An Investigation by High Definition Mineralogy into

THE MINERALOGICAL CHARACTERISTICS OF FOUR IRON OXIDE SAMPLES FROM TIMMINS, ONTARIO

prepared for

STONEWATER RESOURCES

CUSTOM MIN, MI5002-NOV13 – Final Report
March 18, 2014

SGS Canada Inc. | P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
Tel: (705) 652-2000 Fax: (705) 652-6365 www.met.sgs.com www.ca.sgs.com
Member of the SGS Group (SGS SA)

Table of Contents

List of Tables

List of Figures

Executive Summary

The mineralogical examination of four samples, referred to as TM-13-8, TM-13-9, TM-13-10, and TM-13-11, submitted by Stonewater Resources was carried out with optical mineralogy, QEMSCAN analysis, magnetic separation by Davis Tube, iron by titration, specific gravity (SG), and whole rock analysis (WRA). The purpose of the mineralogical test program was to determine the overall mineralogy and to identify the iron oxide species.

Note that the Davis Tube testwork was done at a K_{80} of 106 µm.

A summary of the results is presented below.

Modal Mineralogy

Samples TM-13-8, -10 and -11 are dominated by magnetite (5% to 41%), whereas sample TM-13-9 is dominated by iron oxides (32% in total) including both hematite (20% to 24%) and magnetite (8% to 12%). Sample TM-13-11 also contains a minor goethite component (15%). The samples also contain significant amounts of quartz (45% to 80%).

Note that magnetite is finer-grained in sample TM-13-11 than in the other samples.

The mineral abundance presented in Table 1 reflects the modal mineralogy of three polished sections from each sample and not crushed material that could better represent the mineral abundance across the entire sample.

Table 1: Mineral Abundance by QEMSCAN

Mineral/Sample	TM-13-8	TM-13-9	TM-13-10	TM-13-11
Quartz	65.8	62.6	44.6	79.8
Feldspar	0.0	0.0	0.1	0.0
Micas/Clays	0.0	0.1	0.1	0.0
Amphibole	0.0	0.0	0.1	0.0
Other Silicates	0.0	0.0	0.0	0.0
Fe-Oxides	33.4	32.3	40.8	5.2
Goethite	0.5	1.8	7.2	14.9
Calcite	0.1	0.3	1.4	0.0
Dolomite	0.1	2.7	5.7	0.0
Other	0.1	0.1	0.0	0.0
Total	100.0	100.0	100.0	100.0

Sample TM 13-8

The sample consists primarily of quartz (65.8%) and iron oxides (33.4%), with trace amounts (<1%) of goethite, dolomite, calcite, other minerals, micas/clays, feldspar, amphibole and other silicates.

Sample TM 13-9

The sample consists mainly of quartz (62.6%) and iron oxides (32% in total) including both hematite (20% to 24%) and magnetite (8% to 12%), minor goethite (2.7%) and dolomite (1.8%), and trace amounts (<1%) of calcite, other minerals, micas/clays, amphibole, feldspar and other silicates.

Sample TM 13-10

The sample consists primarily of quartz (44.6%) and magnetite (40.8%), minor goethite (7.5%), dolomite (5.7%) and calcite (1.4%), and trace amounts (<1%) of amphibole, micas/clays, feldspar, other minerals and other silicates.

Sample TM 13-11

The sample consists mainly quartz (79.8%), moderate goethite (14.9%), minor magnetite (5.2%) and trace amounts (<1%) of micas/clays, amphibole, calcite, other minerals, other silicates, dolomite and feldspar.

Specific Gravity

The specific gravity (SG) of the as-received samples ranges from 3.12 to 3.46.

Davis Tube Tests

The results from the Davis Tube tests for samples TM-13-9 and TM-13-10 are presented in Table 2. Note that the K_{80} of the samples tested was 106 µm. The % Mags in sample TM-13-9 is lower (34.2%) than that in the TM-13-10 (60.1%). The reason is most likely due to the iron oxides consisting of more hematite than magnetite in sample TM-13-9, whereas sample TM-13-10 mainly contains magnetite.

Note that hematite and goethite would not report to the Davis Tube concentrates if they are free. However, if the minerals are associated with magnetite, then they may report into the magnetic concentrate.

Table 2: Davis Tube Results

Sample	Weight	Mags	Non-mags	% Mags
TM-13-9	24.8	8.5	16.3	34.2
TM-13-10	24.9	15.0	9.9	60.1

Introduction

This summary report describes a mineralogical and analytical test program using optical mineralogy, QEMSCAN analysis, magnetic separation by Davis Tube, iron by titration, specific gravity, and whole rock analysis conducted on four samples submitted by Stonewater Resources. The purpose of the mineralogical test program was to determine the overall mineralogy and to identify the iron oxide species.

Tassos Grammatikopoulos, Ph.D., P.Geo
Senior Mineralogist, Advanced Mineralogy Facility

Stephanie Downing, M.Sc
Manager, Advanced Mineralogy Facility

Sample Preparation by: Scott Young
QEMSCAN Operation: Amie Brock
QEMSCAN Processing: Nicole Morton and Tassos Grammatikopoulos
Electron Microscopy: Aldis Margot
Optical Mineralogy: Tassos Grammatikopoulos
Report preparation by: Tassos Grammatikopoulos
Report reviewed by: Kim Gibbs, Alicia Windsor, Stephanie Downing

Testwork Summary

1. Sample Receipt and Preparation

Four samples, referred to as TM-13-8, -9, -10 and -11 (Table 3), from an iron ore property in Timmins, Ontario, were submitted to the mineralogy department at SGS Canada Inc., Lakefield site, by Stonewater Resources. They were assigned the LIMS number MI5002-NOV13.

A total of twelve polished sections were prepared, three from each rock sample for mineralogical analysis.

Specific gravity (SG) of the samples was measured on the rock specimens. The samples were then crushed to -10 mesh, and crushed again to a K_{80} of 106 µm. Representative sub-samples were riffled for whole rock analysis (WRA) by X-ray fluorescence (XRF) for all samples, and iron by titration for samples TM 13-9 and TM 13-10. Iron was calculated for the rest of the sample by conversion from Fe_2O_3 to elemental Fe. In addition, sub-samples were riffled from TM 13-9 and TM 13-10 for Davis Tube testwork.

The mineralogical examination was carried out using both optical mineralogy and QEMSCAN technology. The QEMSCAN analysis was done using the Field Stitch (FS) mode of measurement. The FS maps a sample that has been mounted in a polished section. It collects a chemical spectrum at a set interval within the field of view. Each field of view is then processed offline and a pseudo image of the core sample is produced. The pixel spacing for the analysis was 15 µm. The polished epoxy grain mounts were also examined with an optical microscope in both transmitted and reflected light.

Table 3: Sample ID and Testwork Requested

Sample No.	WRA	%Fe	SG	Davis Tube
TM-13-8	X		X	
TM-13-9	X	X	X	X
TM-13-10	X	X	X	X
TM-13-11	X		X	

2. Specific Gravity Results

The specific gravity (SG) test results are presented in Table 4.

Table 4: Specific Gravity Results

No.	ID	Description	Dry Rock	Weight in Water	Water Displacemt	Density (g/cm³)	Density (lbs/ft³)
1	TM-13-8	Rock	1605.4	1105.5	499.9	**3.21**	200.5
2	TM-13-9	Rock	3660.6	2566.1	1094.5	**3.34**	208.8
3	TM-13-10	Rock	2770.7	1970.1	800.6	**3.46**	216.1
4	TM-13-11	Rock	2516.2	1709.5	806.7	**3.12**	194.8

3. WRA by XRF and Iron by Titration Results

The results from the WRA by XRF are presented in Table 5 and Table 6. The certificate of chemical analysis is given in Appendix A.

Table 5: WRA by XRF Results

Sample ID	TM-13-8	TM-13-9	TM-13-10	TM-13-11	TM-13-9 Cut 2	TM-13-10 Cut 2
SiO2 %	57.10	46.90	36.60	66.60	48.80	38.00
Al2O3 %	0.08	0.07	0.09	0.08	0.22	0.16
Fe2O3 %	41.60	48.40	58.60	29.10	47.30	57.80
MgO %	0.26	0.82	1.25	0.78	0.82	1.23
CaO %	0.71	1.74	1.71	0.43	1.80	1.68
Na2O %	0.03	0.02	0.04	0.03	0.14	0.09
K2O %	< 0.01	< 0.01	0.01	< 0.01	0.03	0.02
TiO2 %	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
P2O5 %	0.18	0.14	0.19	0.10	0.15	0.18
MnO %	0.02	0.01	0.04	0.10	0.01	0.03
Cr2O3 %	0.02	< 0.01	0.02	0.04	0.03	0.01
V2O5 %	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
LOI %	-0.51	1.72	1.77	3.44	1.66	1.64
Sum %	99.60	99.90	100.30	100.70	101.00	100.90

Table 6: Iron by Titration Results

Sample ID	Fe %
TM-13-9	33.73
TM-13-10	40.87

4. Davis Tube Results

The results from the Davis Tube testwork are presented in Table 7. Note that the K_{80} of the samples tested was 106 µm. The Mags fraction from both samples (TM-13-9 and TM13-10) was submitted for WRA by XRF (Table 8). It should be noted that the % Mags in sample TM-13-9 is lower (34.2%) than that in sample TM-13-10 (60.1%). The reason is most likely due to the iron oxides consisting of more hematite than magnetite in the TM-13-9, whereas sample TM-13-10 mainly contains magnetite.

Note that hematite and goethite would not report to the Davis Tube concentrates if they are free. However, if the minerals are associated with magnetite, then they may report into the magnetic concentrate.

Table 7: Davis Tube Results

DAVIS TUBE TEST

Test Conditions:

Water flow:	1000 mL per minute
Tube Speed:	100 strokes per minute
Current to Poles:	1.5 amperes
Retention Time:	4 minutes

Project # : **MI5002-NOV13**

Sample	Weight	Mags	Non-mags	% Mags
TM-13-9	24.8	8.5	16.3	34.2
TM-13-10	24.9	15.0	9.9	60.1

Table 8: WRA by XRF Results for the Davis Tube Mag Fraction

Sample ID	**TM-13-9 Davis Tube Mag Fraction**	**TM-13-10 Davis Tube Mag Fraction**
SiO2 %	5.28	10.10
Al2O3 %	0.01	< 0.01
Fe2O3 %	97.10	91.70
MgO %	0.06	0.24
CaO %	0.10	0.26
Na2O %	0.01	0.01
K2O %	< 0.01	< 0.01
TiO2 %	< 0.01	< 0.01
P2O5 %	0.02	0.04
MnO %	< 0.01	0.01
Cr2O3 %	0.04	0.02
V2O5 %	< 0.01	< 0.01
LOI %	-2.77	-2.31
Sum %	99.90	100.10

5. Mineralogical Results

QEMSCAN and optical mineralogy were used to examine the samples.

Samples TM-13-8, -10 and -11 are dominated by magnetite (5% to 41%), whereas sample TM-13-9 is dominated by hematite and magnetite. TM-13-11 also contains a minor goethite component. The samples also contain a significant amount of quartz (45% to 80%) (Table 9, Figure 1).

Note that these values reflect the average modal mineralogy of three polished sections for each sample and not of crushed material that could better represent the modal abundance of entire sample.

Table 9: Mineral Abundance by QEMSCAN and Characteristics for all Samples

Survey		Stonewater Resources Ltd.			
Project		CUSTOM MIN / MI5002-NOV13			
Sample		TM-13-8	TM-13-9	TM-13-10	TM-13-11
Calculated ESD Particle Size		20980	19127	20605	20331
Mineral Mass (%)	Quartz	65.8	62.6	44.6	79.8
	Feldspar	0.0	0.0	0.1	0.0
	Micas/Clays	0.0	0.1	0.1	0.0
	Amphibole	0.0	0.0	0.1	0.0
	Other Silicates	0.0	0.0	0.0	0.0
	Fe-Oxides	33.4	32.3	40.8	5.2
	Goethite	0.5	1.8	7.2	14.9
	Calcite	0.1	0.3	1.4	0.0
	Dolomite	0.1	2.7	5.7	0.0
	Other	0.1	0.1	0.0	0.0
	Total	100.0	100.0	100.0	100.0

