ORE RESEARCH & EXPLORATION

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CERTIFICATE OF ANALYSIS FOR

HIGH GRADE COPPER ORE REFERENCE MATERIAL

OREAS 935

Table 1. Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 935

Constituent	Certified Value	95% Confidence Limits		95% Tolerance Limits	
		Low	High	Low	High
4-Acid Digestion					
Ag, Silver (ppm)	46.1	43.5	48.7	42.3	49.9
Al, Aluminium (wt.%)	3.55	2.78	4.32	3.35	3.74
As, Arsenic (ppm)	8.72	8.32	9.12	7.54	9.90
Be, Beryllium (ppm)	< 2	IND	IND	IND	IND
Bi, Bismuth (ppm)	709	681	738	685	734
Ca, Calcium (wt.%)	0.320	0.304	0.337	0.304	0.337
Cd, Cadmium (ppm)	< 2	IND	IND	IND	IND
Co, Cobalt (ppm)	77	75	79	75	80
Cr, Chromium (ppm)	37.6	32.6	42.5	34.7	40.4
Cu, Copper (wt.%)	12.55	12.40	12.71	12.31	12.79
Fe, Iron (wt.%)	22.89	22.06	23.71	22.43	23.34
La, Lanthanum (ppm)	23.0	19.8	26.2	21.3	24.6
Li, Lithium (ppm)	12.9	10.5	15.3	12.0	13.9
Mg, Magnesium (wt.%)	0.802	0.750	0.855	0.761	0.843
Mn, Manganese (wt.%)	0.070	0.066	0.074	0.067	0.072
Nb, Niobium (ppm)	6.53	5.75	7.30	6.12	6.94
Ni, Nickel (ppm)	29.7	27.2	32.3	26.6	32.9
P, Phosphorus (wt.%)	< 0.05	IND	IND	IND	IND
Pb, Lead (ppm)	225	215	236	220	231
S, Sulphur (wt.%)	11.83	10.60	13.07	11.54	12.12
Sb, Antimony (ppm)	2.70	2.49	2.92	2.57	2.83
Se, Selenium (ppm)	88	80	95	84	91
Sn, Tin (ppm)	108	104	111	104	111
Sr, Strontium (ppm)	24.2	20.4	28.0	22.7	25.6
Th, Thorium (ppm)	7.90	6.83	8.98	7.52	8.28
Ti, Titanium (wt.%)	0.182	0.165	0.198	0.169	0.194
V, Vanadium (ppm)	< 60	IND	IND	IND	IND
W, Tungsten (ppm)	36.0	31.1	40.9	31.5	40.5
Y, Yttrium (ppm)	12.3	11.0	13.6	11.6	12.9
Zn, Zinc (ppm)	692	670	715	674	711

Table 1 continued.

