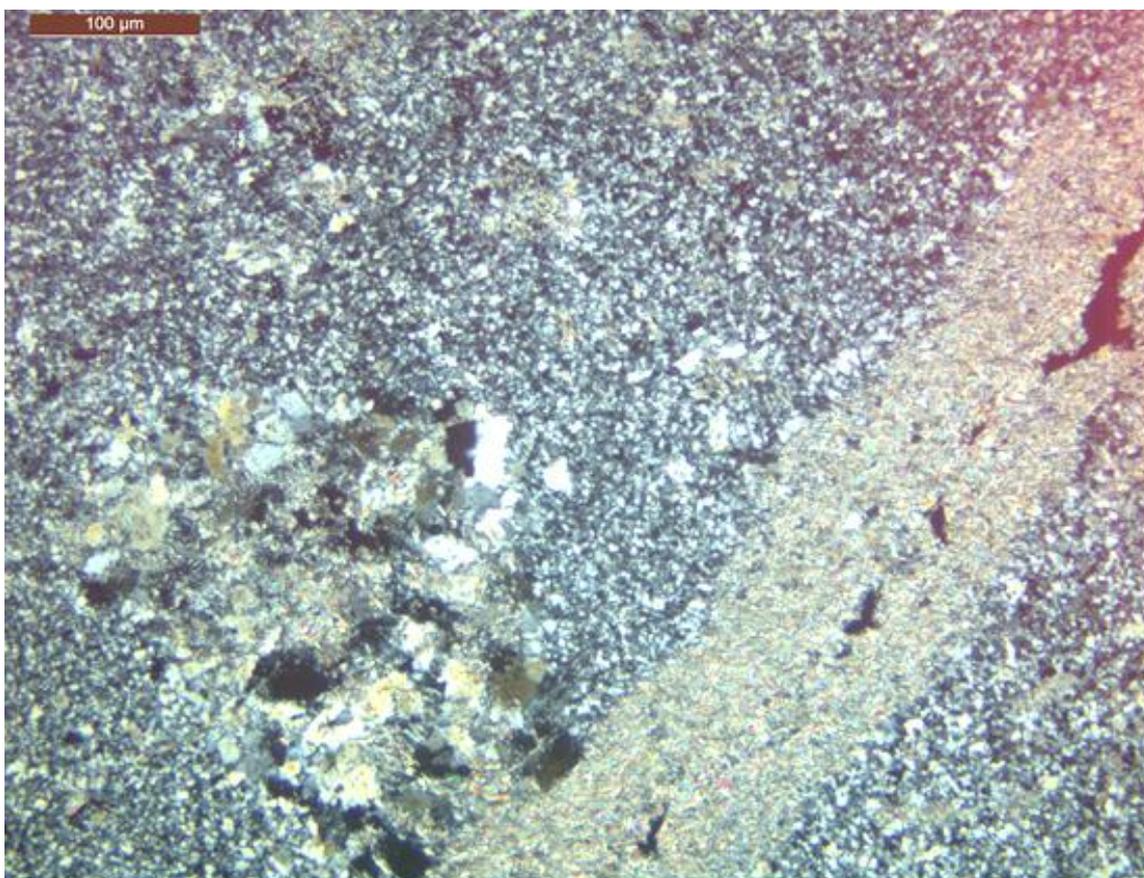


Fig. 8. G407336 MJ021/1018.6-1018.7 *Cherty rock with coarser patches of sericitic quartz, and fine grained, sericite veins with open space. Cross polarised transmitted light.*

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G407337 MJ021/1022.3-1022.4

This is a fine grained, sheared, quartz-muscovite schist (Fig. 9).



Fig. 9. G407337 MJ021/1022.3-1022.4: sericitic chert.

G407338 MJ021/1039.1-1039.3

This is a fine grained, sheared, quartz-muscovite schist (Fig. 10).



Fig. 10. G407338 MJ021/1039.1-1039.3: sheared, quartz-muscovite schist

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XRD

The samples were prepared, examined and analysed in the Mineral Resources Tasmania (MRT) laboratories, Rosny Park, Tasmania. They were run on an automated Philips X-Ray diffractometer system: PW 1729 generator, PW 1050 goniometer and PW 1710 microprocessor with nickel-filtered copper radiation at 35kV/25mA, a graphite monochromator (PW1752), sample spinner and a proportional detector (sealed gas filled PW1711). Our typical step-size is 0.02 degrees, and the standard scanning speed is 0.02 degrees/second. The PW1710 system is presently driven by the CSIRO XRD software: "VisualXRD", "PW1710 for Windows" and "XPLOT for Windows". Interpretation and quantification is largely manual, using a series of prepared standards of the more common minerals to enable some semi-quantitative analysis. Quartz, if present, is used as an internal standard; and if not present, it is often added to the sample for a supplementary scan. Our semi-quantitative results are calculated using single-peak calibration factors derived from scans of known mixtures of minerals.