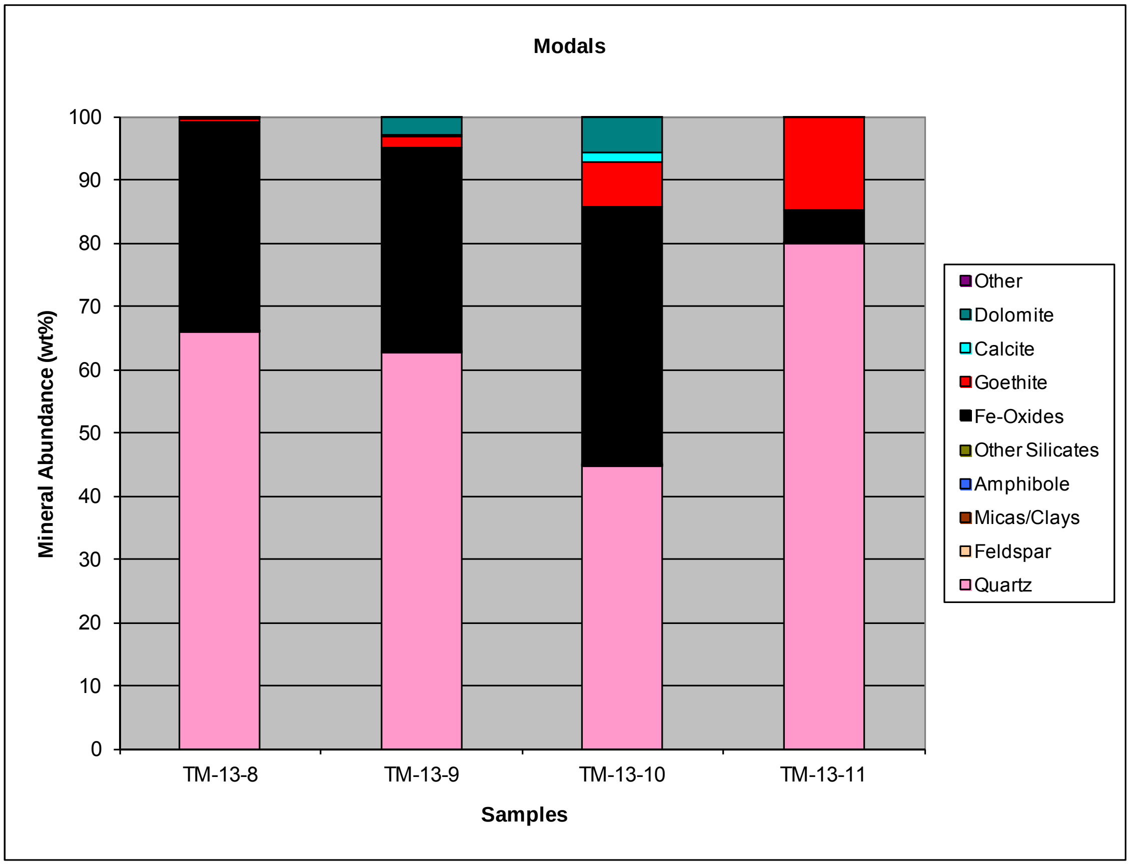


Figure 1: QEMSCAN Modal Mineralogy for all Samples

5.1. Sample TM-13-8

The sample is fine-grained and is dominated by quartz (65.8%) and iron oxides (33.4%), including mainly magnetite and traces of hematite, and trace amounts (<1% each) of goethite, dolomite, calcite, other minerals, micas/clays, feldspar, amphibole and other silicates (Table 10, Figure 2). Hematite replaces magnetite locally. Magnetite shows a bimodal grain size distribution and ranges from <50 µm to 1 mm in size. It forms aggregates and semi-massive to poorly defined layers alternating with silicate layers. Magnetite also occurs as disseminated grains in silicates. The contacts between magnetite and gangue minerals are generally sharp on the mesoscopic level.

QEMSCAN pseudo-coloured images are given in Figure 3 to Figure 5. Representative photomicrographs from the optical microscope are presented in Figure 6 to Figure 7.

Table 10: Mineral Abundance by QEMSCAN and Characteristics for Sample TM 13-8

Survey		Stonewater Resources Ltd.			
Project		CUSTOM MIN / MI5002-NOV13			
Sample		TM-13-8			
Calculated ESD Particle Size		20980	20791	21250	20896
		Comb	**Rep 1**	**Rep 2**	**Rep 3**
Mineral Mass (%)	Quartz	65.8	56.1	61.3	82.8
	Feldspar	0.0	0.0	0.0	0.0
	Micas/Clays	0.0	0.0	0.0	0.0
	Amphibole	0.0	0.0	0.0	0.0
	Other Silicates	0.0	0.0	0.0	0.0
	Fe-Oxides	33.4	43.5	38.2	15.5
	Goethite	0.5	0.2	0.4	1.0
	Calcite	0.1	0.0	0.0	0.2
	Dolomite	0.1	0.1	0.0	0.4
	Other	0.1	0.1	0.1	0.1
	Total	100.0	100.0	100.0	100.0
Mean Grain Size by Frequency (µm)	Quartz	565	453	530	761
	Feldspar	25	21	21	26
	Micas/Clays	33	35	33	32
	Amphibole	35	38	35	34
	Other Silicates	23	21	25	22
	Hematite	158	184	177	88
	Goethite	47	42	45	49
	Calcite	45	38	33	46
	Dolomite	56	54	0	57
	Other	39	41	39	34

Note: The size of the minerals as shown in the table below is calculated statistically from the length of all the horizontal intercepts through each particle. It uses an assumption of random sectioning of spherical particles having uniform size, to obtain an estimate of the stereologically-corrected grain size in microns. The size calculation is a statistical property, which means that it is only valid when applied to a population of particles, and its accuracy increases as the population size increases. The accuracy of the size calculation is extremely low if applied to just a single cross-section.

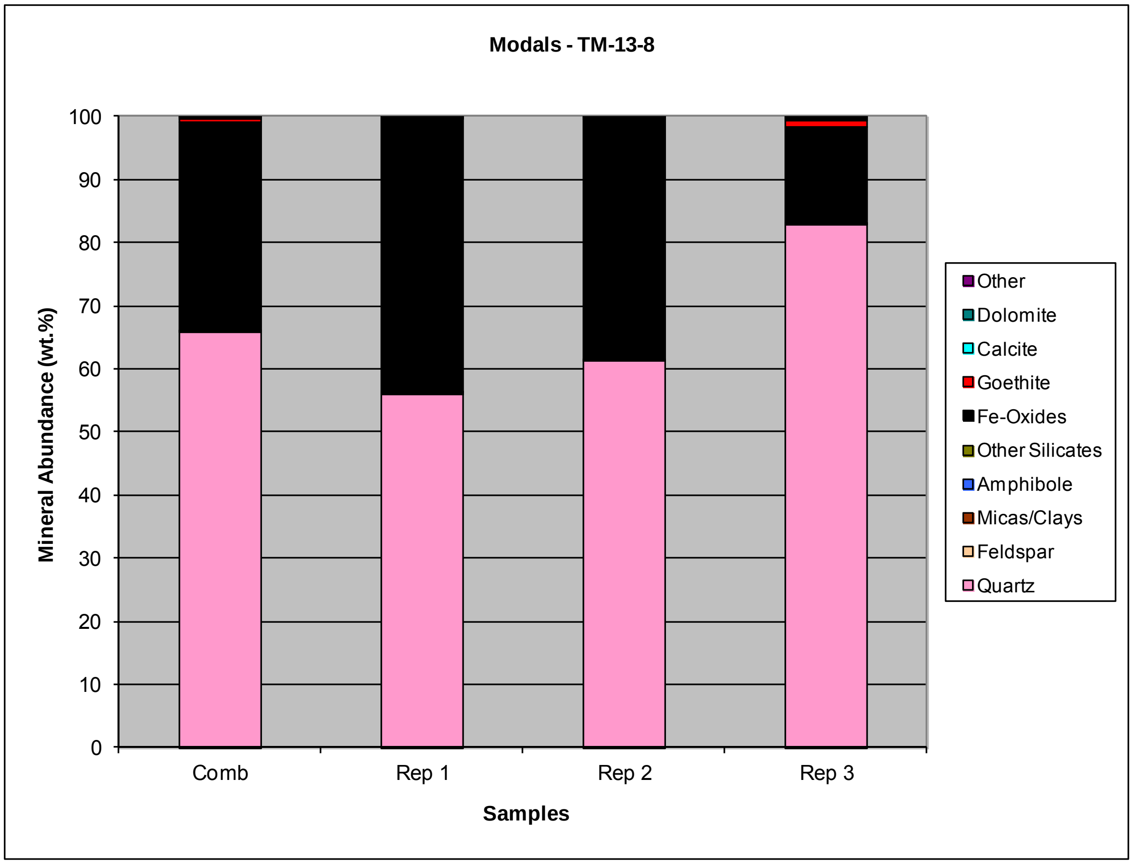


Figure 2: QEMSCAN Modal Mineralogy for Three Replicates from Sample TM-13-8

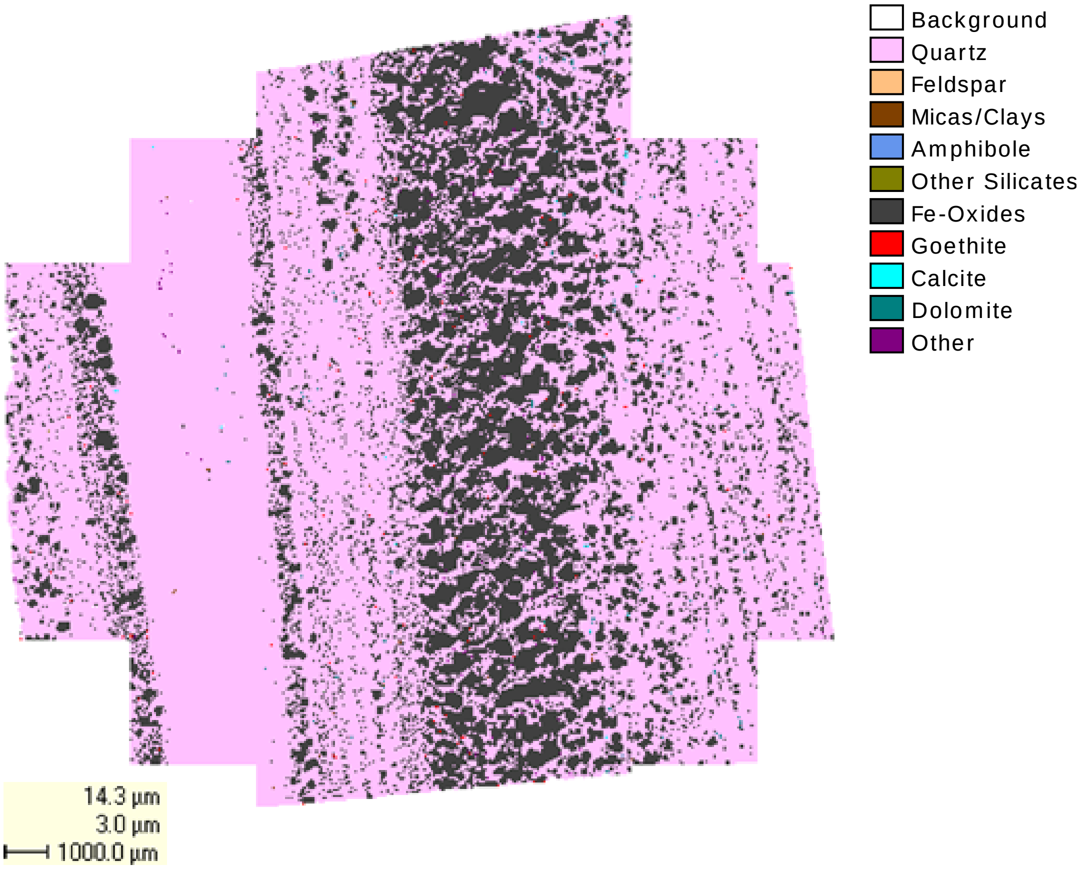


Figure 3: QEMSCAN Pseudo-Image of Sample TM-13-8 (Rep 1)

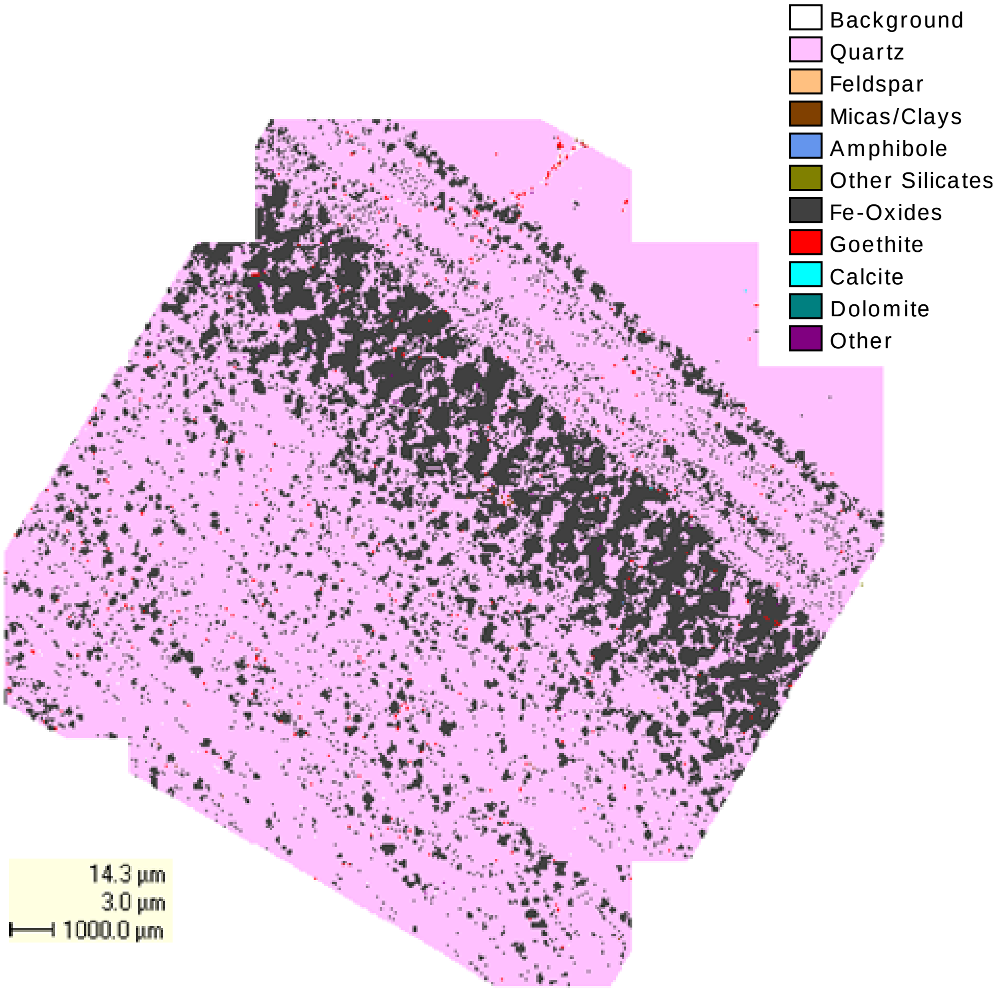


Figure 4: QEMSCAN Pseudo-Image of Sample TM-13-8 (Rep 2)

