



SGS proposal: 19186-PR2 COS#1
SGS project #: 1619

Work order date: 13-Sep-24
Report date: 1-Oct-24

Version: Final

ANALYSIS REPORT

Method Summaries

Test method information available upon request.

S(T) and C(T): Total sulfur and total carbon by LECO, Method CSA06V
S(SO4): Sulfate by HCl digestion with ICP finish, Method CSA07V
S(S2-): Sulfide by calculation of S(T) - S(SO4) or by nitric acid digestion with ICP finish (Method CSA08C1)

TIC: Total inorganic carbon by coulometry, Method CSB02V
AP: Acid generating potential based on sulfide sulfur
NP: Modified neutralisation potential by excess acid addition and back titration to pH 8.3
Net NP: Net neutralisation potential = NP - AP

Metals by aqua regia digest with ICP-OES/MS finish, Method ICP21B20/ICM21B20
Metals by multi-acid digest with ICP-OES/MS finish, Method ICP40Q12/IMS40Q12

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Preliminary Data

Anahita Etemadifar - Laboratory Supervisor

Final Data Approval

Noelene Ahern - Manager: ARD



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ABA Report

Test	S(T)	S(SO4)	S(S-2)	Insoluble S	AP
Units	%	%	%	%	kg CaCO3/t
Method Code	CSA06V	CSA07V	CSA08C1	Calc.	Calc.
LOD	0.005	0.01	0.01	#N/A	#N/A
Sample ID					
HQ1	0.081	0.01	0.02	0.051	0.6
HQ2	0.101	<0.01	<0.01	0.101	<0.3
HQ3	0.008	<0.01	<0.01	0.008	<0.3
HQ4	0.110	<0.01	0.03	0.080	0.9
HQ5	0.134	<0.01	0.01	0.124	0.3
Duplicates					
HQ2			<0.01		
HQ5	0.138				
QA/QC					
Blank	<0.005	<0.01	<0.01		
Certified standards					
OREAS 278			0.69		
GS-314-2	2.580				
RTS-3a		0.94			



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Test	C(T)	TIC	CaCO3 NP	Modified NP	Net Modified NP	Fizz Test	Paste pH
Units	%	%	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t		
Method Code	CSA06V	CSB02V	Calc.	Modified	Calc.	Sobek	Sobek
LOD	0.005	0.01		0.5			0.2
Sample ID							
HQ1	NA	0.30	25.0	21.8	21.2	None	8.51
HQ2	NA	0.08	6.7	7.7	7.7	None	9.57
HQ3	NA	0.12	10.0	11.6	11.6	None	9.75
HQ4	NA	0.03	2.5	6.1	5.2	None	8.95
HQ5	NA	0.22	18.3	16.9	16.6	None	9.76
Duplicates							
HQ1				21.7		None	8.60
HQ5		0.20					

QA/QC							
Blank		<0.01					
Certified standards							
NBM-1				44.6		Slight	
TIC-L1		0.11					
SX35-13		11.68					



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Metals - Aqua Regia Digestion with ICP-OES/MS Finish

Test	Al	Ba	Ca	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ni	P	S	Sr	Ti	V
Units	%	ppm	%	ppm	ppm	%	%	ppm	%	ppm	%	ppm	%	%	ppm	%	ppm
Method Code	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20
Lower detection	0.01	5	0.01	1	0.5	0.01	0.01	1	0.01	2	0.01	1	0.01	0.01	0.5	0.01	1
Upper detection	15	10000	15	10000	10000	15	15	10000	15	10000	15	10000	15	5	10000	15	10000
Sample ID																	
HQ1	0.04	6	0.63	113	10	0.64	0.01	<1	0.19	568	0.01	7	0.04	0.08	53.8	0.02	1
HQ2	0.13	32	0.2	72	3	0.44	0.12	1	0.08	196	0.01	5	0.01	0.10	24.4	0.03	1
HQ3	0.12	37	0.41	63	6	0.24	0.11	<1	0.02	387	0.03	2	<0.01	<0.01	54.1	<0.01	<1
HQ4	0.68	79	0.12	35	17	1.53	0.48	6	0.30	130	0.02	17	0.02	0.12	14.8	0.05	7
HQ5	0.08	21	0.46	67	5	0.48	0.06	<1	0.14	456	0.03	4	0.02	0.13	39.4	<0.01	<1
Duplicates																	
HQ3	0.12	37	0.41	65	6	0.24	0.11	<1	0.02	386	0.03	2	<0.01	<0.01	53.9	<0.01	<1
QA/QC																	
Blank	<0.01	<5	<0.01	<1	<0.5	<0.01	<0.01	<1	<0.01	<2	<0.01	<1	<0.01	<0.01	<0.5	<0.01	<1
Certified standards																	
OREAS 235	2.55	97	0.2	105	24	3.54	1	32	1.36	222	0.08	58	0.05	0.08	15.9	0.16	70
OREAS 501c	2.08	418	1.03	67	2709	4.09	1.15	31	1.25	387	0.20	56	0.10	0.34	61.6	0.38	115