Constituent	Certified Value	95% Confidence Limits		95% Tolerance Limits	
		Low	High	Low	High
4-Acid Digestion continued					
Zr, Zirconium (ppm)	47.4	40.6	54.2	44.8	50.0
Aqua Regia Digestion					
Ag, Silver (ppm)	43.7	41.2	46.1	40.6	46.8
Al, Aluminium (wt.%)	1.65	1.49	1.81	1.58	1.72
As, Arsenic (ppm)	8.77	8.04	9.49	7.15	10.39
Bi, Bismuth (ppm)	680	657	703	659	701
Ca, Calcium (wt.%)	0.240	0.230	0.249	0.219	0.261
Co, Cobalt (ppm)	77	74	79	75	79
Cr, Chromium (ppm)	20.4	19.0	21.7	IND	IND
Cu, Copper (wt.%)	12.48	12.26	12.71	12.19	12.78
Fe, Iron (wt.%)	22.76	21.82	23.70	22.27	23.24
K, Potassium (wt.%)	0.217	0.196	0.237	IND	IND
Mg, Magnesium (wt.%)	0.665	0.609	0.722	0.645	0.685
Mn, Manganese (wt.%)	0.064	0.058	0.071	0.061	0.067
Mo, Molybdenum (ppm)	< 1.6	IND	IND	IND	IND
Na, Sodium (wt.%)	< 0.03	IND	IND	IND	IND
Ni, Nickel (ppm)	26.2	22.8	29.5	24.0	28.3
Pb, Lead (ppm)	222	214	230	213	232
Sb, Antimony (ppm)	< 2	IND	IND	IND	IND
Se, Selenium (ppm)	86	81	92	82	91
Sn, Tin (ppm)	96	91	102	93	99
Sr, Strontium (ppm)	13.8	12.8	14.9	IND	IND
Ti, Titanium (wt.%)	0.041	0.032	0.051	0.038	0.045
W, Tungsten (ppm)	30.1	24.0	36.3	23.9	36.3
Zn, Zinc (ppm)	666	638	693	645	686
Infrared Combustion					
S, Sulphur (wt.%)	14.36	14.21	14.52	14.03	14.69
Borate Fusion XRF					
Co, Cobalt (ppm)	< 100	IND	IND	IND	IND
Cu, Copper (wt.%)	12.54	12.33	12.74	12.36	12.71
Fe_2O_3, Iron(III) oxide (wt.%)	33.80	33.09	34.50	33.28	34.32
Pb, Lead (ppm)	255	208	302	217	293
S, Sulphur (wt.%)	14.60	14.12	15.07	14.36	14.83
SiO_2, Silicon dioxide (wt.%)	31.25	30.58	31.92	30.58	31.92
Zn, Zinc (ppm)	688	664	712	664	712
Peroxide Fusion ICP					
Ag, Silver (ppm)	43.7	40.9	46.6	IND	IND
As, Arsenic (ppm)	< 20	IND	IND	IND	IND
Bi, Bismuth (ppm)	679	663	695	652	706
Co, Cobalt (ppm)	85	78	91	81	88
Cu, Copper (wt.%)	12.43	12.23	12.63	12.09	12.76
Fe, Iron (wt.%)	23.59	22.97	24.21	23.20	23.98

Table 1 continued.

Constituent	Certified Value	95% Confidence Limits		95% Tolerance Limits	
		Low	High	Low	High
Peroxide Fusion ICP continued					
Pb, Lead (ppm)	233	220	247	222	245
S, Sulphur (wt.%)	14.59	14.39	14.79	14.34	14.84
Sb, Antimony (ppm)	2.79	2.54	3.04	2.19	3.39
Se, Selenium (ppm)	105	95	115	99	111
Si, Silicon (wt.%)	14.75	14.56	14.95	14.18	15.32
Sn, Tin (ppm)	119	113	126	114	124
Zn, Zinc (ppm)	721	699	743	695	747

Note: intervals may appear asymmetric due to rounding

INTRODUCTION

OREAS reference materials are intended to provide a low cost method of evaluating and improving the quality of analysis of geological samples. To the geologist they provide a means of implementing quality control in analytical data sets generated in exploration from the grass roots level through to prospect evaluation, and in grade control at mining operations. To the analyst they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

SOURCE MATERIAL

OREAS 935 is one of a suite of sixteen copper CRMs (OREAS 920 to OREAS 935) prepared from material from the CSA mine located near the town of Cobar in central western New South Wales, Australia. The copper ore body is hosted by the Early Devonian CSA Siltstone, a thinly bedded turbiditic sequence of carbonaceous siltstones and mudstones with minor coarser units. The CSA Siltstone is part of the Cobar Supergroup, consisting of lower syn-rift sediments and upper post-rift sag phase sediments. The mineralisation is structurally controlled and confined to a number of steeply dipping bodies within a major shear zone on the eastern margin of the Early Devonian Cobar Basin. It is characterised by low-grade greenschist alteration and epigenetic low-grade mineralisation enveloping higher-grade shoots of vein complexes or sub-massive to massive sulphides. The sulphides include chalcopyrite, pyrrhotite, pyrite, sphalerite, galena, bornite and cubanite. Iron-rich chlorite and silica are prominent alterations in the siltstone host.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 935 was prepared in the following manner:

- drying to constant mass at 105°C;
- preliminary blending of copper ores and barren siltstone materials;
- multi-stage milling to approximately 99% less than 75 microns;
- final homogenisation;
- packaging in 10g units sealed under nitrogen, in laminated foil pouches.