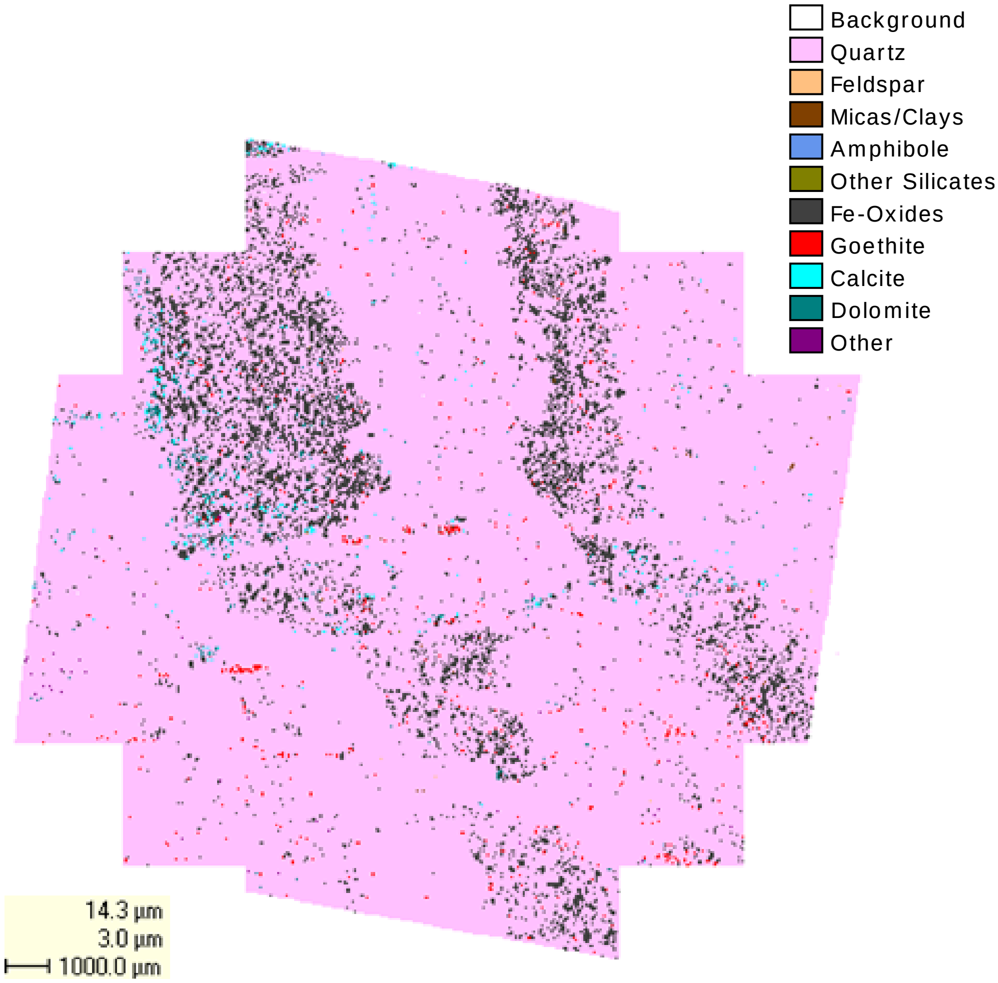


Figure 5: QEMSCAN Pseudo-Image of Sample TM-13-8 (Rep 3)

Iron oxides form layers, typically <1-5 mm in thickness, alternating with quartz-rich layers. These consist of massive to semi-massive oxides. Disseminated iron oxides occur interstitial in the quartz layers. Iron oxides also form poorly defined layers.

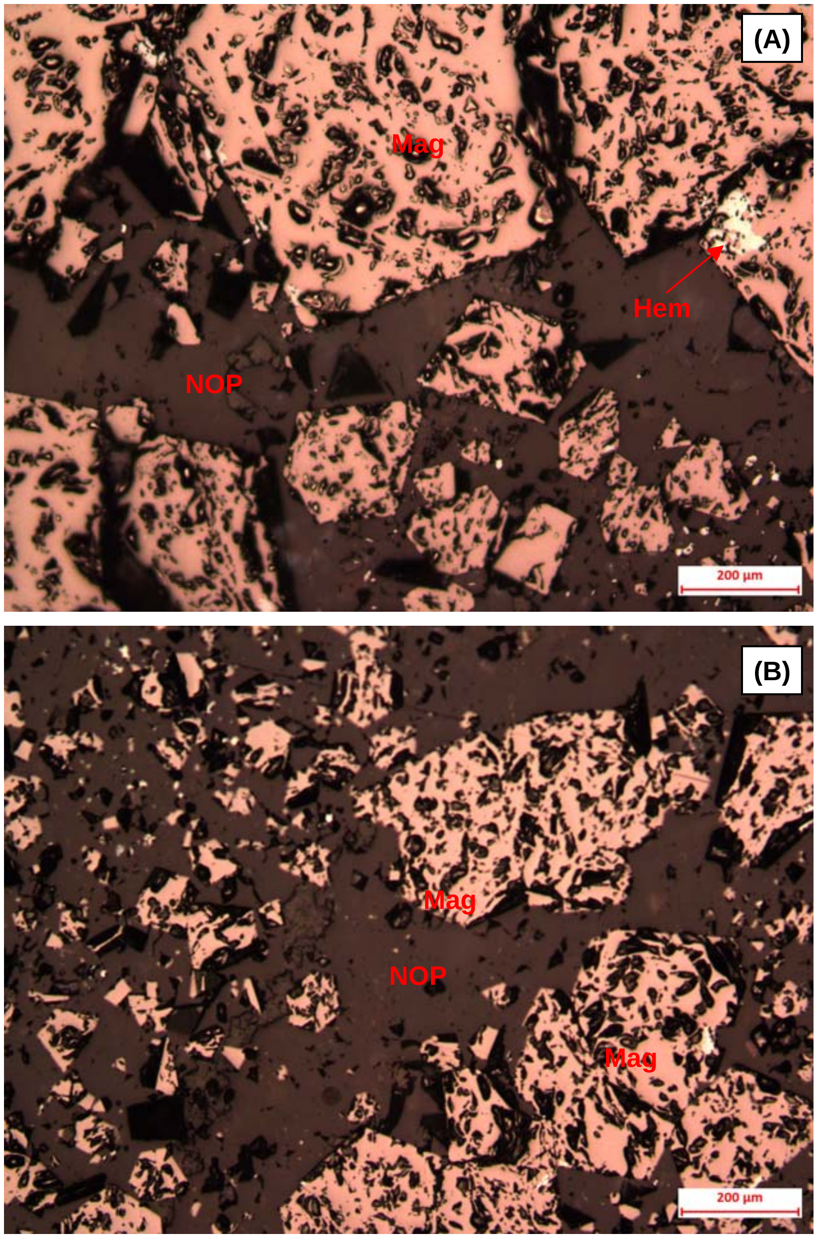


Figure 6: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM-13-8

(A) Image shows coarse-grained (relative to the next samples) magnetite (Mag) intergrown with silicate minerals (NOP: dark grey). Minor hematite (Hem) replaces magnetite locally.

(B) Image shows fine and coarse-grained magnetite and silicate minerals.

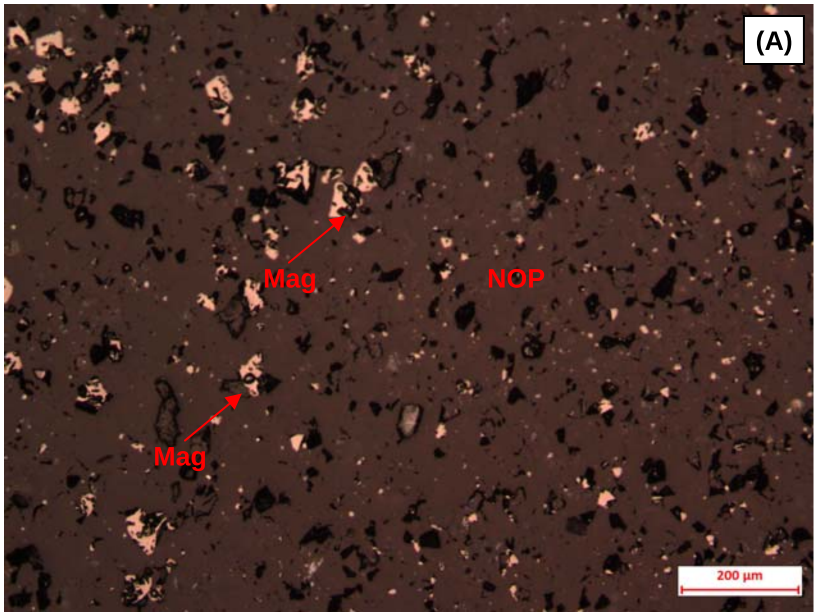


Figure 7: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM-13-8

(A) Image shows fine-grained, disseminated magnetite (Mag) interstitially locked in silicate minerals (NOP: dark grey).

5.2. Sample TM-13-9

The sample is fine-grained and is dominated by quartz (62.6%) and by iron oxides (32%) including both hematite (20%-24%) and magnetite (8-12%), minor goethite (2.7%) and dolomite (1.8%), and trace amounts (<1%) of calcite, other minerals, micas/clays, amphibole, feldspar and other silicates (Table 11, Figure 8). Note that the estimation between magnetite and hematite is only based on visual observations and may vary within the sample.

Iron oxides include both hematite (mainly) and magnetite. They are subhedral in nature and form aggregates and comprise massive layers. The contacts between the iron oxides and gangue minerals are generally sharp on the mesoscopic level. Hematite is typically less than 0.3 mm in size and magnetite up to 0.7 mm in the layers that they form.

QEMSCAN pseudo-colour images are given in Figure 9 to Figure 11. Representative photomicrographs from the optical microscope are presented in Figure 12 to Figure 13.

Table 11: Mineral Abundance by QEMSCAN and Characteristics for Sample TM-13-9

Survey		**Stonewater Resources Ltd.**			
Project		**CUSTOM MIN / MI5002-NOV13**			
Sample		**TM-13-9**			
Calculated ESD Particle Size		19127	19219	18058	20236
		Comb	**Rep 1**	**Rep 2**	**Rep 3**
Mineral Mass (%)	Quartz	62.6	56.4	52.6	81.0
	Feldspar	0.0	0.0	0.0	0.0
	Micas/Clays	0.1	0.1	0.1	0.1
	Amphibole	0.0	0.0	0.0	0.0
	Other Silicates	0.0	0.0	0.0	0.0
	Fe-Oxides	32.3	40.8	37.5	16.9
	Goethite	1.8	2.4	1.1	1.9
	Calcite	0.3	0.0	0.9	0.0
	Dolomite	2.7	0.2	7.6	0.0
	Other	0.1	0.1	0.2	0.1
	Total	100.0	100.0	100.0	100.0
Mean Grain Size by Frequency (µm)	Quartz	407	292	329	783
	Feldspar	22	21	21	22
	Micas/Clays	36	32	44	29
	Amphibole	38	40	35	37
	Other Silicates	23	27	23	21
	Hematite	143	116	199	130
	Goethite	48	47	46	50
	Calcite	46	48	46	37
	Dolomite	87	77	87	0
	Other	44	35	49	43

Note: The size of the minerals as shown in the table below is calculated statistically from the length of all the horizontal intercepts through each particle. It uses an assumption of random sectioning of spherical particles having uniform size, to obtain an estimate of the stereologically-corrected grain size in microns. The size calculation is a statistical property, which means that it is only valid when applied to a population of particles, and its accuracy increases as the population size increases. The accuracy of the size calculation is extremely low if applied to just a single cross-section.

