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[redacted]
ACN 061 827 674 *ABN 37 061 827 674*

Testing Laboratory: [redacted]

2012

COMPANY: Black Cat Syndicate Limited

[redacted] [redacted]nton

[redacted] [redacted]

SUBJECT: **Myhree Deposit**: Geochemical Characterisation of Tailings-Slurry Samples and Implications for Tailings Management

NO. PAGES (including this page): 50 DATE: 25th February 2021

Alistair,

The tailings-slurry samples submitted for testing are:

- **Oxide-Ore-Tailings** (i.e. derived from a 50:50 blend of Oxide-Ores and Transition-Ores)

  GCA11933 is the Sample_ID assigned to this tailings-slurry sample.

- **Primary-Ore-Tailings** (i.e. derived from a blend of Primary-Ores)

  GCA11934 is the Sample_ID assigned to this tailings-slurry sample.

The tailings-slurry samples were generated via a bench-scale metallurgical testwork programme undertaken by Fremantle Metallurgy (Kardinya).

The testwork results obtained in this study are presented in **Tables 1-4**, and shown on **Figure 1**.

A photograph of the tailings-slurry samples received for testing is shown on **Plate 1**, and copies of the laboratory reports are presented in the **Attachment**.

1.0 TESTWORK OUTCOMES

1.1 Tailings-Solids

1.1.1 Acid-Base Chemistry

Both tailings-solids samples are classified as Non-Acid Forming (NAF) [**Table 1**].

For the Oxide-Ore-Tailings sample, the NAF classification simply reflects 'negligible-sulphides', corresponding to a Cr(II)-Reducible-S (CRS) value less than 0.005 %.

The NAF classification for the Primary-Ore-Tailings sample reflects a CRS value of 0.741 % (as pyrite-S) in a gangue that is appreciably calcareous associated with dolomites (**Table 1**). Though the dolomite is appreciably ferroan (e.g. ankeritic), the tailings-gangue has an excess of 'carbonate-alkalinity' forms for circum-neutral buffering as the pyrite decomposes over time during weathering.

The shape of the pH-buffering curve for the Primary-Ore-Tailings sample (**Figure 1**) is consistent with the acidimetric dissolution of dolomites which are ferroan (e.g. ankerites).

In order to assess the intrinsic sulphide-mineral (chiefly pyrite) reactivity for the Primary-Ore-Tailings sample, Oxygen-Consumption Rate (OCR) determinations were undertaken. The resulting OCR_{30oC} value was 9.5E-12 kg O_2/kg/s. Given the CRS value and circum-neutral-pH, this OCR_{30oC} value indicate that the pyrite in the Primary-Ore-Tailings exhibits a moderate reactivity in terms of its tendency towards aerobic oxidation.

1.1.2 Multi-Element Composition and Mineralogy

Both tailings-solids samples were characterised by major/minor-element contents either less than, or close to, those typically recorded for soils, regoliths and bedrocks derived from non-mineralised terrain (Bowen 1979) [**Table 2**].[1]

Slight enrichments were recorded for As and Cr for the Oxide-Ore-Tailings sample, and fall within the range generally observed for tailings-solids derived from oxide- and fresh-ores at gold deposits located on the Yilgarn block (Campbell, unpublished results since the late-1980s).

The Oxide-Ore-Tailings sample comprised mostly albite and phengite with subordinate chlorite, kaolinite, phillipsite, and goethite (**Table 3**). Traces of rutile also occurred.

The Primary-Ore-Tailings sample mainly comprised albite and quartz with sub-ordinate muscovite. Pyrite, dolomite, chlorite, and goethite were accessory components, together with traces of rutile and ilmenite.[2]

1.2 Tailings-Slurry-Waters

1.2.1 General Chemistry

Both tailings-slurry-water samples were mildly-alkaline (pH 8.7-9.1) [**Table 4**]

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[1] Bowen HJM, 1979, "Environmental Chemistry of the Elements", Academic Press, New York

[2] Though not indicated in the mineralogical report, the dolomite is quite ferroan as shown by the 'wet-chemistry' findings above.

Both tailings-slurry-water samples were also hypersaline with TDS-(grav.) values of *ca.* 85-86 g/L.[3]

1.2.2 Cyanide Forms

The tailings-slurry-water samples had (**Table 4**):

- Total-Cyanide ($CN_{Tot.}$) concentrations of 243-277 mg/L
- Weak-Acid-Dissociable-Cyanide (CN_{WAD}) concentrations of 236-239 mg/L
- Free-Cyanide (CN_{Free}) concentrations of 252-262 mg/L

The NH_3-N concentrations of 65 mg/L recorded for the Oxide-Ore-Tailings sample reflects incomplete degradation of cyanide during cyanidation in the bench-scale metallurgical testwork programme. Within the full-scale milling operation with aerated, agitated process-circuits that are 'open' to the atmosphere (cf. drums used in the bench-scale leaching), NH_3-N concentrations would be lowered through both volatilisation, and more favoured conditions for aerobic oxidation to NO_3-N.

1.2.3 Minor-Elements

For both tailings-slurry-water samples, Cu and Ni were the chief cyanide-complexing metals in solution (**Table 4**).

Due to the salinity of the tailings-slurry-waters, the detection-limits for minor-elements were raised (e.g. 100-1,000 µg/L range) reflective of dilution necessary to eliminate analytical interferences associated with 'salt-matrix' effects.

2.0 IMPLICATIONS FOR TAILINGS MANAGEMENT

It is understood that the process-tailings stream (as a slurry) to be generated from the milling of ores from the **Myhree Deposit** is to be discharged to an engineered, above-ground tailings-storage facility (TSF).

Based on the testwork results obtained in this study, it is concluded that the so-produced tailings stream discharged to the TSF should be classified as NAF. In addition, environmentally, the contents of metals / metalloids in the various types of tailings-solids are minimal, so solubility at circum-neutral-pH during weathering within the hypersaline-tailings is tightly constrained.

Within the TSF, the decant-water should have CN_{WAD} concentrations less than the industry 50 mg/L target for the protection of wildlife (e.g. birds), corresponding to efficient volatilisation and degradation of cyanide forms under the arid conditions of the Eastern Goldfields. However, this should be confirmed through monitoring of decant-water quality should be undertaken as part of the routine TSF operations.

In short, the lithochemistry and mineralogy of the Myhree ores are such that no environmental geochemistry concerns are foreseen for the resulting streams of process-tailings discharged to the TSF. In this regard, the "Myhree-tailings" are no different from the tailings produced at many gold mines throughout the WA Goldfields.

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[3] TDS-(grav.) = Total-Dissolved-Solids-(gravimetric).

For completeness going forward for the Project, testing of slurry samples of the 'ex-mill' stream of tailings should be undertaken during the lifetime of the TSF to confirm (or refine) the conclusions drawn in this study for tailings-slurry samples generated from the bench-scale metallurgical testwork programme. Such information will usefully add to the database for regular TSF auditing as part of license conditions, etc.

I trust the above is useful to you.

Regards,

[redacted]

encl. Tables 1-4
Figure 1
Plate 1
Attachment

TABLES

Table 1: Acid-Base-Analysis Results for Tailings-Solids Samples

GCA-SAMPLE NO.	TAILINGS-TYPE	TOTAL-S (%)	CRS (%)	TOTAL-C (%)	CO3-C (%)	CARB.-ANC (calc'd)	BULK-ANC	NAG-pH4.5	NAG-pH7.0	NAG-pH	BULK-ANC / MPA RATIO	AFP CATEGORY
						kg H2SO4/tonne						
GCA11933	Oxide-Ore-Tailings	0.10 (0.10)	<0.005	0.16 (0.16)	0.04 (0.04)	3	8	<1	<1	7.8	nc	**NAF**
GCA11934	Primary-Ore-Tailings	0.82	0.741	1.78	1.73	141	80 (80)	<1 (<1)	<1 (<1)	9.1 (9.2)	3.5	**NAF**

Notes:

CRS = Cr(II)-Reducible-S; ANC = Acid-Neutralisation Capacity; NAG = Net-Acid Generation; MPA = Maximum-Potential Acidity; AFP = Acid-Formation Potential; nc = not calculated; NAF = Non-Acid Forming

Values in parentheses represent duplicate determinations

Calculated Carbonate-ANC value assume that all CO3-C is associated with Ca/Mg-carbonates (i.e. 'non-ferroan-carbonates').