Table 2: Summary of Main Results, discrepancies highlighted

Client ID	DDH?depth	Hylogger ID	Main XRD mineralogy	Comment
G407333	MJ021/999.9-1000.0	quartz -baryte- phyllsilicates	Quartz (>80%), Dickite (10%-15%)	Fair
G407334	MJ021/1009.4 5-1009.55	quartz -topaz- muscovite-dickite	Quartz (65%-80%), Dickite (15%-25%), Mica (<2%)	Fair
G407335	MJ021/1016.7- 1016.8	fluorite-quartz-topaz- muscovite-dickite	Quartz (>80%), Dickite (5%-10%), Chlorite (<2%)	Poor
G407336	MJ021/1018.6- 1018.7	quartz -baryte- muscovite-dickite	Quartz (>80%), Mica (5%-10%), Dickite (5%-10%), 'Crandallite' (2%-5%), Anatase (<2%)	Fair
G407337	MJ021/1022.3- 1022.4	kaolin-pyrophyllite- dickite	Kaolinite (35%-50%), Mica (25%-35%), Quartz (25%-35%), Anatase (<2%), ? ⁵	Poor
G407338	MJ021/1039.1- 1039.3	muscovite-baryte- dickite	Quartz (50%-65%), Kaolinite (15%-25%), Mica (10%-15%), Baryte (5%-10%), Dickite (2%-5%), Anatase (<2%)	Poor

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SUMMARY AND DISCUSSION

The XRD results generally confirm the presence of many of the minerals indicated by the Hylogger/IR methods. There are some significant misidentifications or misses in the Hylogger results. The Hylogger results shown in Table 2 are classified here as:

Good: Two or more main minerals identified, subordinates detected correctly.

Fair: One main mineral confirmed, and/or only one incorrectly identified; some subordinates detected correctly.

Poor: Main phases not detected, some subordinates detected correctly.

Very poor: No phases detected correctly.

The results thus vary from poor to fair.

Notable XRD results and possible issues include that:

1. In three samples abundant baryte was reported by TIR, but XRD indicated its presence in only one.
2. In two samples topaz was reported by TIR, but not detected by XRD.
3. In one sample abundant fluorite and muscovite were reported by TIR, but not detected by XRD (which indicated chlorite).
4. In one sample abundant pyrophyllite was reported by TIR, but not detected by XRD (which reported muscovite and quartz instead).
5. XRD reported quartz and kaolinite in one sample, but these were not found in the TIR.

The lack of XRD support for the presence of any topaz, fluorite and pyrophyllite and most of the baryte in the drillcore is disturbing and requires follow up analyses.

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R.S. Bottrill

MINERALOGIST/PETROLOGIST

R.N. Woolley

TECHNICAL OFFICER

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This and other data collected in MRT laboratories may enter the MRT databases but every attempt will be made to ensure it remains closed file and not be available externally, unless at your request.

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Appendix 1: XRD Analysis Report

Client: R. Bottrill/ D. Green

Sample Source: Mt. Julia (MJ021)

MRT Job Number: LJN2016/060

Analysis: Approximate Mineralogy

Methods: X-Ray Diffraction and X-Ray Fluorescence

Results (XRD):

MRT Reg. No.	G407333	G407334	G407335
<i>Sample</i>	999.9-1000.0	1009.45-1009.55	1016.7-1016.8
<i>Mineral</i>	<i>Wt %</i>	<i>Wt %</i>	<i>Wt %</i>
Quartz	50 ± 4	69 ± 5	39 ± 3
Muscovite	49 ± 4	3 ± 1	55 ± 4
Rutile	1 ± 0.5	1 ± 0.5	1 ± 0.5
Topaz		23 ± 2	
Fluorite		2 ± 1	4 ± 1
Dickite		1 ± 0.5	1 ± 0.5
Pyrite		1 ± 0.5	
Chlorite		*	

MRT Reg. No.	G407336	G407337	G407338
<i>Sample</i>	1018.6-1018.7	1022.3-1022.4	1039.1-1039.3
<i>Mineral</i>	<i>Wt %</i>	<i>Wt %</i>	<i>Wt %</i>
Quartz	52 ± 4	63 ± 4	
Muscovite	40 ± 3	6 ± 1	95 ± 2
Rutile	1 ± 0.5	1 ± 0.5	1 ± 0.5
Topaz		21 ± 2	
Fluorite	6 ± 1	5 ± 1	
Dickite	1 ± 0.5	4 ± 1	1 ± 0.5
Pyrite			
Chlorite			
? ¹			3 ± 1

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Results (XRF):

Sample	G407333	G407337	G407338
<i>Oxide</i>	<i>Wt %</i>	<i>Wt %</i>	<i>Wt %</i>
SiO ₂	71.66	75.50	45.93
TiO ₂	0.60	0.57	1.20
Al ₂ O ₃	18.41	14.91	35.90
Total Fe as Fe ₂ O ₃	0.32	0.04	0.35
MnO	<0.01	<0.01	<0.01
MgO	0.41	0.06	0.55
CaO	0.16	3.30	0.29
Na ₂ O	0.15	<0.01	0.41
K ₂ O	5.42	0.63	10.10
P ₂ O ₅	0.09	0.04	0.19
LOI	2.36	1.99	4.56
Total	99.58	97.04	99.48

* possible trace

¹ unidentified mineral, small peak at 4.28Å; C = 0.2%, S <0.02% (so presumably not a sulphate)

Peak overlap may interfere with identifications and quantitative calculations.

Amorphous minerals and minerals present in trace amounts may not be detected.

Analyst: R.N. Woolley

Date: 8 August 2016