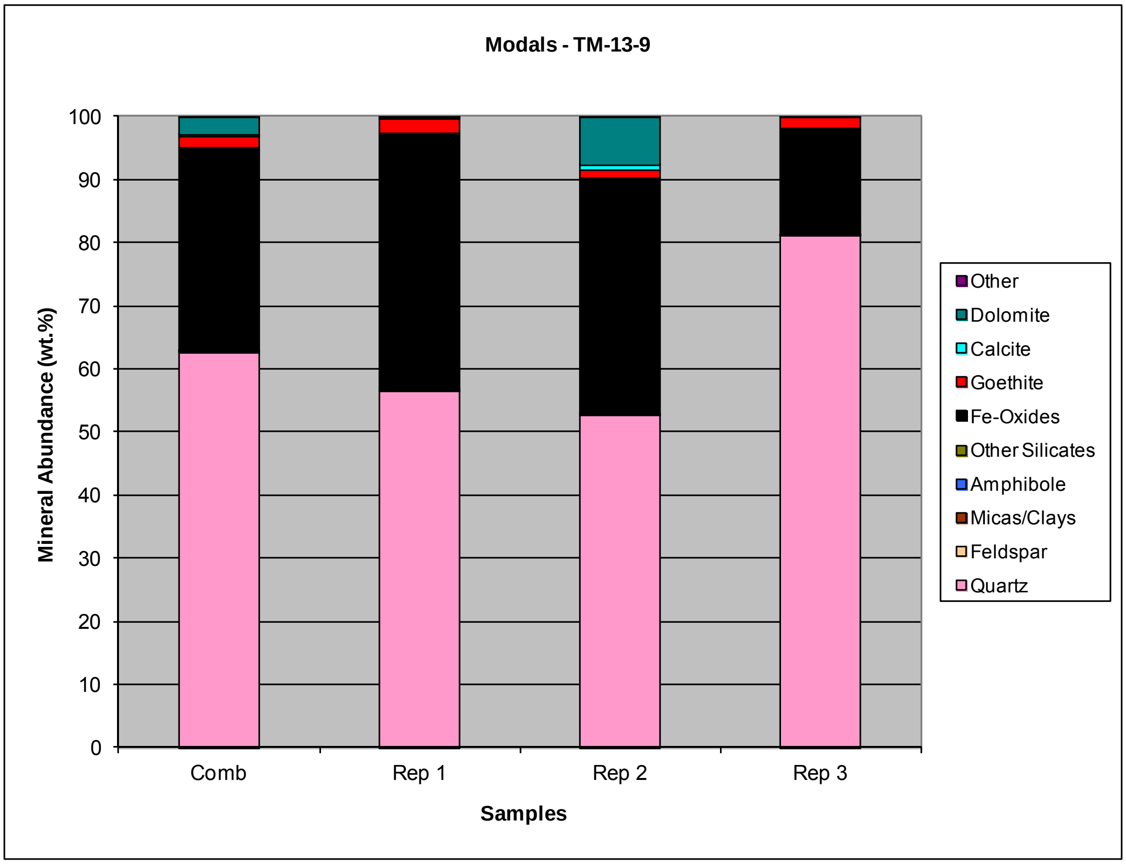


Figure 8: QEMSCAN Modal Mineralogy for Three Replicates from Sample TM-13-9

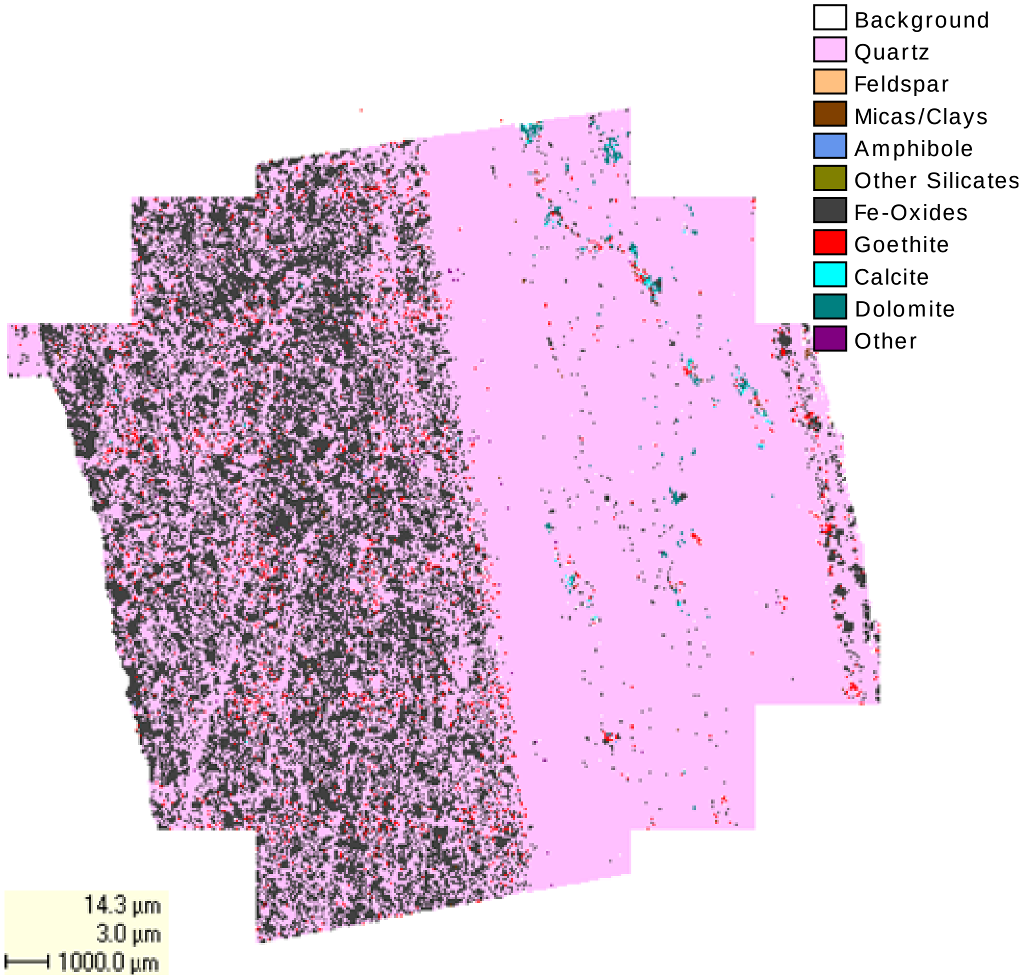


Figure 9: QEMSCAN Pseudo-Image of Sample TM-13-9 (Rep 1)

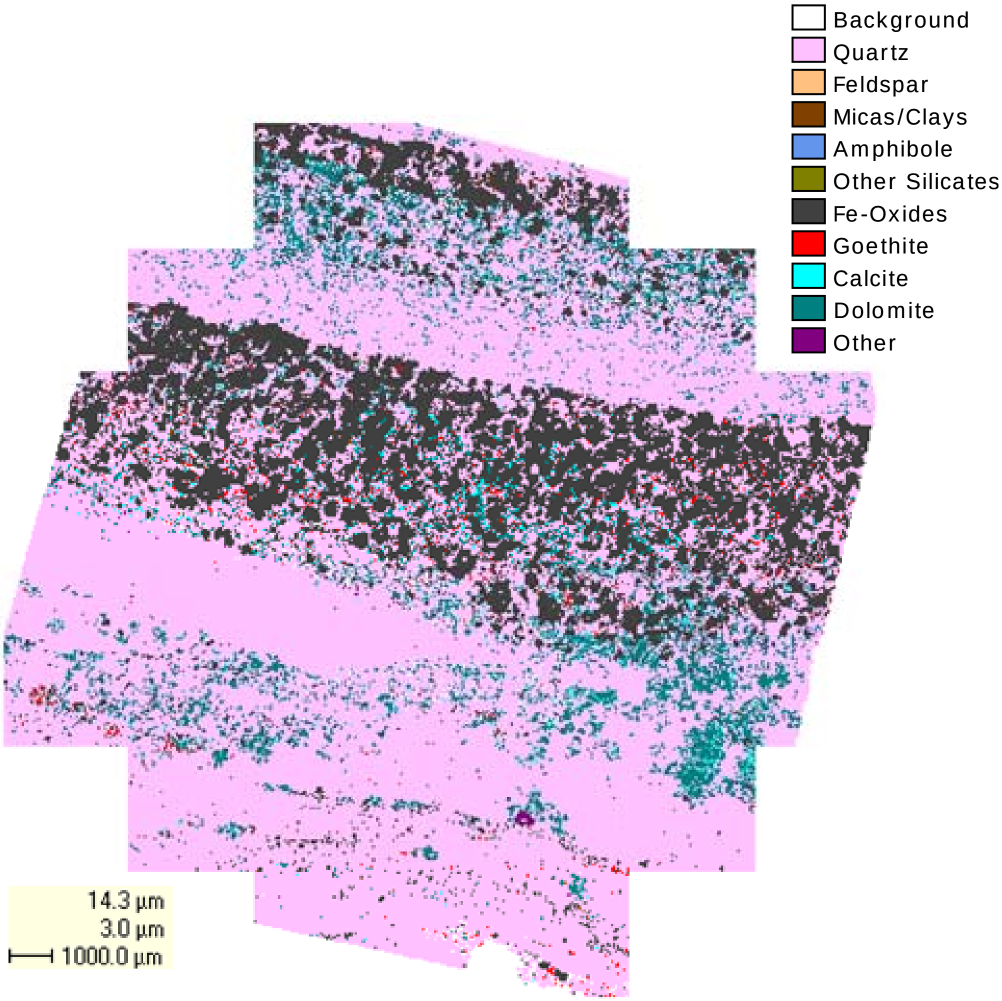


Figure 10: QEMSCAN Pseudo-Image of Sample TM-13-9 (Rep 2)

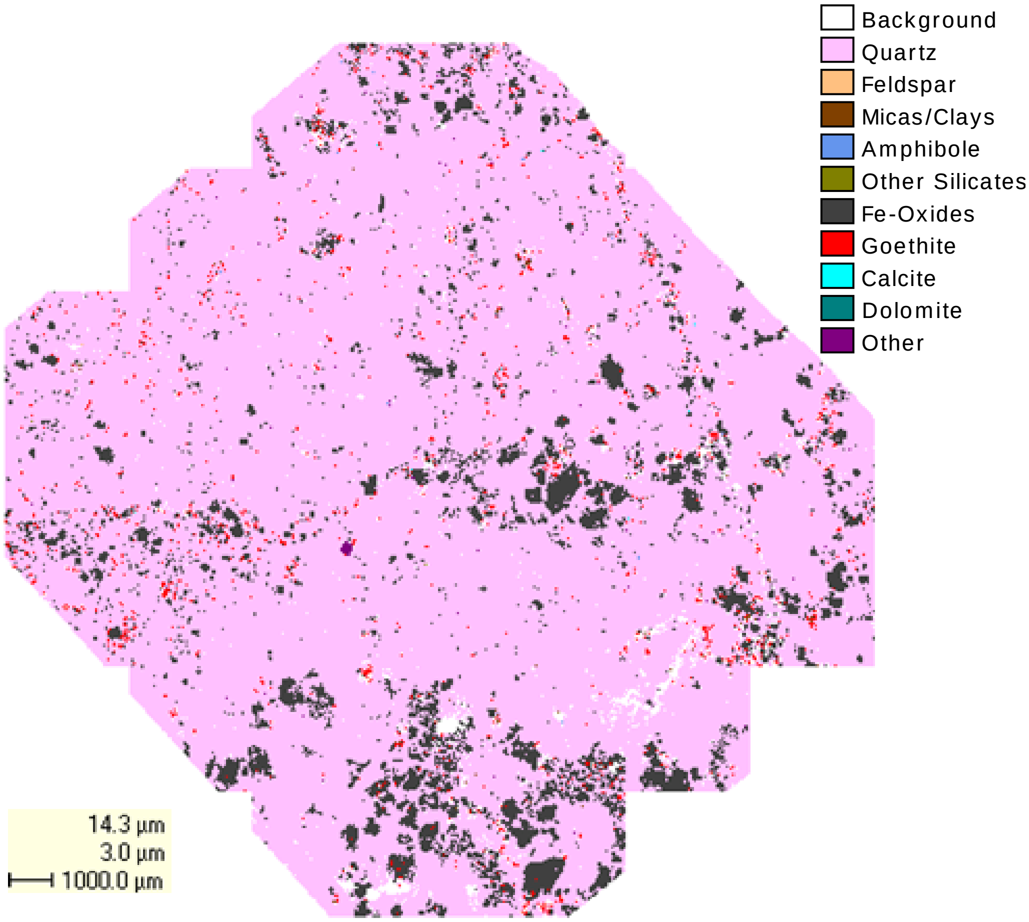


Figure 11: QEMSCAN Pseudo-Image of Sample TM-13-9 (Rep 3)

Iron oxides form layers, typically <1-5 mm in thickness, alternating with quartz-rich and carbonate layers. These consist of massive to semi-massive oxides. Disseminated iron oxides occur interstitial in the quartz layers. Iron oxides/quartz layers show sharp boundaries.