The dolomite identified in the mineralogical study (Table 3) was appreciably ferroan, as indicated by the heavy precipitation of Fe-oxyhydroxide upon completion of the back-titration step with NaOH solution in the ANC testwork (see photogaph in the ANC-test-certificate).

The shape of the pH-buffering curve for sample GCA11934 (Figure 1) is consistent with 'dolomite' that is quite feroran (e.g. ankeritic).

Table 2: Multi-Element-Analysis Results for Tailings-Solids Samples

SAMPLE_ ID	TAILINGS- TYPE	S	Ca	Mg	K	Na	Al	Fe	Ti	Si	As	Sb	Se	Mo	B	F
		%									mg/kg					
GCA11933	Oxide-Ore-Tailings	0.10	0.3	1.07	1.77	1.88	9.27	8.50	0.58	24.7	45.2	1.40	0.31	1.5	62	624
GCA11934	Primary-Ore-Tailings	0.82	1.5	2.06	1.46	2.69	6.28	8.63	0.33	25.3	11.8	0.65	0.29	3.6	<50	707
		Average-Crustal Abundance (Bowen 1979)									1.5	0.2	0.05	1.5	10	950

		Cu	Zn	Cd	Pb	Hg	Ni	Cr	Co	Mn	Ag	Bi	P	Sr	Ba	Sn	V	Tl	Th	U
		mg/kg																		
GCA11933	Oxide-Ore-Tailings	74	67	0.11	4.5	0.005	781	1,038	75.1	1,767	0.05	0.06	108	45.75	405.9	0.8	268	0.45	2.10	0.54
GCA11934	Primary-Ore-Tailings	30	76	0.04	6.9	0.031	590	420	39.3	1,527	0.17	0.06	395	205.08	451.6	0.6	156	0.39	2.64	0.68
Average-Crustal Abundance (Bowen 1979)		50	75	0.11	14	0.05	80	100	20	950	0.07	0.05	#####	370	500	2.2	160	0.6	12	2.4

▨ signifies element content 10-100 times average-crustal abundance

🟦 signifies element content 100+ times average-crustal abundance

Reference: Bowen HJM, 1979, "Environmental Chemistry of the Elements", Academic Press, New York

Table 3: Mineralogical Results for Tailings-Solids Samples

Oxide-Ore-Tailings **(GCA11933)**		**Primary-Ore-Tailings** **(GCA11934)**	
albite phengite	20-50 %	albite quartz	20-50 %
chlorite quartz	10-20 %	muscovite	10-20 %
kaolin phillipsite goethite	1-10 %	**pyrite** **dolomite** chlorite goethite	1-10 %
rutile	< 1 %	rutile ilmenite	< 1 %

Notes:
major = 20-30 %; minor = 10-20 %; accessory = 1-10 %; trace = less than 1 %

Table 4: Analysis Results for Tailings-Slurry-Water Samples

ELEMENT/ PARAMETER	**Oxide-Ore-Tailings (GCA11933)**	**Primary-Ore-Tailings (GCA11934)**	**ELEMENT/ PARAMETER**	**Oxide-Ore-Tailings (GCA11933)**	**Primary-Ore-Tailings (GCA11934)**
Major-Parameters			***Minor-Ions (µg/L)***		
pH	8.7	9.1	As	20	10
pH (GCA)	8.8	9.1	Sb	3	5
EC (µS/cm)	124,300	124,200	Se	<50	<50
EC (GCA, µS/cm)	108,700	109,500	B	200	600
TDS-(grav.)	85,470	85,500	Mo	56	39
Major-Ions (mg/L)			Mn	200	500
			Al	2,100	1,000
Na	25,466	26,500	Cd	3	10
K	125	141	Pb	<50	<50
Mg	1,751.4	2,149.9	Cr	<100	<100
Ca	2,720.0	1,905.8	Bi	<1	<1
Cl	48,700	48,500	P	<1,000	<1,000
SO4	5,082	6,400	Ba	239	519
HCO3 (as CaCO3)	9	<2	Sr	20,268	13,346
CO3 (as CaCO3)	268	348	Tl	<1	<1
OH (as CaCO3)	<1	96	V	<100	<100
F	0.2	0.1	Sn	<10	<10
Si	2.8	1.3	U	<1	<1
			Th	<1	<1
Nitrogen-Forms (mg/L)					
			Cyanide-Complexing Metals (mg/L)		
NH3-N	65.000	2.400			
NO3-N	0.008	<0.005	Fe	0.1	0.8
			Cu	1.5	8.9
Cyanide Forms (mg/L)			Zn	0.7	0.9
			Ni	1.1	6.8
CNtot	277	243	Co	0.12	0.56
CNwad	239	236	Ag	0.03	0.13
CNfree	252	262	Hg	<0.01	0.04
SCN	5.69	26.39			

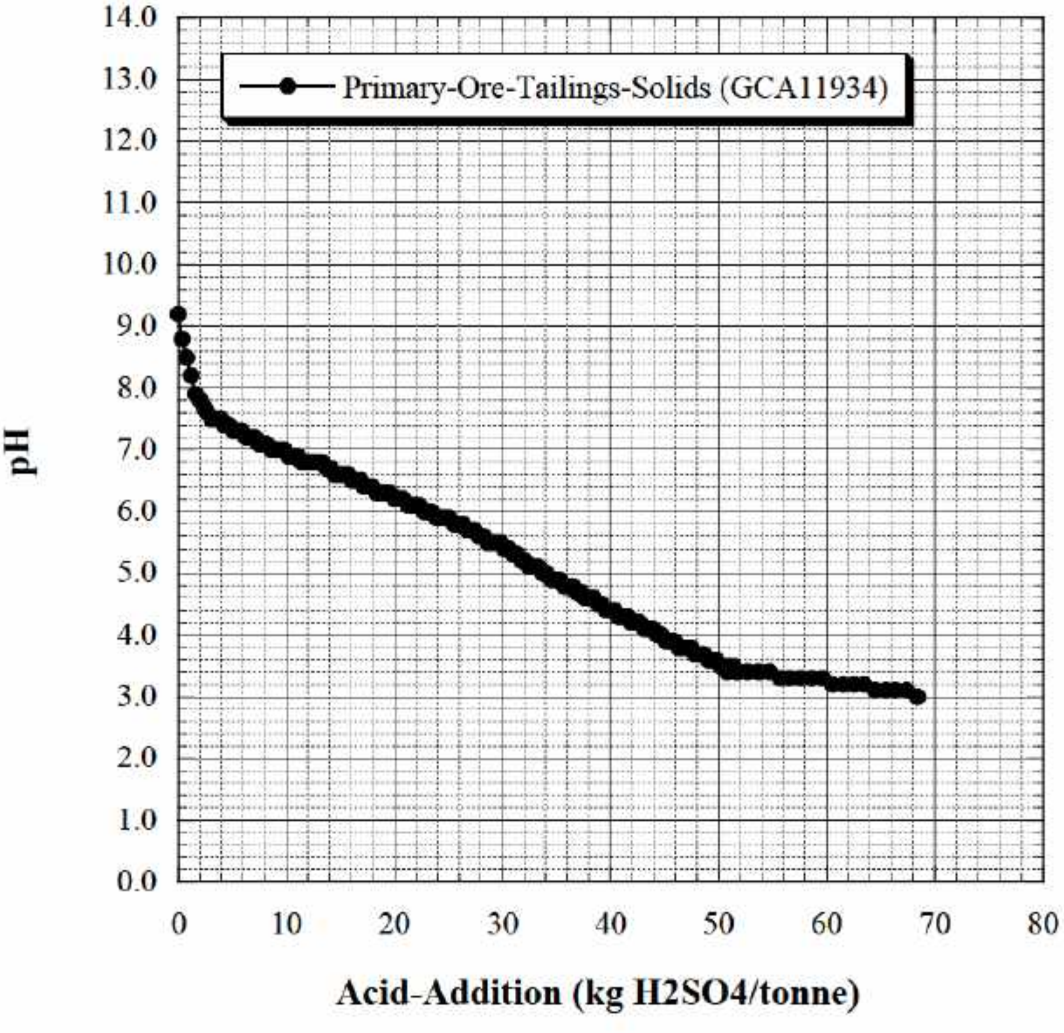
Notes:
EC = Electrical-Conductivity; TDS-(grav.) = Total-Dissolved-Solids-(gravimetric).
CNtot = Total-Cyanide; CNwad = Weak-Acid-Dissociable-Cyanide; CNfree = Free-Cyanide; SCN = thiocyanate.