Test	Zn	Zr	Ag	As	Be	Bi	Cd	Ce	Co	Cs	Ga	Ge	Hf	Hg	In	La	Lu
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method Code	ICP21B20	ICP21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20
Lower detection	1	0.5	0.01	1	0.1	0.02	0.01	0.05	0.1	0.05	0.1	0.1	0.05	0.01	0.02	0.1	0.01
Upper detection	10000	10000	100	10000	100	10000	10000	1000	10000	1000	10000	10000	500	100	500	10000	1000
Sample ID																	
HQ1	2	<0.5	<0.01	<1	<0.1	<0.02	<0.01	37.15	4	<0.05	<0.1	<0.1	<0.05	<0.01	<0.02	13.2	0.02
HQ2	2	<0.5	<0.01	<1	<0.1	<0.02	<0.01	21.05	4.9	0.08	0.3	<0.1	<0.05	<0.01	<0.02	9.2	<0.01
HQ3	<1	<0.5	0.14	<1	<0.1	0.5	<0.01	19.86	1.2	<0.05	0.3	<0.1	<0.05	<0.01	<0.02	8.2	0.01
HQ4	17	0.9	0.02	<1	0.2	0.0	<0.01	22.49	7	1.03	2.0	<0.1	<0.05	<0.01	<0.02	10.4	<0.01
HQ5	2	<0.5	<0.01	<1	<0.1	<0.02	<0.01	16.49	2.5	<0.05	0.1	<0.1	<0.05	<0.01	<0.02	7	<0.01
Duplicates																	
HQ3	<1	<0.5	0.17	1	<0.1	0.5	<0.01	20.09	1.2	<0.05	0.3	<0.1	<0.05	<0.01	<0.02	8.2	0.01
QA/QC																	
Blank	<1	<0.5	<0.01	<1	<0.1	<0.02	<0.01	<0.05	<0.1	<0.05	<0.1	<0.1	<0.05	<0.01	<0.02	<0.1	<0.01
Certified standards																	
OREAS 235	77	30.5	0.14	348	1.4	0.3	0.05	60.81	13	7.71	7.9	<0.1	0.87	<0.01	0.02	32	0.13
OREAS 501c	71	9.6	0.45	25	0.6	0.7	0.15	61.96	14.3	10.15	8.7	0.1	0.42	0.0	0.04	30.9	0.23



Test	Mo	Nb	Pb	Rb	Sb	Sc	Se	Sn	Ta	Tb	Te	Th	Tl	U	W	Y	Yb
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method Code	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20
Lower detection	0.05	0.05	0.2	0.2	0.05	0.1	1	0.3	0.05	0.02	0.05	0.1	0.02	0.05	0.1	0.05	0.1
Upper detection	10000	1000	10000	10000	10000	10000	1000	1000	10000	10000	1000	10000	10000	10000	10000	10000	100
Sample ID																	
HQ1	1.40	0.30	1.2	0.6	<0.05	0.3	<1	<0.3	<0.05	0.2	<0.05	3.9	<0.02	0.54	<0.1	1.62	<0.1
HQ2	0.80	0.12	3.3	5.2	<0.05	0.2	<1	<0.3	<0.05	0.1	<0.05	8.6	0.02	0.88	<0.1	0.95	<0.1
HQ3	0.69	<0.05	95.7	4.3	<0.05	0.2	<1	<0.3	<0.05	0.1	<0.05	2.8	<0.02	0.41	<0.1	1.03	<0.1
HQ4	0.60	0.36	1.7	30.1	<0.05	0.7	<1	<0.3	<0.05	0.1	<0.05	8.5	0.21	2.69	<0.1	1.21	<0.1
HQ5	0.76	<0.05	7.7	2.3	<0.05	0.4	<1	<0.3	<0.05	0.1	<0.05	2.8	<0.02	0.63	<0.1	0.99	<0.1
Duplicates																	
HQ3	0.71	<0.05	97.6	4.2	<0.05	0.2	<1	<0.3	<0.05	0.1	<0.05	2.8	<0.02	0.41	<0.1	1.04	<0.1
QA/QC																	
Blank	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<1	<0.3	<0.05	<0.02	<0.05	<0.1	<0.02	<0.05	<0.1	<0.05	<0.1
Certified standards																	
OREAS 235	1	0.40	9.2	102	218.0	6.3	<1	1.3	<0.05	0.5	<0.05	13.5	0.65	1.64	0.4	10.02	0.9
OREAS 501c	97.68	1.92	8.4	139	1.6	8.3	<1	2.7	<0.05	0.6	0.25	19.3	0.77	4.93	3.5	17.87	1.6



ANALYSIS REPORT

ABA Report - CRM Expected Values and Tolerances

CRM	Test	S(T)	S(SO4)	S(SO4)	S(S-2)	C(T)	TIC	CO2	Modified NP	Modified with Siderite Correction NP
	Units	%	%	%	%	%	%	%	kg CaCO3/t	kg CaCO3/t
	Method Code	CSA06V	CSA07V	CSA07D	Calc.	CSA06V	CSB02V	CSB02V	Modified	
	LOD	0.005	0.01	1.01	0.01	0.005	0.01	0.005	0.5	
GGC-07	Expected value	0.51				0.56				
	Tolerance (+/-)	0.09				0.09				
HCC-1	Expected value	33.92								
	Tolerance (+/-)	5.04								
RTS-3a	Expected value		0.98	1.34						
	Tolerance (+/-)		0.12	0.35						
OREAS 278	Expected value				0.699					
	Tolerance (+/-)				0.06					
NBM-1	Expected value								41.92	53.21
	Tolerance (+/-)								3.04	3.3
TIC-L1	Expected value						0.13	0.477		
	Tolerance (+/-)						0.02	0.78		
GS314-2	Expected value	2.56				5.15				
	Tolerance (+/-)	0.14				0.27				
GS915-8	Expected value	0.13				0.07				
	Tolerance (+/-)	0.02				0.02				
OREAS 550	Expected value	0.220				4.110				
	Tolerance (+/-)	0.004				0.22				
SX35-13	Expected value						11.954			
	Tolerance (+/-)									
SY4	Expected value						0.95			
	Tolerance (+/-)						0.06			