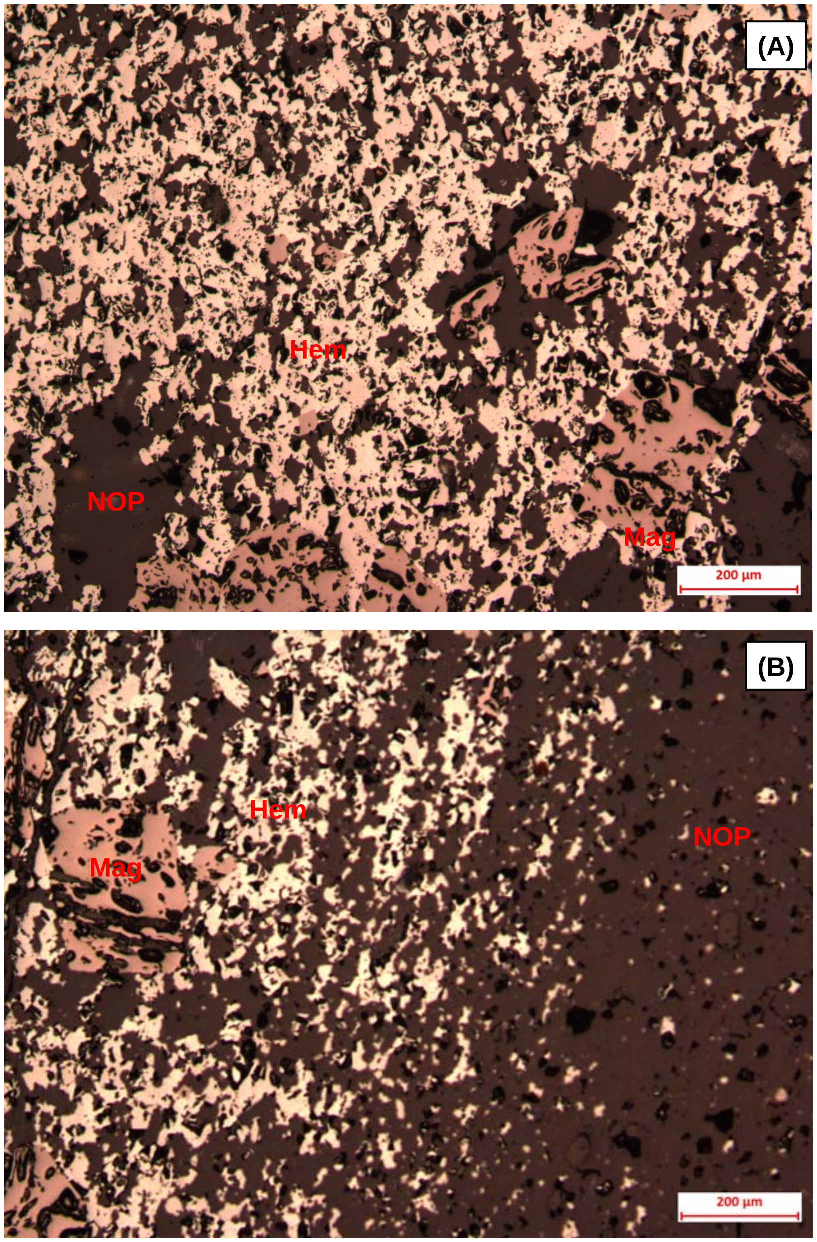


Figure 12: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM-13-9

(A) Image shows massive fine-grained magnetite (Mag) and hematite intergrown with quartz (NOP: dark grey).

(B) Image shows a contact between the massive magnetite/hematite layer with the quartz layer that hosts disseminated magnetite.

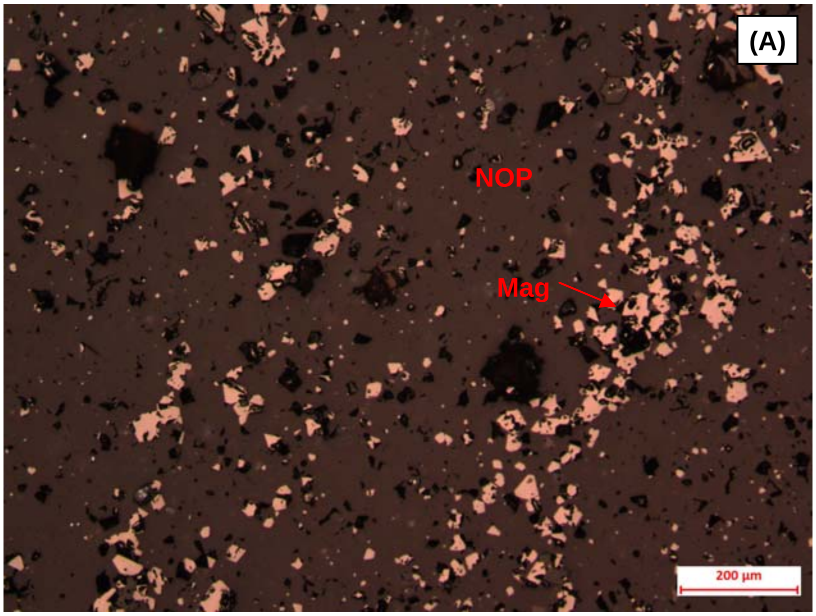


Figure 13: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM 13-9

(A) Image shows fine-grained disseminated magnetite (Mag) interstitially locked in quartz (NOP: dark grey).

5.3. Sample TM-13-10

The sample is fine-grained and is dominated by quartz (44.6%) and iron oxides (40.8%), including mainly magnetite, and traces of hematite, minor goethite (7.5%), dolomite (5.7%) and calcite (1.4%), and trace amounts (<1%) of amphibole, micas/clays, feldspar, other minerals, and other silicates (Table 12, Figure 14). Iron oxides are mainly magnetite and are fine-grained, <150 µm in size but aggregates are coarser as they form layers. Magnetite forms layers that are interlayered with silicate minerals. The contacts between magnetite and gangue minerals are generally sharp on the mesoscopic level. Note that goethite might have been overestimated. This is because it is anhedral with irregular grain boundaries, fine and coarse, and disseminated in the sample.

QEMSCAN pseudo-colour images are given in Figure 15 to Figure 17. Representative photomicrographs from the optical microscope are presented in Figure 18 to Figure 19.

Table 12: Mineral Abundance by QEMSCAN and Characteristics for Sample TM-13-10

Survey		**Stonewater Resources Ltd.**			
Project		**CUSTOM MIN / MI5002-NOV13**			
Sample		**TM-13-10**			
Calculated ESD Particle Size		20605	20612	20239	20976
		Comb	**Rep 1**	**Rep 2**	**Rep 3**
Mineral Mass (%)	Quartz	44.6	69.3	68.1	10.6
	Feldspar	0.1	0.0	0.1	0.1
	Micas/Clays	0.1	0.0	0.0	0.1
	Amphibole	0.1	0.0	0.1	0.2
	Other Silicates	0.0	0.0	0.0	0.0
	Fe-Oxides	40.8	24.7	18.4	67.9
	Goethite	7.2	4.6	6.7	9.4
	Calcite	1.4	0.2	0.8	2.7
	Dolomite	5.7	1.1	5.8	8.9
	Other	0.0	0.0	0.0	0.1
	Total	100.0	100.0	100.0	100.0
Mean Grain Size by Frequency (µm)	Quartz	313	547	525	65
	Feldspar	42	30	45	39
	Micas/Clays	31	30	27	33
	Amphibole	46	42	42	48
	Other Silicates	23	23	22	23
	Hematite	124	108	96	136
	Goethite	58	54	63	56
	Calcite	48	46	47	49
	Dolomite	96	73	143	86
	Other	29	27	29	29

Note: The size of the minerals as shown in the table below is calculated statistically from the length of all the horizontal intercepts through each particle. It uses an assumption of random sectioning of spherical particles having uniform size, to obtain an estimate of the stereologically-corrected grain size in microns. The size calculation is a statistical property, which means that it is only valid when applied to a population of particles, and its accuracy increases as the population size increases. The accuracy of the size calculation is extremely low if applied to just a single cross-section.

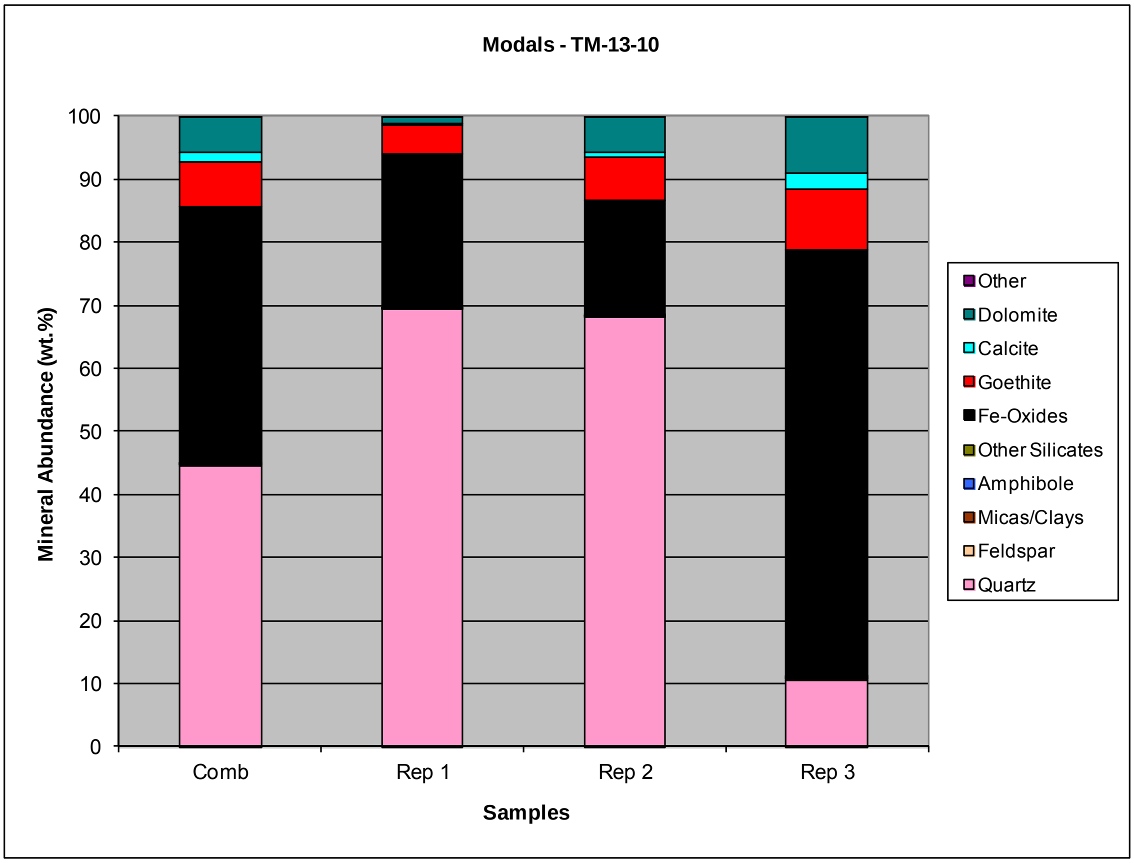


Figure 14: QEMSCAN Modal Mineralogy for Three Replicates from Sample TM-13-10

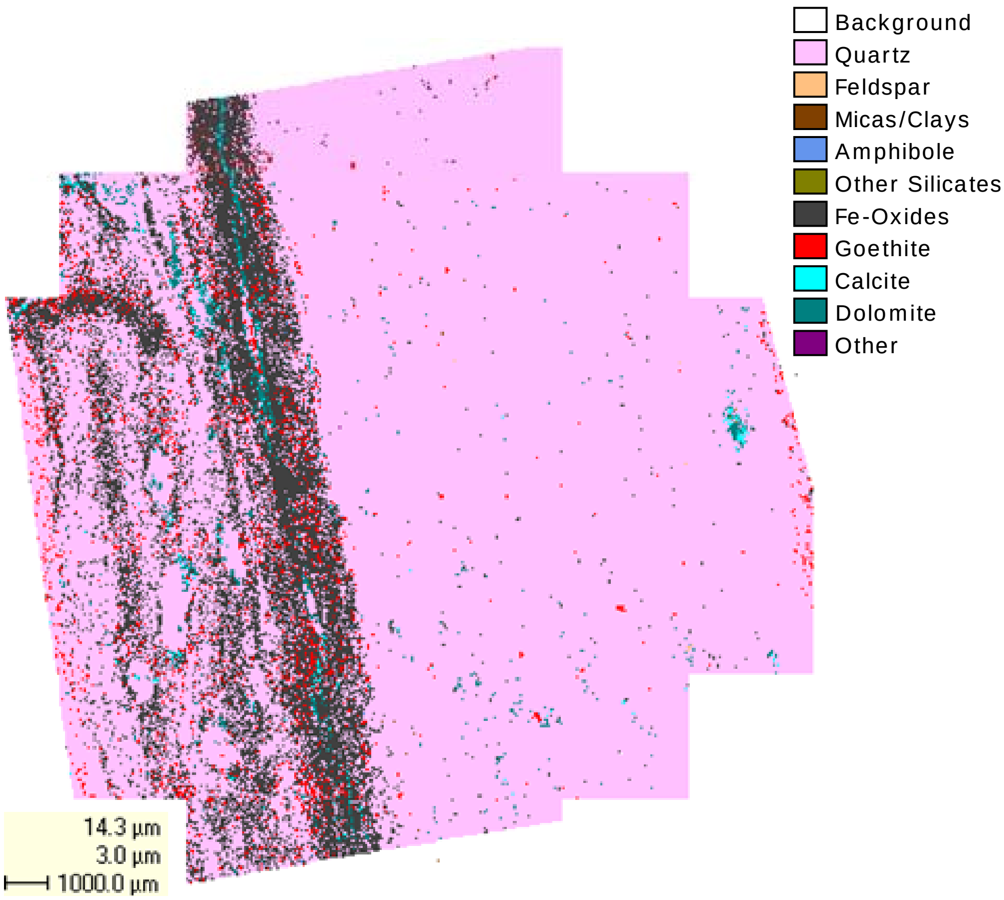


Figure 15: QEMSCAN Pseudo-Image of Sample TM-13-10 (Rep 1)