Due to the elevated salinity, the detection-limits for numerous minor-elements were raised, and reflect dilution required to avoid matrix-interference effects in assaying.

FIGURE

Figure 1

pH-Buffering Curve for Primary-Ore-Tailings-Solids Sample



PLATE

PLATE 1: **Tailings-Slurry** Samples (**GCA11933** and **GCA11934**) 'As-Received' at GCA Testing Laboratory (Bridgetown).

ATTACHMENT

LABORATORY REPORTS

TOWNEND
mineralogy laboratory

Graeme Campbell and Assoc, 4-12-2020

[redacted]

Our reference 24504

Mineralogical examination (PLM/SEM/XRD) of two pulps.

[redacted]

ACN: 069 920 476 ABN: 92 076 109 663

[redacted]

RESULTS

Polished section/SEM/XRD.

	GCA11933	**GCA11934**
Quartz	Minor	Major
Albite	Major	Major
Muscovite		Minor
Phengite	Major	
Chlorite	Minor (2)	Accessory
Kaolin	Accessory	
Phillipsite (1)	Accessory	
Dolomite		Accessory
Goethite	Accessory	Accessory
Pyrite		Accessory
Rutile	Trace	Trace
Ilmenite		Trace

(1) based only on XRD. (2) Ni and Cr bearing.

intertek genalysis

MINERALS
TEST REPORT

CLIENT

[redacted]
CAMPBELL & ASSOCIATES PTY LIMITED
[redacted]

JOB INFORMATION

JOB CODE	: 143.0/2020204
NO. SAMPLES	: 2
NO. ELEMENTS	: 37
CLIENT ORDER NO.	: GCA2012 (Job 1 of 1)
SAMPLE SUBMISSION NO.	:
PROJECT	: MYHREE
SAMPLE TYPE	: Solid
DATE RECEIVED	: 20/10/2020
DATE TESTED	: 23/10/2020 - 12/11/2020
DATE REPORTED	: 13/11/2020
DATE PRINTED	: 13/11/2020

REPORT NOTES

[redacted]

[redacted]

APPROVED SIGNATURE FOR

[redacted]

Accredited for compliance with ISO/IEC 17025 - Testing.
Company Accreditation Number 3244

NATA

This report relates specifically to the sample(s) tested that were drawn and/or provided by the client or their nominated third party to Intertek. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment. This report was prepared solely for the use of the client named in this report. Intertek accepts no responsibility for any loss, damage or liability suffered by a third party as a result of any reliance upon or use of this report. The results provided are not intended for commercial settlement purposes.
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SIGNIFICANT FIGURES

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For more information on the uncertainty on individual reported values, please contact the laboratory.

MEASUREMENT OF UNCERTAINTY

Measurement of uncertainty estimates are available for most tests upon request.

SAMPLE STORAGE

All solid samples (assay pulps, bulk pulps and residues) will be stored for 60 days without charge. Following this samples will be stored at a daily rate until clients written advice regarding return, collection or disposal is received. If storage information is not supplied on the submission, or arranged with the laboratory in writing the default will be to store the samples with the applicable charges. Storage is charged at $4.00 per m3 per day, expenses related to the return or disposal of samples will be charged at cost. Current disposal cost is charged at $150.00 per m3.

Samples received as liquids, waters or solutions will be held for 60 days free of charge then disposed of, unless written advice fo return or collection is received.

LEGEND

X = Less than Detection Limit
SNR = Sample Not Received
LNR = Lab Not Received
* = Result Checked
DTF = Result still to come
I/S = Insufficient Sample for Analysis

NA = Not Analysed
UA = Unable to Assay
> = Value beyond Limit of Method
+ = Extra Sample Received Not Listed

ELEMENTS	Ag	Al	As	B	Ba	Bi
UNITS	ppm	%	ppm	ppm	ppm	ppm
DETECTION LIMIT	0.01	0.01	0.5	50	0.1	0.01
DIGEST	4A/	FP1/	4A/	FP1/	4A/	4A/
ANALYTICAL FINISH	MS	OE	MS	OE	MS	MS
SAMPLE NUMBERS						
0001 GCA11933	0.05	9.27	44.2	62	397.7	0.06
0002 GCA11934	0.17	6.28	11.8	X	451.6	0.06
CHECKS						
0001 GCA11933	0.04	9.21	45.2	57	405.9	0.06
STANDARDS						
0001 OREAS 277						
0002 OREAS 279						
0003 OREAS 123	0.03		4.7		1018.8	0.05
0004 AMIS0372		1.47		X		
0005 OREAS 46						
0006 AMIS0343						
0007 OREAS 97.01						
BLANKS						
0001 Control Blank	X	X	X	X	X	0.02

ELEMENTS	C	C-Acinsol	C-CO3	Ca	Cd	Co
UNITS	%	%	%	%	ppm	ppm
DETECTION LIMIT	0.01	0.01	0.01	0.1	0.02	0.1
DIGEST		C71/		FP1/	4A/	4A/
ANALYTICAL FINISH	/CSA	CSA	/CALC	OE	MS	MS
SAMPLE NUMBERS						
0001 GCA11933	0.16	0.12	0.04	0.3	0.11	73.9
0002 GCA11934	1.78	0.05	1.73	1.5	0.04	39.3
CHECKS						
0001 GCA11933	0.16	0.12	0.04	0.3	0.06	75.1
STANDARDS						
0001 OREAS 277	1.88					
0002 OREAS 279		0.23				
0003 OREAS 123					X	4.2
0004 AMIS0372				X		
0005 OREAS 46						
0006 AMIS0343						
0007 OREAS 97.01						
BLANKS						
0001 Control Blank	X	X		X	X	X

ELEMENTS	Cr	Cu	F	Fe	Hg	K
UNITS	ppm	ppm	ppm	%	ppb	%
DETECTION LIMIT	50	1	50	0.01	1	0.05
DIGEST	FP1/	4A/	FC7/	FP1/	AR005/	FP1/
ANALYTICAL FINISH	OE	OE	SIE	OE	MSHg	OE
SAMPLE NUMBERS						
0001 GCA11933	1038	74	624	8.50	4	1.77
0002 GCA11934	420	30	707	8.63	31	1.46
CHECKS						
0001 GCA11933	1036	73	600	8.43	5	1.77
STANDARDS						
0001 OREAS 277						
0002 OREAS 279						
0003 OREAS 123		3				
0004 AMIS0372	123			54.62		X
0005 OREAS 46					7	
0006 AMIS0343			2337			
0007 OREAS 97.01						
BLANKS						
0001 Control Blank	X	X	X	X	X	X

ELEMENTS	Mg	Mn	Mo	Na	Ni	P
UNITS	%	ppm	ppm	ppm	ppm	ppm
DETECTION LIMIT	0.01	1	0.1	20	1	10
DIGEST	FP1/	4A/	4A/	4A/	4A/	4A/
ANALYTICAL FINISH	OE	OE	MS	OE	OE	OE
SAMPLE NUMBERS						
0001 GCA11933	1.07	1763	1.5	1.87%	781	108
0002 GCA11934	2.06	1527	3.6	2.69%	590	395
CHECKS						
0001 GCA11933	1.05	1767	1.4	1.88%	780	108
STANDARDS						
0001 OREAS 277						
0002 OREAS 279						
0003 OREAS 123		741	7.2	2382	12	214
0004 AMIS0372	0.04					
0005 OREAS 46						
0006 AMIS0343						
0007 OREAS 97.01						
BLANKS						
0001 Control Blank	X	X	X	X	X	X

ELEMENTS	Pb	S	S	Sb	Se	Si
UNITS	ppm	%	ppm	ppm	ppm	%
DETECTION LIMIT	0.5	0.01	50	0.05	0.01	0.1
DIGEST	4A/		4A/	4A/	SE1/	FP1/
ANALYTICAL FINISH	MS	/CSA	OE	MS	MS	OE
SAMPLE NUMBERS						
0001 GCA11933	4.4	0.10	1065	1.40	0.31	24.7
0002 GCA11934	6.9	0.82	8130	0.65	0.29	25.3
CHECKS						
0001 GCA11933	4.5	0.10	1068	1.39	0.27	24.3
STANDARDS						
0001 OREAS 277		0.65				
0002 OREAS 279						
0003 OREAS 123	17.9		X	0.08		
0004 AMIS0372						6.1
0005 OREAS 46						
0006 AMIS0343						
0007 OREAS 97.01					0.62	
BLANKS						
0001 Control Blank	X	X	X	X	X	X

ELEMENTS	Sn	Sr	Th	Ti	Ti	Tl
UNITS	ppm	ppm	ppm	%	ppm	ppm
DETECTION LIMIT	0.1	0.05	0.01	0.01	5	0.02
DIGEST	4A/	4A/	4A/	FP1/	4A/	4A/
ANALYTICAL FINISH	MS	MS	MS	OE	OE	MS
SAMPLE NUMBERS						
0001 GCA11933	0.8	45.73	2.04	0.57	3976	0.45
0002 GCA11934	0.6	205.08	2.64	0.33	2716	0.39

CHECKS						
0001 GCA11933	0.8	45.75	2.10	0.58	3925	0.45

STANDARDS						
0001 OREAS 277						
0002 OREAS 279						
0003 OREAS 123	0.9	154.05	5.09		2414	0.41
0004 AMIS0372				0.11		
0005 OREAS 46						
0006 AMIS0343						
0007 OREAS 97.01						

BLANKS						
0001 Control Blank	X	X	X	X	X	X

ELEMENTS	U	V	Zn
UNITS	ppm	ppm	ppm
DETECTION LIMIT	0.01	1	1
DIGEST	4A/	4A/	4A/
ANALYTICAL FINISH	MS	OE	OE
SAMPLE NUMBERS			
0001 GCA11933	0.48	268	67
0002 GCA11934	0.68	156	76
CHECKS			
0001 GCA11933	0.54	261	67
STANDARDS			
0001 OREAS 277			
0002 OREAS 279			
0003 OREAS 123	842.76	22	14
0004 AMIS0372			
0005 OREAS 46			
0006 AMIS0343			
0007 OREAS 97.01			
BLANKS			
0001 Control Blank	X	X	X

METHOD CODE DESCRIPTION

Method Code Date Tested	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation	
/CALC **28/10/20 16:42**	Intertek Genalysis Perth **3244 3237**	*	No digestion or other pre-treatment undertaken. Results Determined by calculation from other reported data.
/CSA **12/11/20 12:08**	Intertek Genalysis Perth **3244 3237**	**ENV_W061**	Induction Furnace Analysed by Infrared Spectrometry
4A/MS **26/10/20 04:31**	Intertek Genalysis Perth **3244 3237**	**MPL_W002, MS_IM_001**	Multi-acid digest including Hydrofluoric, Nitric, Perchloric and Hydrochloric acids in Teflon Tubes. Analysed by Inductively Coupled Plasma Mass Spectrometry.
4A/OE **26/10/20 04:31**	Intertek Genalysis Perth **3244 3237**	**MPL_W002, ICP_IM_001**	Multi-acid digest including Hydrofluoric, Nitric, Perchloric and Hydrochloric acids in Teflon Tubes. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.
AR005/MSHg **25/10/20 22:57**	Intertek Genalysis Perth **3244 3237**	*	0.5 gram mini Aqua-Regia digest. Analysed by Inductively Coupled Plasma Mass Spectrometry.
C71/CSA **23/10/20 19:00**	Intertek Genalysis Perth **3244 3237**	**ENV_W063**	Digestion by hot acid(s) and Induction Furnace Analysed by Infrared Spectrometry
FC7/SIE **26/10/20 08:38**	Intertek Genalysis Perth **3244 3237**	**ENV_W012**	Alkaline fusion (Nickel crucible) specific for Fluorine. Analysed by Specific Ion Electrode.
FP1/OE **26/10/20 17:35**	Intertek Genalysis Adelaide **3244 18645**	**MPL_W011, MS_IM_001**	Sodium peroxide fusion (Zirconia crucibles) and Hydrochloric acid to dissolve the melt. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.

METHOD CODE DESCRIPTION

Method Code Date Tested	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
SE1/MS **26/10/20 06:25**	Intertek Genalysis Perth **3244 3237**	**MPL_W005, MS_IM_001**
	Aqua-Regia digest followed by Precipitation and Concentration. Specific for Selenium. Analysed by Inductively Coupled Plasma Mass Spectrometry.	

* Denotes not on Scope of Accreditation

NATA ENDORSED DOCUMENT

Analysing Laboratory: Intertek Genalysis Perth

The contents of this report have been prepared in accordance with the terms of NATA accreditation and as such should only be reproduced in full.
The analysis results reported herein have been obtained using the following methods and conditions:

Project: MYHREE

SAMPLES:

The 2 Tailings-Solid samples of GCA11933 and GCA11934 were received on 20th October 2020.

SAMPLE PREPARATION:

They were dried at 80°C overnight and crushed to -2mm nominal.

Approximately 300g of each was pulverised to -75µm using a steel bowl.

DIGESTIONS:

MPL_W002 (4A/), MPL_W005 (SE1/), GL_W009 (AR005/), MPL_W011 (FP1/), ENV_W012 (FC7/) and ENV_W063 (C71/).

ANALYTICAL FINISHES:

ICP_W003 (/MS), ICP_W004 (/OES), ENV_W061 (/CSA) and ENV_W012 (/SIE).

RESULTS:

Result are expressed in respective units: [ppm, %].

The results included the assay of blanks, in-house standards: Se 0.1ppm, Se 1.0ppm

and international reference standards: AMIS0372, AMIS0343, OREAS 123, OREAS 46, OREAS 277, OREA
279, OREAS 924 and OREAS 97.01.

“CO3 calc” was calculated by subtraction of “C-Acinsol” from total Carbon.

Intertek Genalysis signatory

[redacted]

Environmental Analysis Laboratory

Southern Cross University
[redacted]
ABN: 41 995 651 524

Mr Graeme Campbell
PO Box 247
Bridgetown WA 6255

EAL Lab ID	K0245
Number of Samples	2
Customer Job Reference	GCA-Job-No. 2012
Date Received	5 November 2020
Date Reported	9 November 2020

NATA
WORLD RECOGNISED ACCREDITATION
Accreditation No. 14960
Accredited for compliance with ISO/IEC 17025 - Testing

1.0 Introduction

The Chromium Reducible Sulfur (CRS) results below have been provided in accordance to the requirements of GCA for the analysis of sulfide in samples of waste rock, ore, tailings and soils. Samples submitted by GCA correspond to pulps (nominal 75 µm) prepared by pulverising as per standard procedures for mining projects.

The analysis is in accordance with the National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual (2018).

2.0 Chromium Reducible Sulfur (CRS)

Ring mill ground sample at a sample weight from around 0.05-0.5 g is added to a 150 mL quick fit flask with 1 g of Cr powder. Ethanol is used to wash down the sides of the quick fit flask. The flask is placed on the cold hotplate and locked into the condensers of the CRS unit. Forty millilitres of zinc acetate trapping solution is dispensed into a 100 mL erlenmeyer flask. A new pasturer pipette, attached to the top of the condenser is inserted into the trapping solution. The system is purged with argon gas for 3 minutes. Sixty millilitres of 5.65 M hydrochloric acid is slowly added to the sample flask. Once dispensed the hotplate is turned on and the system allowed to proceed for 35 min with cold water circulating through the condensers.

On completion, 1 mL of starch indicator solution is added to the trapping solution and 20 mL of 5.65 M hydrochloric acid washed down the side of the flask into the trap. An iodometric titration is quickly undertaken to a permanent blue endpoint with standardised 0.025 M Iodine Solution.

A 0.025 N Sodium thiosulfate solution is used daily to assess recovery; the expected value is 0.16% ± 0.01% S.

Reference:

Sullivan, L, Ward, N, Toppler, N and Lancaster, G 2018, *National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual*, Department of Agriculture and Water Resources, Canberra, ACT.

3.0 Results

Sample Identification	EAL Lab Code	Potential Sulfidic Acidity (Chromium Reducible Sulfur - CRS)	
		(% S_{cr})	(mol H^+/t)
Method Info.		*(In-house method S20)*	
GCA11933, 0.10%S	*K0245/1*	<0.005	0
GCA11934, 0.82%S	*K0245/2*	0.741	462

Notes:

1. All analysis is reported on a dry weight (DW) basis.
2. Analytical procedures are sourced from Sullivan L, Ward N, Toppler N and Lancaster G. 2018. National acid sulfate soils guidance: national acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT. CC BY 4.0.
3. Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.
4. Analysis conducted between sample arrival date and reporting date.
5. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).