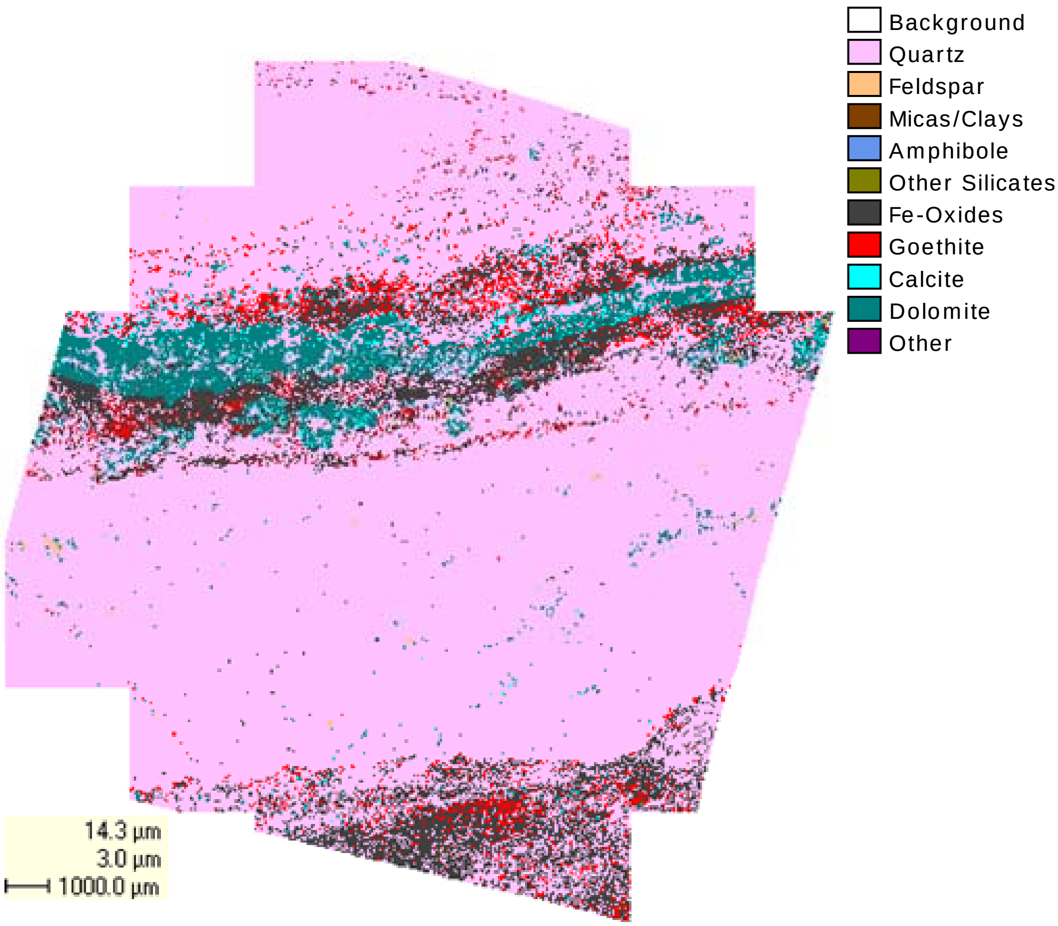


Figure 16: QEMSCAN Pseudo-Image of Sample TM-13-10 (Rep 2)

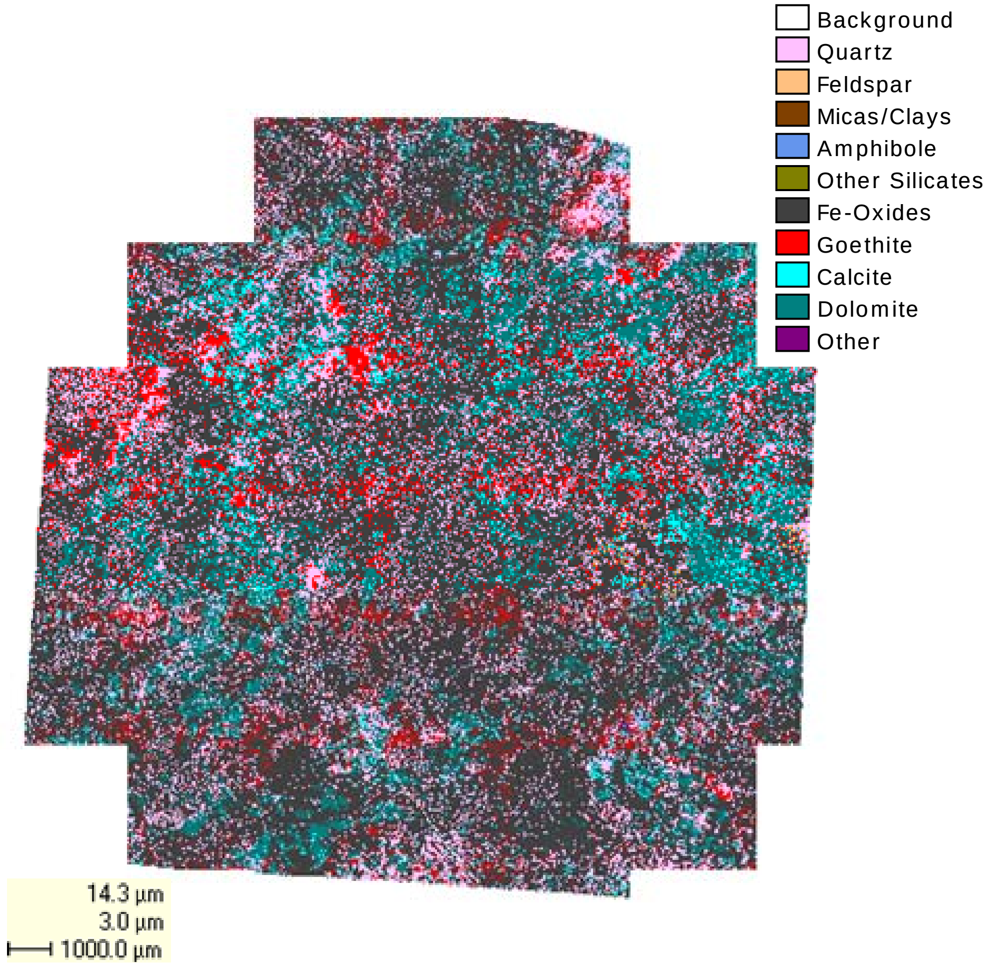


Figure 17: QEMSCAN Pseudo-Image of Sample TM-13-10 (Rep 3)

Iron oxides form layers, typically <1 mm in thickness, alternating with quartz-rich and carbonate layers. They also occur as complex aggregates with carbonates and quartz. Iron oxides/quartz layers show sharp boundaries. Note the disseminated nature of the iron oxides in the carbonates and quartz in the replicate 3 compared to the replicates 1 and 2.

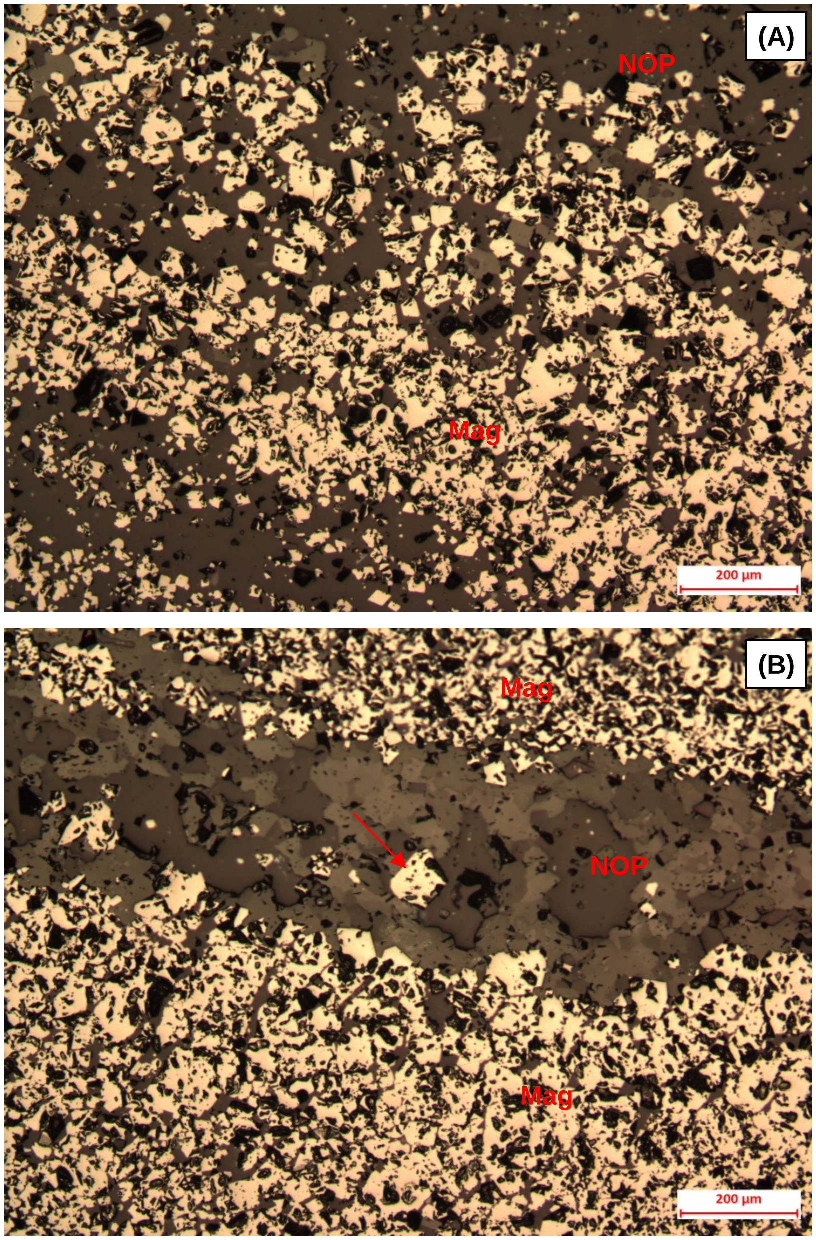


Figure 18: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM-13-10

(A) Image shows fine-grained magnetite (Mag) forming aggregates, interlayered with silicates (NOP: dark grey).

(B) Image shows magnetite layers enclosing a quartz layer.

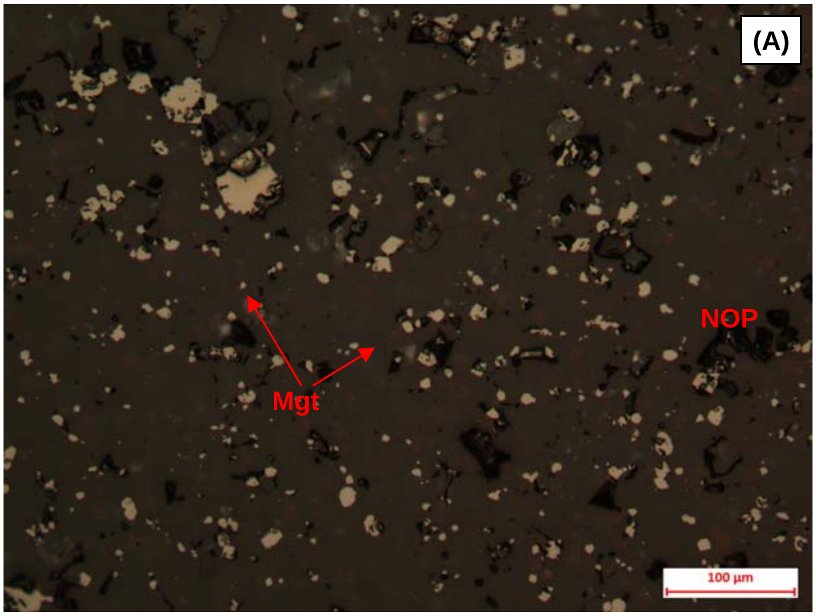


Figure 19: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from TM-13-10

(A) Image shows fine-grained, disseminated magnetite (Mgt) in silicate minerals (NOP: dark grey).

5.4. Sample TM-13-11

The sample is fine-grained and is dominated by quartz (79.8%), moderate goethite (14.9%), minor iron oxides (mainly magnetite) (5.2%) and trace amounts (<1%) of micas/clays, amphibole, calcite, other minerals, other silicates, dolomite and feldspar (Table 13, Figure 20). The contacts between iron oxides and gangue minerals are generally sharp on the mesoscopic level. Iron oxides form massive layers, poorly formed layers and also occur as fine-grained disseminated particles in the quartz layers. They range from <10 to 150 µm in size and they are finer-grained than iron oxides in other samples. Goethite is coarser than magnetite (<300 µm) and forms 1-2 mm layers and is intergrown with quartz.

QEMSCAN pseudo-colour images are given in Figure 21 to Figure 23. Representative photomicrographs from the optical microscope are presented in Figure 24 to Figure 25.

Table 13: Mineral Abundance by QEMSCAN and Characteristics for Sample TM-13-11

Survey		**Stonewater Resources Ltd.**			
Project		**CUSTOM MIN / MI5002-NOV13**			
Sample		**TM-13-11**			
Calculated ESD Particle Size		20331	20864	20658	19500
		Comb	**Rep 1**	**Rep 2**	**Rep 3**
Mineral Mass (%)	Quartz	79.8	80.5	83.2	75.8
	Feldspar	0.0	0.0	0.0	0.0
	Micas/Clays	0.0	0.0	0.0	0.1
	Amphibole	0.0	0.0	0.0	0.1
	Other Silicates	0.0	0.0	0.0	0.0
	Fe-Oxides	5.2	6.8	5.6	3.1
	Goethite	14.9	12.6	11.1	20.9
	Calcite	0.0	0.1	0.0	0.0
	Dolomite	0.0	0.0	0.0	0.0
	Other	0.0	0.0	0.0	0.0
	Total	100.0	100.0	100.0	100.0
Mean Grain Size by Frequency (µm)	Quartz	570	727	761	379
	Feldspar	21	21	21	0
	Micas/Clays	32	32	29	33
	Amphibole	38	38	37	38
	Other Silicates	26	28	23	26
	Hematite	78	88	88	53
	Goethite	68	71	66	68
	Calcite	56	58	51	46
	Dolomite	49	43	0	55
	Other	27	25	22	30

Note: The size of the minerals as shown in the table below is calculated statistically from the length of all the horizontal intercepts through each particle. It uses an assumption of random sectioning of spherical particles having uniform size, to obtain an estimate of the stereologically-corrected grain size in microns. The size calculation is a statistical property, which means that it is only valid when applied to a population of particles, and its accuracy increases as the population size increases. The accuracy of the size calculation is extremely low if applied to just a single cross-section.