Please contact the laboratory if you have any queries.

[redacted]

NET-ACID-GENERATION (NAG) TESTWORK (SINGLE-ADDITION)

Sample_ ID	**Sample Weight (g)**	**Comments**	**pH of Test Suspension within approx. 10 mins**	**pH of Test-Suspension After O'Night Reaction [Before Boiling Steps]**	**pH of Test-Suspension After 1st-Boiling Step [Before Cu(II) Addition]**	**Test-Suspension Values After 2nd-Boiling Step [Cu(II) Added Before 2nd-Boiling Step]**		**Titre (mL) (0.1 M-NaOH)**		**NAG (kg H_2SO_4/tonne)**		
						NAG-pH	**NAG-EC (µS/cm)**	**To pH 4.5**	**pH 4.5 to pH 7.0**	**To pH 4.5**	**pH 4.5 to pH 7.0**	**To pH 7.0**
GCA11933	3.04	reaction peaked overnight	6.4	8.2	8.0	7.8	710	-	-	<1	<1	<1
GCA11934	3.00	reaction peaked overnight	6.5	8.1	9.4	9.1	580	-	-	<1	<1	<1
GCA11934 d	3.00	reaction peaked overnight	6.5	8.2	9.4	9.2	630	-	-	<1	<1	<1
Blank		no apparent reaction overnight	4.8	4.9	4.9	5.0	8	-	0.40			"<1"

Notes: Chem-Supply® A.R. 30 % H_2O_2 employed ('apparent-pH' = 4.1). **15 % H_2O_2** reagent corresponds to 1:1 (v/v) mixing with high-purity deionised-water (HPDW).
250 mL of peroxide solution is added to sample in in 500 mL conical Erlenmeyer beaker that is then covered with a watchglass. pH values of test-suspensions determined at different stages during testing. Following reaction overnight, the occurrence and vigour of reaction is judged according to degree of water condensation on the underside of the watchglass. The suspension-pH is measured, and the test-suspensions then boiled for *ca.* 1 hr. After allowing to cool, *ca.* 1 mL of **0.016 M-$CuSO_4$** is added, and the 2nd-boiling step carried out for *ca.* 1 hr. The added Cu(II) catalyses the decomposition of any residual, unreacted H_2O_2 (AS 4969.12-2009).
Following determination of supernatant-EC and suspension-pH, the test-suspensions are titrated manually with standardised NaOH solution to respective **pH4.5** and **pH7.0** end-points.
The Blank corresponds to a "NAG-[pH7]" value less than 1 kg H_2SO_4/tonne for a sample weight of 3.00 gm. $CuSO_4$ was added to Blank. Boiling during 2nd-boiling step continued until it was visually evident that residual-H_2O_2 in the Blank was negligible.
Separate Blank* (results not reported) without $CuSO_4$ addition characterised by appreciable residual H_2O_2 after completion of boiling steps, as expected.
Testing performed on **pulps** (nominal -75 µm).

[redacted] **1st December 2020**

NAG Testwork: 1st-Boiling Step [without Cu(II) addition] After Overnight Reaction

ACID-NEUTRALISATION-CAPACITY (ANC) TESTWORK: BASED ON AMIRA (2002) WITH VARIATIONS TO CONSTRAIN DISSOLUTION OF NON-CARBONATE-MINERALS UNRELATED TO CIRCUM-NEUTRAL BUFFERING SAVE FOR VANISHINGLY-SMALL RATES OF PYRITE OXIDATION (e.g. < 0.1 kg H2SO4/tonne/year)

SAMPLE		**HCl**		**milli moles H+ Added**	**Digest-Slurry-Final-pH**	**NaOH**		**milli moles OH- Added**	**pH after H2O2 Added**	**Vigour of 'Fizzing' from HCl Addition ('in-the-cold')**	**BULK-ANC (kg H2SO4/ tonne)**
ID	**WT (g)**	**Conc. (M)**	**Pipette Volume (mL)**			**Conc. (M)**	**Titre Volume (mL)**				
GCA11933	**4.98**	0.10	10	1.00	3.1	0.05	4.10	0.205	> 4.0		**8**
GCA11934	2.31	0.50	15	7.50	1.3	0.10	37.50	3.750	2.7	moderate / slight delay	**80**
GCA11934 d	2.30	0.50	15	7.50	1.3	0.10	37.45	3.745	2.8		**80**
ANC Std	4.50	0.10	25	2.50	2.0	0.05	10.50	0.525	> 4.0		22
ANC Std d	4.51	0.10	25	2.50	1.9	0.05	10.45	0.523	> 4.0		22
HCl	-	0.10	10	1.00		0.05	20.15	1.01			100.8%
HCl (d)	-	0.10	10	1.00		0.05	20.10	1.01			100.5%

Notes:

1. Testing performed on **dry tailings**-solids (105 oC).
The **'fizz'** testing with *ca.* 10 % HCl (1-2 M-HCl approx.) undertaken **on pulps** (-75 **µm nominal**).

2. *ca.* **20 mL of high-purity-deionised-water** (HPDW) **added to** all samples (including HCl-solution 'blanks') initially.

3. HCl solution added manually via volumetric glass pipette (A Class).

4. **HCl and NaOH** solutions certified reagents from Merck (viz. Titripur® reagents in hermetically-sealed Titripac® casks).

5. Sample weight, and volume and strength of HCl added, based on corresponding CO3-C value(s).

6. During acid-digestion temperature of waterbath is **80** +/- **5 oC, and digestion** performed for **1.0** hr **with beakers swirled by hand** 1-2 **times during this reaction period**. Digestion performed using 250 mL tall-form beakers covered with watchglasses.

7. **After completion of acid-digestion step, the test-slurries are boiled for** *ca.* **1 min to expel** any dissolved CO2(aq) **which is important for the** attainment of a stable pH7 end-point in the subsequent back-titration with NaOH solution.

8. Following cooling to room-T, **digest-slurry-final-pH** is measured. HPDW is then added to bring test-slurry volume to *ca.* **125 mL** for titration with NaOH solution.

9. Titration with NaOH performed manually using 50 mL glass burette with slurry stirred using magnetic stirrer-bar. Fast titration with stopcock fully open until slurry-pH rises to approximate range 4.0-4.5 when titration stops for H2O2 addition.

10. Three drops of 30 % **H2O2** (v/v) [adjusted to pH 4.5] added to slurry to oxidise **soluble-Fe(II)** forms ('latent-acidity') and precipitation of Fe(III)/Al-oxyhydroxides, etc. Minimum slurry-pH attained following H2O2 addition recorded.

11. Following completion of H2O2 addition, titration with NaOH continues to a **pH7 end-point**. Titration with NaOH undertaken so that slurry-pH at end-point is within range 6.9-7.1 (i.e. pH 7.0 +/- 0.1) for *ca.* 30 seconds. [Related pH-end-point stability criteria for manual titration (cf. autotititration) option applies in ASTM E1915-13, and AS-4969.12-09].

12. ANC Standard is pulped mixture of quartz and AR CaCO3 (CO3-C = 0.28 %; ANC = 23 kg H2SO4/tonne).

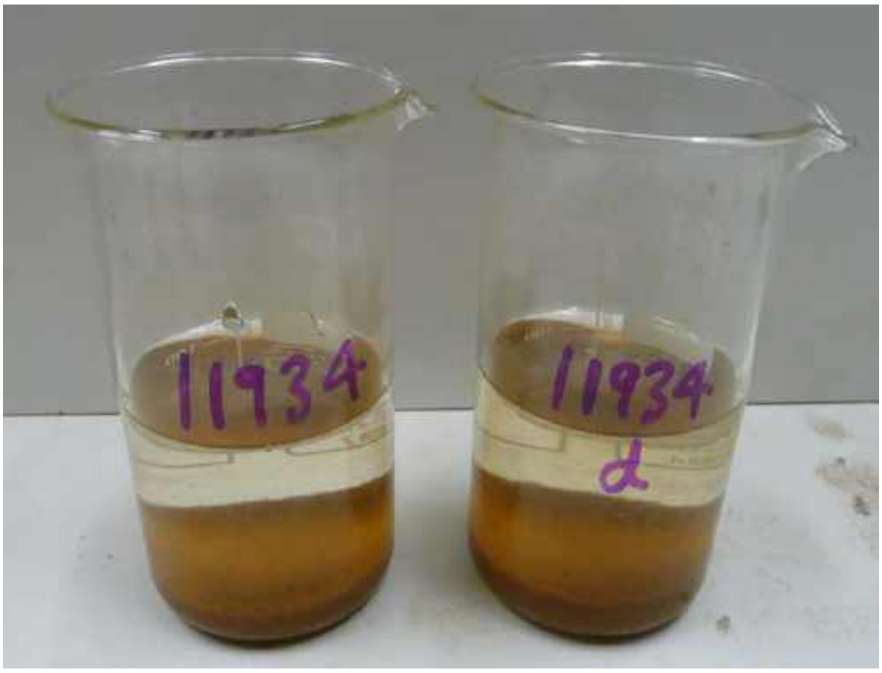
The main variations to the AMIRA (2002) method are the initial 'applied HCl loadings', as governed by CO3-C values.