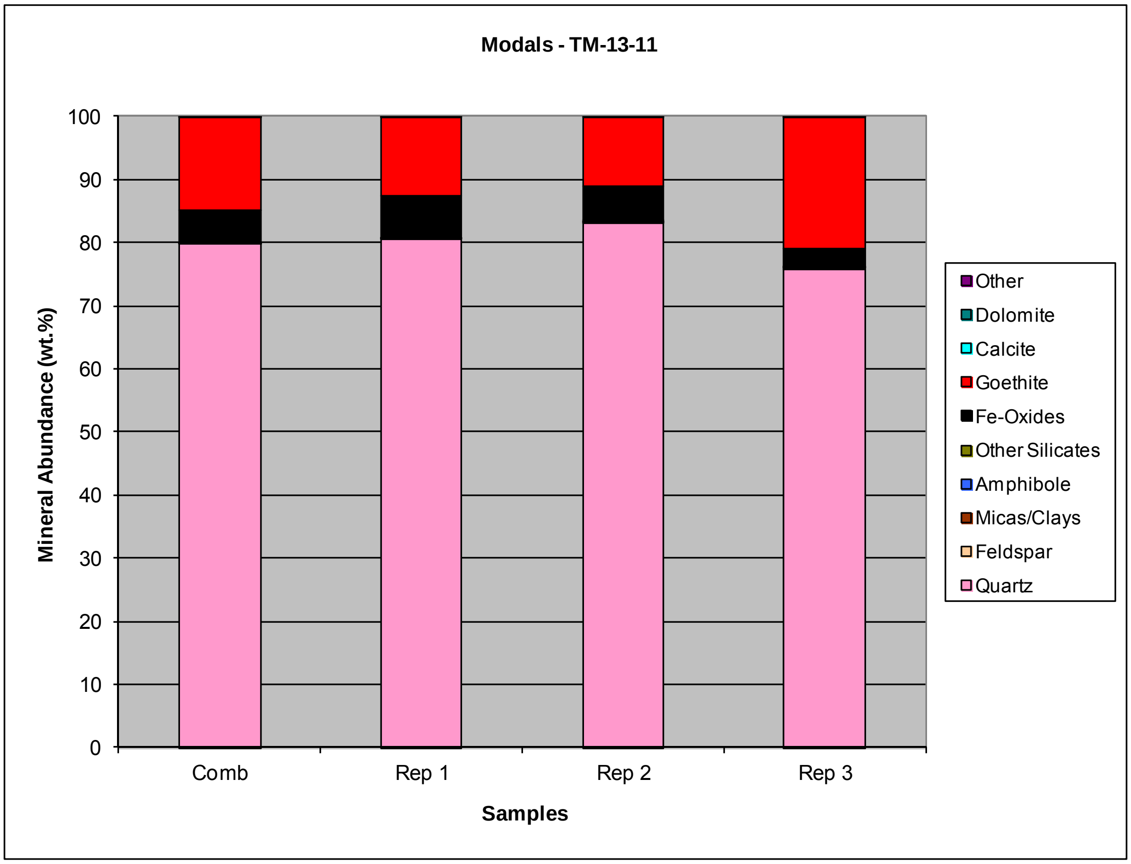


Figure 20: QEMSCAN Modal Mineralogy for Three Replicates from Sample TM-13-11

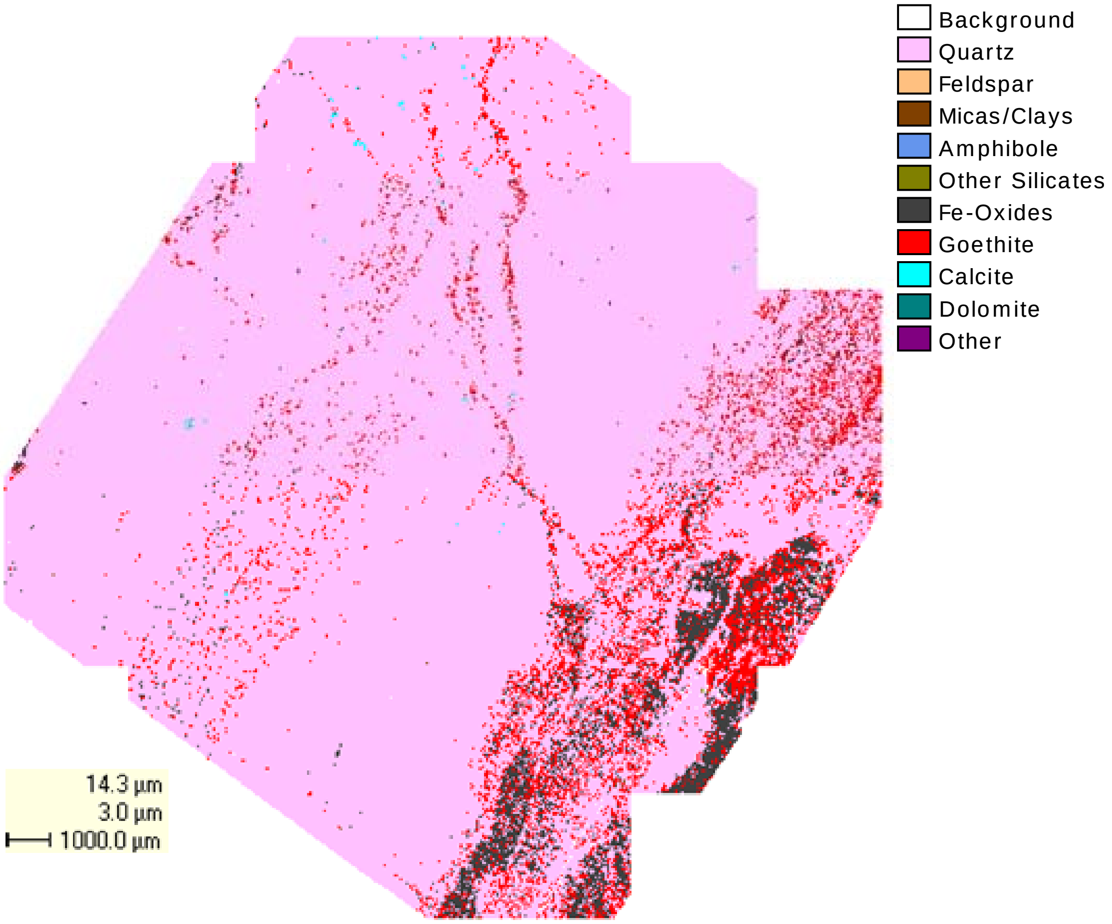


Figure 21: QEMSCAN Pseudo Image of Sample TM-13-11 (Rep 1)

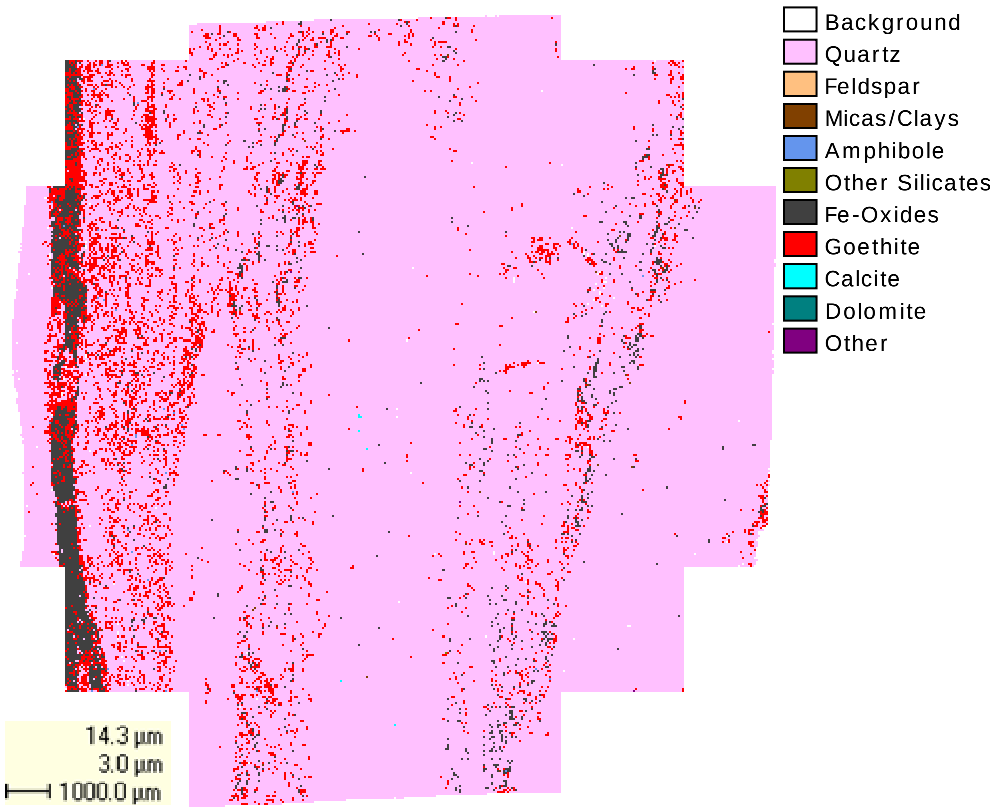


Figure 22: QEMSCAN Pseudo Image of Sample TM-13-11 (Rep 2)

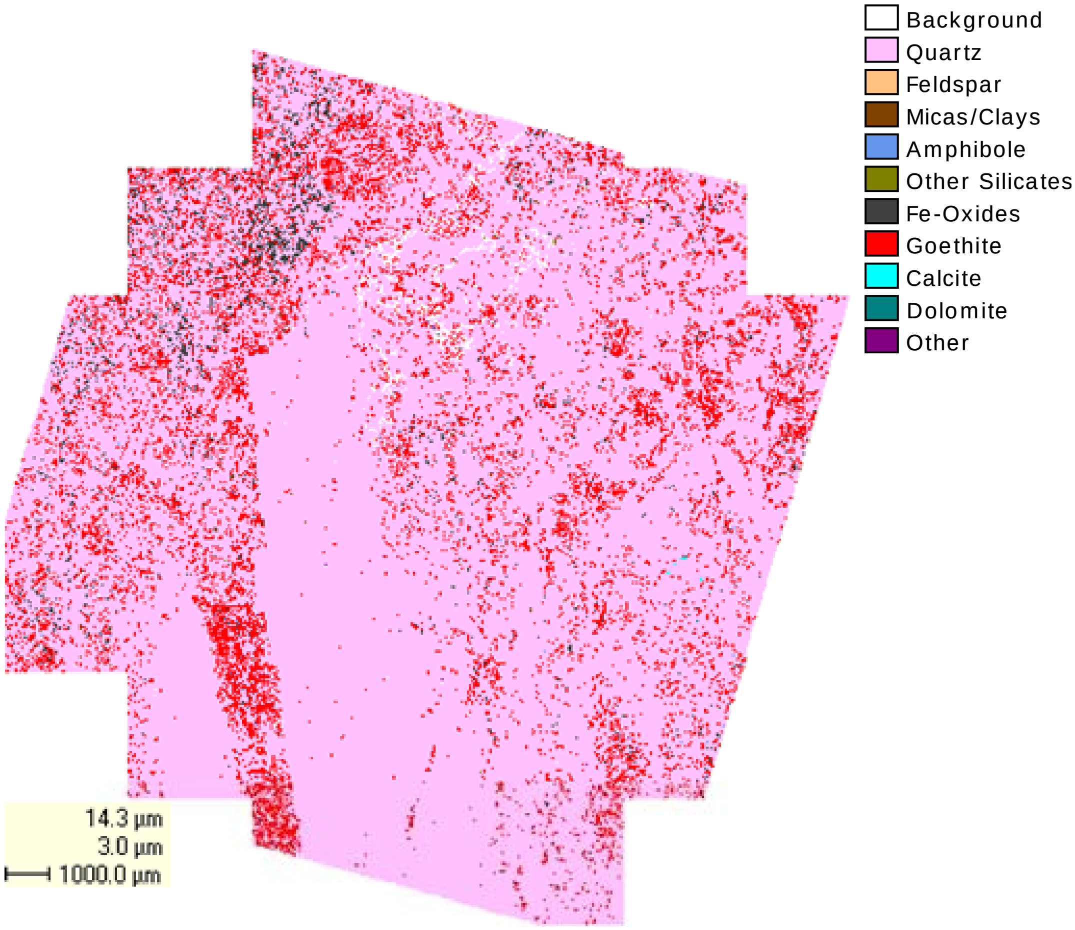


Figure 23: QEMSCAN Pseudo Image of Sample TM-13-11 (Rep 3)

Iron oxides form layers, typically <1-2 mm in thickness, and locally irregularly developed domains alternating with quartz-rich layers. These consist of semi-massive oxides. Disseminated iron oxides occur interstitial in the quartz layers. Iron oxides/quartz layers show sharp boundaries.