[redacted]

ANC Testwork: Back-Titrations with NaOH Solution

Quite Ferroan Nature of Carbonate-Mineral Suite in Sample GCA11934

(Settled Fe-oxyhydroxide precipitates after completion of NaOH-back-titration).



pH-BUFFERING TESTWORK (GCA11934)

Cumulative Volume of Acid Added (mL)	Cumulative Acid Consumption (kg H2SO4/tonne)	pH	Cumulative Volume of Acid Added (mL)	Cumulative Acid Consumption (kg H2SO4/tonne)	pH
0.00	0.0	9.2	22.40	22.0	6.1
0.40	0.4	8.8	22.80	22.3	6.1
0.80	0.8	8.5	23.20	22.7	6.0
1.20	1.2	8.2	23.60	23.1	6.0
1.60	1.6	7.9	24.00	23.5	6.0
2.00	2.0	7.8	24.40	23.9	5.9
2.40	2.4	7.7	24.80	24.3	5.9
2.80	2.7	7.6	25.20	24.7	5.9
3.20	3.1	7.5	25.60	25.1	5.9
3.60	3.5	7.5	26.00	25.5	5.8
4.00	3.9	7.5	26.40	25.9	5.8
4.40	4.3	7.4	26.80	26.3	5.8
4.80	4.7	7.4	27.20	26.7	5.7
5.20	5.1	7.3	27.60	27.0	5.7
5.60	5.5	7.3	28.00	27.4	5.7
6.00	5.9	7.3	28.40	27.8	5.6
6.40	6.3	7.2	28.80	28.2	5.6
6.80	6.7	7.2	29.20	28.6	5.5
7.20	7.1	7.2	29.60	29.0	5.5
7.60	7.4	7.1	30.00	29.4	5.5
8.00	7.8	7.1	30.40	29.8	5.5
8.40	8.2	7.1	30.80	30.2	5.4
8.80	8.6	7.0	31.20	30.6	5.4
9.20	9.0	7.0	31.60	31.0	5.3
9.60	9.4	7.0	32.00	31.4	5.3
10.00	9.8	7.0	32.40	31.8	5.2
10.40	10.2	6.9	32.80	32.1	5.2
10.80	10.6	6.9	33.20	32.5	5.1
11.20	11.0	6.9	33.60	32.9	5.1
11.60	11.4	6.8	34.00	33.3	5.1
12.00	11.8	6.8	34.40	33.7	5.0
12.40	12.2	6.8	34.80	34.1	5.0
12.80	12.5	6.8	35.20	34.5	4.9
13.20	12.9	6.8	35.60	34.9	4.9
13.60	13.3	6.8	36.00	35.3	4.9
14.00	13.7	6.7	36.40	35.7	4.8
14.40	14.1	6.7	36.80	36.1	4.8
14.80	14.5	6.6	37.20	36.5	4.8
15.20	14.9	6.6	37.60	36.8	4.7
15.60	15.3	6.6	38.00	37.2	4.7
16.00	15.7	6.6	38.40	37.6	4.6
16.40	16.1	6.5	38.80	38.0	4.6
16.80	16.5	6.5	39.20	38.4	4.6
17.20	16.9	6.5	39.60	38.8	4.5
17.60	17.2	6.4	40.00	39.2	4.5
18.00	17.6	6.4	40.40	39.6	4.4
18.40	18.0	6.4	40.80	40.0	4.4
18.80	18.4	6.3	41.20	40.4	4.4
19.20	18.8	6.3	41.60	40.8	4.3
19.60	19.2	6.3	42.00	41.2	4.3
20.00	19.6	6.3	42.40	41.6	4.3
20.40	20.0	6.2	42.80	41.9	4.2
20.80	20.4	6.2	43.20	42.3	4.2
21.20	20.8	6.2	43.60	42.7	4.2
21.60	21.2	6.1	44.00	43.1	4.1
22.00	21.6	6.1	44.40	43.5	4.1

Cumulative Volume of Acid Added (mL)	Cumulative Acid Consumption (kg H2SO4/tonne)	pH	Cumulative Volume of Acid Added (mL)	Cumulative Acid Consumption (kg H2SO4/tonne)	pH
44.80	43.9	4.1	52.80	51.7	3.4
45.20	44.3	4.0	51.80	50.8	3.4
45.60	44.7	4.0	52.80	51.7	3.4
46.00	45.1	3.9	53.80	52.7	3.4
46.40	45.5	3.9	54.80	53.7	3.4
46.80	45.9	3.9	55.80	54.7	3.4
47.20	46.3	3.8	56.80	55.7	3.3
47.60	46.6	3.8	57.80	56.6	3.3
48.00	47.0	3.8	58.80	57.6	3.3
48.40	47.4	3.8	59.80	58.6	3.3
48.80	47.8	3.7	60.80	59.6	3.3
49.20	48.2	3.7	61.80	60.6	3.2
49.60	48.6	3.7	62.80	61.5	3.2
50.00	49.0	3.6	63.80	62.5	3.2
50.40	49.4	3.6	64.80	63.5	3.2
50.80	49.8	3.6	65.80	64.5	3.1
51.20	50.2	3.5	66.80	65.5	3.1
51.60	50.6	3.5	67.80	66.4	3.1
52.00	51.0	3.5	68.80	67.4	3.1
52.40	51.4	3.5	69.80	68.4	3.0

Notes: Titration performed using Metrohm® 736 Titrino auto-titrator, and 0.05 M-H2SO4. Equlibration time between titrant additions is 15 minutes.

5.00 g of pulped (nominal -75 µm) sample initially dispersed in *ca.* 150 mL of deionised-water.

Test-suspension in contact with air in a CT-room @ 20 (+/1 1-2) oC, and continuously stirred.

Calibration of pH-Glass Electrode:

Immediately prior to titration: asymmetry potential = 14 mV (pH=7.00); slope-point = 188 mV (pH=4.00); 98.2 % of Nernstian response.

[redacted]

Determination of Oxygen-Consumption Rate (OCR)

	GCA11934
Test Specifications and Conditions	
Moist-Solids (kg)	0.72
GWC (%)	**8.2**
Dry-Solids [DS] (kg)	0.67
Solids-SG	2.80
Dry-Solids Volume (L)	0.24
Pore-Fluid Volume (L)	0.05
Cell Volume (L)	0.65
Gas Volume [GV] (L)	0.36
GV/DS Ratio (L/kg)	0.54
Temperature (oC) [+/- **0.1**]	**30.0**
Measurement with Quantek O901	
Reaction-Time (days)	**6.0**
Reaction-Time (hrs)	144
Measured O2-Conc. (%) [+/- 0.1]	**20.2**
O2-Consumption (%) [+/- 0.2]	0.7
O2-Consumption (mg O2)	3.3
OCR (kg O2/kg/s)	**9.5E-12**

Notes:

Tailings-solids initially oven-dried overnight at 80 oC, and then moistened via misting with high-purity-deionised-water (HPDW) and hand-mixing until a 'just-clumpy' state attained.

Moisted tailings-solids then aged for 2-3 days in a plastic-bag in a CT-room at 20 oC.

GWC = Gravimetric-Water Content; SG = Specific-Gravity.

SG estimated.

GWC determined on sub-sample of tailings-solids dried at 105 oC.

The relative-error for the OCR value is estimated to be *ca.* 10-20 %.

[redacted]

23rd November 2020

MINERALS
TEST REPORT

CLIENT

[redacted]
CAMPBELL & ASSOCIATES PTY LIMITED
[redacted]

JOB INFORMATION

JOB CODE : 143.0/2019768
NO. SAMPLES : 8
NO. ELEMENTS : 47
CLIENT ORDER NO. : GCA2012 (Job 1 of 1)
SAMPLE SUBMISSION NO. :
PROJECT : MYHREE
SAMPLE TYPE : Water
DATE RECEIVED : 14/10/2020
DATE TESTED : 03/11/2020
DATE REPORTED : 04/11/2020
DATE PRINTED : 04/11/2020

REPORT NOTES

[redacted]

APPROVED SIGNATURE FOR

[redacted]

Accredited for compliance with ISO/IEC 17025 - Testing.
Company Accreditation Number 3244

This report relates specifically to the sample(s) tested that were drawn and/or provided by the client or their nominated third party to Intertek. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment. This report was prepared solely for the use of the client named in this report. Intertek accepts no responsibility for any loss, damage or liability suffered by a third party as a result of any reliance upon or use of this report. The results provided are not intended for commercial settlement purposes.
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SIGNIFICANT FIGURES

It is common practice to report data derived from analytical instrumentation to a maximum of two or three significant figures. Some data reported herein may show more figures than this. The reporting of more than two or three figures in no way implies that figures beyond the least significant digit have significance.

For more information on the uncertainty on individual reported values, please contact the laboratory.

MEASUREMENT OF UNCERTAINTY

Measurement of uncertainty estimates are available for most tests upon request.

SAMPLE STORAGE

All solid samples (assay pulps, bulk pulps and residues) will be stored for 60 days without charge. Following this samples will be stored at a daily rate until clients written advice regarding return, collection or disposal is received. If storage information is not supplied on the submission, or arranged with the laboratory in writing the default will be to store the samples with the applicable charges. Storage is charged at $4.00 per m3 per day, expenses related to the return or disposal of samples will be charged at cost. Current disposal cost is charged at $150.00 per m3.

Samples received as liquids, waters or solutions will be held for 60 days free of charge then disposed of, unless written advice fo return or collection is received.

LEGEND

X = Less than Detection Limit
SNR = Sample Not Received
LNR = Lab Not Received
* = Result Checked
DTF = Result still to come
I/S = Insufficient Sample for Analysis

NA = Not Analysed
UA = Unable to Assay
> = Value beyond Limit of Method
+ = Extra Sample Received Not Listed

ELEMENTS	Ag	Al	As	B	Ba	Bi
UNITS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DETECTION LIMIT	0.001	0.1	0.01	0.1	0.005	0.001
DIGEST						
ANALYTICAL FINISH	/MS	/OE	/MS	/OE	/MS	/MS
SAMPLE NUMBERS						
0001 GCA11933 RAW						
0002 GCA11934 RAW						
0003 GCA11933 HNO3	0.03	2.1	0.02	0.2	0.239	X
0004 GCA11934 HNO3	0.13	1.0	0.01	0.6	0.511	X
0005 GCA11933 H2SO4						
0006 GCA11934 H2SO4						
0007 GCA11933 NaOH						
0008 GCA11934 NaOH						
CHECKS						
0001 GCA11934 RAW						
0002 GCA11934 HNO3	0.13	1.1	0.02	0.6	0.519	X
STANDARDS						
0001 IS-029						
0002 GWS-3						
0003 KCl-0.05M						
0004 QCI-136						
0005 GLS-Brine1						
0006 GWS-3						
0007 GWS-3						
0008 TMDW		X		X		
BLANKS						
0001 Control Blank						
0002 Control Blank	X	X	X	0.1	X	X

ELEMENTS	CO3	Ca	Cd	Cl	Co	Cr
UNITS	mgCaCO3/L	mg/l	mg/l	g/L	mg/l	mg/l
DETECTION LIMIT	1	0.1	0.002	0.2	0.01	0.1
DIGEST						
ANALYTICAL FINISH	/VOL	/OE	/MS	/COL	/MS	/OE
SAMPLE NUMBERS						
0001 GCA11933 RAW	268			48.7	0.12	
0002 GCA11934 RAW	346			48.5	0.56	
0003 GCA11933 HNO3		2720.0	0.003		0.12	X
0004 GCA11934 HNO3		1905.3	0.006		0.55	X
0005 GCA11933 H2SO4						
0006 GCA11934 H2SO4						
0007 GCA11933 NaOH						
0008 GCA11934 NaOH						
CHECKS						
0001 GCA11934 RAW	348			48.4		
0002 GCA11934 HNO3		1905.8	0.010		0.58	X
STANDARDS						
0001 IS-029						
0002 GWS-3						
0003 KCl-0.05M						
0004 QCI-136						
0005 GLS-Brine1				119.2		
0006 GWS-3	X					
0007 GWS-3						
0008 TMDW		35.0				X
BLANKS						
0001 Control Blank	X			X		
0002 Control Blank		X	X		X	X

ELEMENTS	Cu	EC	F	Fe-Sol	HCO3	Hg
UNITS	mg/l	mS/cm	mg/l	mg/l	mgCaCO3/L	mg/l
DETECTION LIMIT	0.1	0.01	0.1	0.1	2	0.01
DIGEST						
ANALYTICAL FINISH	/OE	/MTR	/SIE	/OE	/VOL	/MS
SAMPLE NUMBERS						
0001 GCA11933 RAW	1.5	124.30	0.2	0.1	9	
0002 GCA11934 RAW	8.9	124.10	0.1	0.7	X	
0003 GCA11933 HNO3	1.5			X		X
0004 GCA11934 HNO3	8.9			0.7		0.04
0005 GCA11933 H2SO4						
0006 GCA11934 H2SO4						
0007 GCA11933 NaOH						
0008 GCA11934 NaOH						
CHECKS						
0001 GCA11934 RAW		124.20	0.1		X	
0002 GCA11934 HNO3	8.7			0.8		0.03
STANDARDS						
0001 IS-029						
0002 GWS-3		0.33				
0003 KCl-0.05M						
0004 QCI-136			3.3			
0005 GLS-Brine1						
0006 GWS-3					98	
0007 GWS-3						
0008 TMDW	X			X		
BLANKS						
0001 Control Blank		X	X		3	
0002 Control Blank	X			X		X

ELEMENTS	K	Mg	Mn	Mo	N-NH3	N-NO3
UNITS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DETECTION LIMIT	1	0.1	0.1	0.005	0.005	0.005
DIGEST						
ANALYTICAL FINISH	/OE	/OE	/OE	/MS	/COL	/COL
SAMPLE NUMBERS						
0001 GCA11933 RAW						
0002 GCA11934 RAW						
0003 GCA11933 HNO3	125	1751.4	0.2	0.056		
0004 GCA11934 HNO3	139	2147.1	0.4	0.039		
0005 GCA11933 H2SO4					65.000	0.008
0006 GCA11934 H2SO4					2.400	X
0007 GCA11933 NaOH						
0008 GCA11934 NaOH						
CHECKS						
0001 GCA11934 RAW						
0002 GCA11934 HNO3	141	2149.9	0.5	0.034		
STANDARDS						
0001 IS-029						
0002 GWS-3						
0003 KCl-0.05M						
0004 QCI-136						
0005 GLS-Brine1						
0006 GWS-3						
0007 GWS-3						
0008 TMDW	2	9.0	X			
BLANKS						
0001 Control Blank						
0002 Control Blank	1	X	X	X		

ELEMENTS	Na	Ni	OH	P	Pb	CN-Tot
UNITS	mg/l	mg/l	mgCaCO3/L	mg/l	mg/l	mg/l
DETECTION LIMIT	1	0.1	1	1	0.05	1
DIGEST						
ANALYTICAL FINISH	/OE	/OE	/VOL	/OE	/MS	/COL
SAMPLE NUMBERS						
0001 GCA11933 RAW		1.1	X			
0002 GCA11934 RAW		6.7	96			
0003 GCA11933 HNO3	25466	0.9		X	X	
0004 GCA11934 HNO3	26500	6.8		X	X	
0005 GCA11933 H2SO4						
0006 GCA11934 H2SO4						
0007 GCA11933 NaOH						277
0008 GCA11934 NaOH						243
CHECKS						
0001 GCA11934 RAW			95			
0002 GCA11934 HNO3	26363	6.8		X	X	
STANDARDS						
0001 IS-029						969
0002 GWS-3						
0003 KCl-0.05M						
0004 QCI-136						
0005 GLS-Brine1						
0006 GWS-3			X			
0007 GWS-3						
0008 TMDW	X	X		X		
BLANKS						
0001 Control Blank			X			X
0002 Control Blank	2	X		X	X	