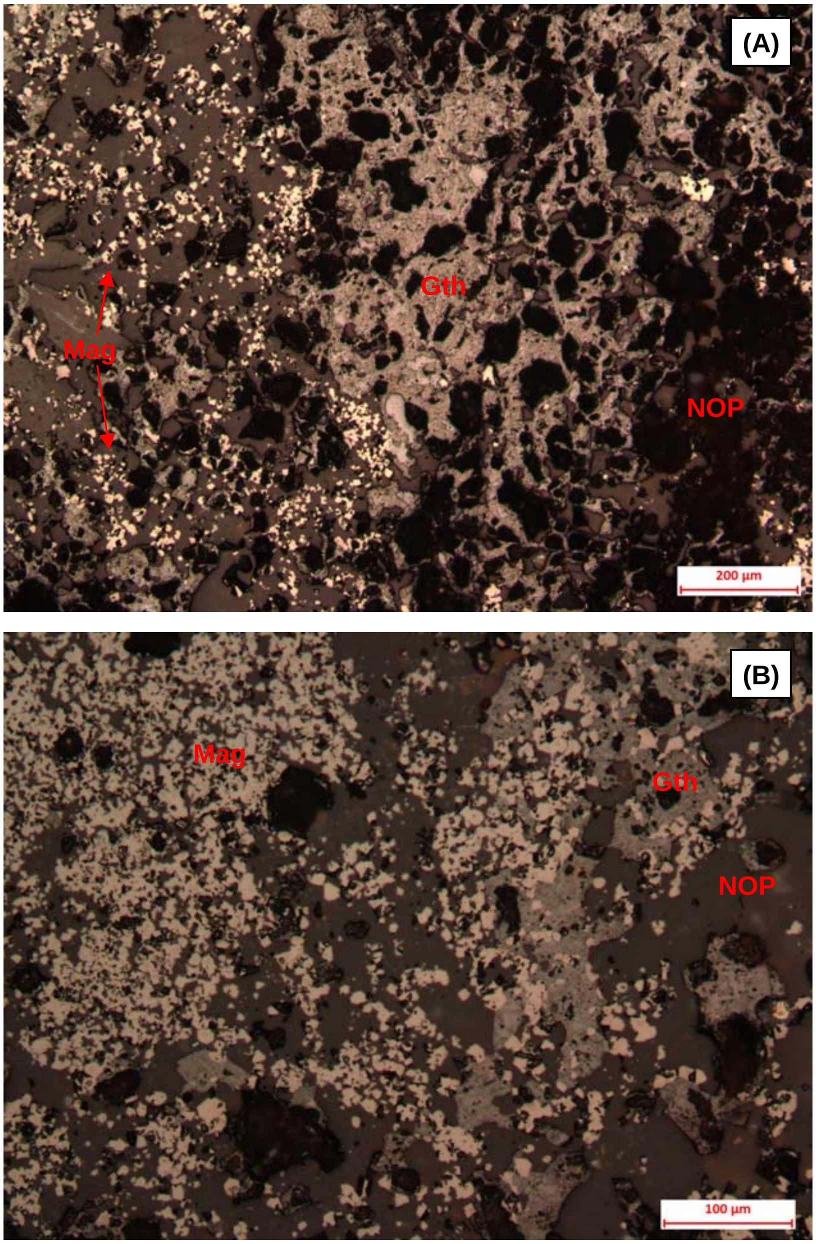


Figure 24: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM-13-11

(A) Image shows fine-grained magnetite (Mag) disseminated in the quartz and coarser goethite intergrown with quartz (NOP: dark grey).

(B) Image shows similar characteristics in larger magnification.

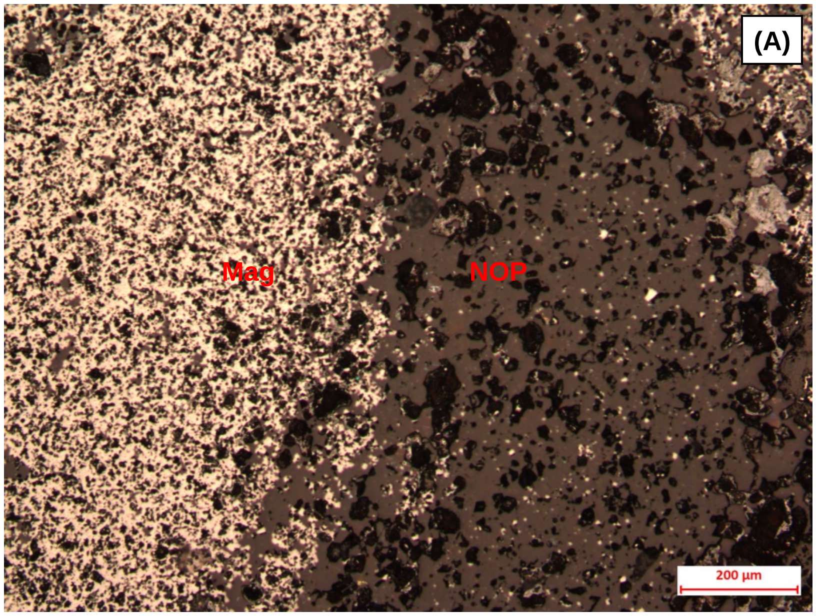


Figure 25: Optical Photomicrographs in Plane Polarized Reflected Light (PPRL) from Sample TM-13-11

(A) Image shows a massive layer of fine-grained magnetite (Mag) in contact with a quartz layer and fine-grained disseminated magnetite in quartz (NOP: dark grey).

Appendix A – Certificates of Analysis

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Mineralogy
Attn : Tassos Grammatikopoulos

-
-, -
-, -

Phone: -
Fax:-

16-December-2013

Date Rec. : 19 November 2013
LR Report : **CA02746-NOV13**
Client Ref : MI5002-NOV13

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %
1: TM-13-8	57.1	0.08	41.6	0.26	0.71	0.03	< 0.01
2: TM-13-9	46.9	0.07	48.4	0.82	1.74	0.02	< 0.01
3: TM-13-10	36.6	0.09	58.6	1.25	1.71	0.04	0.01
4: TM-13-11	66.6	0.08	29.1	0.78	0.43	0.03	< 0.01

Sample ID	TiO2 %	P2O5 %	MnO %	Cr2O3 %	V2O5 %	LOI %	Sum %	Fe2O3 as Fe %
1: TM-13-8	< 0.01	0.18	0.02	0.02	< 0.01	-0.51	99.6	29.1
2: TM-13-9	< 0.01	0.14	0.01	< 0.01	< 0.01	1.72	99.9	33.9
3: TM-13-10	< 0.01	0.19	0.04	0.02	< 0.01	1.77	100.3	41.0
4: TM-13-11	< 0.01	0.10	0.10	0.04	< 0.01	3.44	100.7	20.4

Control Quality Assay
Not Suitable for Commercial Exchange

Tom Watt
Project Coordinator

OnLine LIMS

0000703.26

SGS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Mineralogy
Attn : Tassos Grammatikopoulos / Elaine Glover

29-November-2013

Date Rec. : 25 November 2013
LR Report : **CA02975-NOV13**
Client Ref : MI5002-NOV13

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Fe %
1: TM-13-9	33.73
2: TM-13-10	40.87

Control Quality Assay
Not Suitable for Commercial Exchange

Tom Watt
Project Coordinator

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Mineralogy
Attn : Tassos Grammatikopoulos

-
-, -
-, -

Phone: -
Fax:-

29-November-2013

Date Rec. : 25 November 2013
LR Report : **CA02993-NOV13**
Client Ref : MI5002-NOV13

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %
1: TM-13-9 Cut 2	48.8	0.22	47.3	0.82	1.80	0.14	0.03
2: TM-13-10 Cut 2	38.0	0.16	57.8	1.23	1.68	0.09	0.02

Sample ID	TiO2 %	P2O5 %	MnO %	Cr2O3 %	V2O5 %	LOI %	Sum %	Fe %
1: TM-13-9 Cut 2	< 0.01	0.15	0.01	0.03	< 0.01	1.66	101.0	32.75
2: TM-13-10 Cut 2	< 0.01	0.18	0.03	0.01	< 0.01	1.64	100.9	40.07

Control Quality Assay
Not Suitable for Commercial Exchange

Tom Watt
Project Coordinator

OnLine LIMS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

Mineralogy
Attn : Tassos Grammatikopoulos / Elaine Glover

16-December-2013

Date Rec. : 10 December 2013
LR Report : **CA02417-DEC13**
Client Ref : MI5002-NOV13

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %
1: TM-13-9 Davis Tube Mag Fraction	5.28	0.01	97.1	0.06	0.10	0.01	< 0.01
2: TM-13-10 Davis Tube Mag Fraction	10.1	< 0.01	91.7	0.24	0.26	0.01	< 0.01

Sample ID	TiO2 %	P2O5 %	MnO %	Cr2O3 %	V2O5 %	LOI %	Sum %	Fe2O3 as Fe %
1: TM-13-9 Davis Tube Mag Fraction	< 0.01	0.02	< 0.01	0.04	< 0.01	-2.77	99.9	67.9
2: TM-13-10 Davis Tube Mag Fraction	< 0.01	0.04	0.01	0.02	< 0.01	-2.31	100.1	64.2

Control Quality Assay
Not Suitable for Commercial Exchange

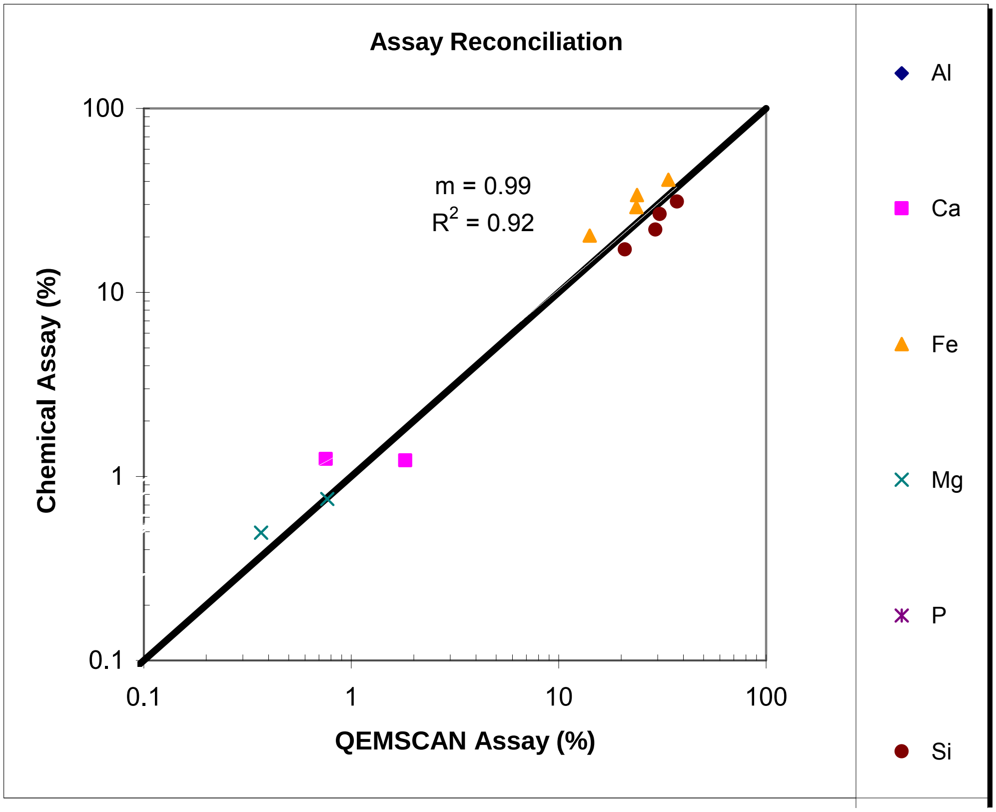
Tom Watt
Project Coordinator

OnLine LIMS

Appendix B – Additional QEMSCAN Data

Stonewater Resources Ltd.
CUSTOM MIN
MI5002-NOV13

Assay Reconciliation



	TM-13-8	TM-13-9	TM-13-10	TM-13-11
Al (QEMSCAN)	0.01	0.01	0.02	0.01
Al (Chemical)	0.04	0.04	0.05	0.04
Ca (QEMSCAN)	0.09	0.76	1.82	0.02
Ca (Chemical)	0.51	1.24	1.22	0.31
Fe (QEMSCAN)	23.7	23.9	33.8	14.1
Fe (Chemical)	29.1	33.9	41.0	20.4
Mg (QEMSCAN)	0.02	0.37	0.77	0.01
Mg (Chemical)	0.16	0.49	0.75	0.47
P (QEMSCAN)	0.01	0.01	0.00	0.00
P (Chemical)	0.08	0.06	0.08	0.04
Si (QEMSCAN)	30.8	29.3	20.9	37.3
Si (Chemical)	26.7	21.9	17.1	31.1

Note: the reconciliation reflects only the polished sections analyzed. These are simply compared to the whole rock analysis by XRF that reflect the entire sample. Thus, large deviations between the actual assays and those calculated by the QEMSCAN may occur. Thus, this graph is only indicative of the actual and calculated assays.