ELEMENTS	CN-WAD	FreeCN	SCN	pH	S	Sb
UNITS	mg/l	mg/l	mg/L	NONE	mg/l	mg/l
DETECTION LIMIT	1	1	0.05	0.1	1	0.001
DIGEST						
ANALYTICAL FINISH	/COL	/COL	/COL	/MTR	/OE	/MS
SAMPLE NUMBERS						
0001 GCA11933 RAW			5.69	8.7		
0002 GCA11934 RAW			26.39	9.1		
0003 GCA11933 HNO3					1694	0.003
0004 GCA11934 HNO3					1800	0.005
0005 GCA11933 H2SO4						
0006 GCA11934 H2SO4						
0007 GCA11933 NaOH	239	252				
0008 GCA11934 NaOH	236	262				
CHECKS						
0001 GCA11934 RAW			26.38	9.1		
0002 GCA11934 HNO3					1747	0.003
STANDARDS						
0001 IS-029	959	964				
0002 GWS-3				9.3		
0003 KCl-0.05M						
0004 QCl-136						
0005 GLS-Brine1						
0006 GWS-3						
0007 GWS-3						
0008 TMDW					X	
BLANKS						
0001 Control Blank	X	X	X	5.5		
0002 Control Blank					X	0.001

ELEMENTS	Se	Si	Sn	Sr	TDSEva	Th
UNITS	mg/l	mg/l	mg/l	mg/l	g/Kg	mg/l
DETECTION LIMIT	0.05	0.5	0.01	0.002	0.02	0.001
DIGEST						
ANALYTICAL FINISH	/MS	/OE	/MS	/MS	/GR	/MS
SAMPLE NUMBERS						
0001 GCA11933 RAW					85.47	
0002 GCA11934 RAW					85.50	
0003 GCA11933 HNO3	X	2.8	X	20.268		X
0004 GCA11934 HNO3	X	1.3	X	13.346		X
0005 GCA11933 H2SO4						
0006 GCA11934 H2SO4						
0007 GCA11933 NaOH						
0008 GCA11934 NaOH						
CHECKS						
0001 GCA11934 RAW					85.49	
0002 GCA11934 HNO3	X	1.0	X	13.286		X
STANDARDS						
0001 IS-029						
0002 GWS-3						
0003 KCl-0.05M					3.72	
0004 QCI-136						
0005 GLS-Brine1						
0006 GWS-3						
0007 GWS-3						
0008 TMDW		X				
BLANKS						
0001 Control Blank					X	
0002 Control Blank	X	X	X	X		X

ELEMENTS	Tl	TotAlk	U	V	Zn
UNITS	mg/l	mgCaCO3/L	mg/l	mg/l	mg/l
DETECTION LIMIT	0.001	5	0.001	0.1	0.1
DIGEST					
ANALYTICAL FINISH	/MS	/CALC	/MS	/OE	/OE
SAMPLE NUMBERS					
0001 GCA11933 RAW		278			0.6
0002 GCA11934 RAW		443			0.9
0003 GCA11933 HNO3	X		X	X	0.7
0004 GCA11934 HNO3	X		X	X	0.9
0005 GCA11933 H2SO4					
0006 GCA11934 H2SO4					
0007 GCA11933 NaOH					
0008 GCA11934 NaOH					
CHECKS					
0001 GCA11934 RAW		444			
0002 GCA11934 HNO3	0.001		0.001	X	0.8
STANDARDS					
0001 IS-029					
0002 GWS-3					
0003 KCl-0.05M					
0004 QCI-136					
0005 GLS-Brine1					
0006 GWS-3					
0007 GWS-3		98			
0008 TMDW				X	X
BLANKS					
0001 Control Blank		X			
0002 Control Blank	X		X	X	X

METHOD CODE DESCRIPTION

Method Code Date Tested	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
/CALC **03/11/20 14:25**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Results Determined by calculation from other reported data.	*
/COL **23/10/20 09:14**	External – Envirolab Services (WA) 16-18 Hayden Court Myaree, 6154, WA **2901** No digestion or other pre-treatment undertaken. Analysed by UV-Visible Spectrometry.	*
/GR **21/10/20 11:44**	Intertek Genalysis Perth **3244 3237** Analysed by Gravimetric Technique.	*
/MS **03/11/20 10:09**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Analysed by Inductively Coupled Plasma Mass Spectrometry.	**MS_IM_001**
/MTR **03/11/20 14:25**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Analysed with Electronic Meter Measurement	*
/OE **03/11/20 14:25**	Intertek Genalysis Perth **3244 3237** Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**ICP_IM_001**
/SIE **03/11/20 14:25**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Analysed by Specific Ion Electrode.	*
/VOL **03/11/20 14:25**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Analysed by Volumetric Technique.	*

* Denotes not on Scope of Accreditation

PROJECT: GCA – JOB-NO. 2012 (MYHREE) – ASSAYING OF TAILINGS-SLURRY-WATERS

SAMPLES: 4 samples were received from GLS on 14/10/2020 as acidified filtered waters under Startrack-Express reference; **S31260294**

- GCA11933 RAW and GCA11934 RAW

  Filtered-(0.45µm-membrane)-Raw-Water in a 250mL-plastic-bottle

- GCA11933 HNO3 and GCA11934 HNO3

  HNO3-Dosed-Filtered-(0.45µm-membrane)-Water in a 125mL-plastic-bottle

- GCA11933 H2SO4 and GCA11934 H2SO4

  Filtered (0.45µm-membrane)-Water in a 125mL-plastic-bottle

- GCA11933 NaOH and GCA11933 NaOH

  Filtered (0.45µm-membrane)-Water in a 125mL-plastic-bottle

ANALYSES

- RAW WATER x 2 was assayed for: Co by ICP-MS and Cu, Fe, Ni and Zn by ICP-OES
- HNO3-DOSED FILTERED WATERS x2 : Ag, As, Ba, Bi, Cd, Co, Hg, Mo, Pb, Sb, Se, Sn, Sr, Th, Tl, U by ICP-MS and Al, B, Ca, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, P, S, Si, V, Zn by ICP-OES
- H2SO4 dosed samples for NH3 and NO3
- NaOH dosed samples for Cyanides: Total, WAD and Free

METHODS

Alkalinity analysis reported as CO3, OH, HCO3 and Total Alkalinity was conducted in accordance with method ENV_W007.

pH and Electrical Conductivity (EC) were read by metered instrumentation using the respective method codes ENV_W001 and ENV_W002

Chloride was read by UV-Vis Spectrophotometer using method code ENV_W013

Fluoride was read by ion selective electrode using method number ENV_W011

Thiocyanate (SCN) was read by UV-Vis Spectrophotometer using method code ENV_W006

Total Dissolved Solids (TDS) were determined gravimetrically using method code ENV_W003

Ammonia as N-NH3 and Nitrate as N-NO3 are subcontracted to NATA accredited MPL-Enviro Lab Myare WA, employing inhouse methods: INORG-057 (based on APHA 4500-NH3 F) and INORG-055 (based on APHA 4500 NO3) respectively with appropriate standards.

Forms of Cyanide were analysed following methods: Cyanide by distillation ENV_W042, Weak Acid Dissociable (WAD) by ENV_W040, Titrimetric Cyanide ENV_W044

Metals were determined through ICP analytical finishes using method codes: ICP_IM_001 (/OE) and MS_IM_001 (/MS)

RESULTS:

Results are expressed in units of: µg/L, mg/L, ppm, mgCaCO3/L equiv, µS/cm, pH units, mg/Kg

The results included the assay of blanks and international reference standard:

Alkalinity:GWS-3, Cl:GLS Brine 1, CN:IS-029, EC:GWS-3, F:GWS-3, pH:GWS-3, SCN:1mg/L Int-Std, TDS:KCl 0.05M, OE:TMDW, MISA 6, MS:ICP-MS-688-A

Intertek Genalysis signatory

[redacted]

Date: 03-Nov-2020