ANALYTICAL PROGRAM

Twenty eight commercial analytical laboratories participated in the program to characterise the analytes reported in Table 1. The following methods were employed for method specific certification:

- Four acid (HCl-HNO_3-HF-$HClO_4$) digestion with ICP-OES, ICP-MS or AAS finish (21 laboratories);
- Aqua regia digestion with ICP-OES, ICP-MS or AAS finish (20 laboratories);
- Infrared combustion furnace for sulphur (19 laboratories);
- Borate or pyro-sulphate fusion with XRF (12 laboratories);
- Peroxide fusion with ICP-OES, ICP-MS or AAS finish (16 laboratories).

For the round robin program ten 300g test units were taken at predetermined intervals during the bagging stage, immediately following final homogenisation, and are considered representative of the entire batch. The six samples received by each laboratory were obtained by taking two 20g scoop splits from each of three separate 300g test units. This format enabled nested ANOVA treatment of the results to evaluate homogeneity, i.e. to ascertain whether between-unit variance is greater than within-unit variance. Table 1 presents the certified values together with their associated 1SD's, 95% confidence and tolerance limits and Table 2 shows indicative values. Table 3 provides performance gate intervals for the certified values of each analytical method group based on their pooled 1SD's. Tabulated results of all elements together with uncorrected means, medians, standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM^3) are presented in the detailed certification data for this CRM (**OREAS 935-DataPack.1.1.250703_143303.xlsx**).

Table 2. Indicative Values for OREAS 935

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
4-Acid Digestion								
Au	ppm	*< 0.1*	Hf	ppm	*1.49*	Re	ppm	*< 0.005*
Ba	ppm	*60*	Ho	ppm	*0.42*	Sc	ppm	*6.70*
Ce	ppm	*46.4*	In	ppm	*12.8*	Sm	ppm	*3.65*
Cs	ppm	*5.83*	K	wt.%	*1.29*	Ta	ppm	*0.58*
Dy	ppm	*2.22*	Lu	ppm	*0.17*	Tb	ppm	*0.41*
Er	ppm	*1.23*	Mo	ppm	*1.41*	Te	ppm	*0.37*
Eu	ppm	*0.75*	Na	wt.%	*0.146*	Tl	ppm	*0.49*
Ga	ppm	*11.6*	Nd	ppm	*19.9*	U	ppm	*1.77*
Gd	ppm	*2.77*	Pr	ppm	*5.12*	Yb	ppm	*1.13*
Ge	ppm	*0.37*	Rb	ppm	*80*			
Aqua Regia Digestion								
Au	ppm	*0.040*	In	ppm	*10.9*	Ta	ppm	*0.013*
B	ppm	*78*	La	ppm	*13.7*	Tb	ppm	*0.25*
Ba	ppm	*29.7*	Li	ppm	*9.23*	Te	ppm	*0.39*
Be	ppm	*0.43*	Lu	ppm	*0.097*	Th	ppm	*7.63*
Cd	ppm	*1.52*	Nb	ppm	*0.42*	Tl	ppm	*0.11*
Ce	ppm	*26.4*	P	wt.%	*0.037*	U	ppm	*1.28*
Cs	ppm	*2.75*	Rb	ppm	*13.6*	V	ppm	*18.1*
Ga	ppm	*5.29*	Re	ppm	*< 0.001*	Y	ppm	*6.23*
Ge	ppm	*0.35*	S	wt.%	*8.40*	Yb	ppm	*0.62*
Hf	ppm	*0.42*	Sc	ppm	*2.10*	Zr	ppm	*13.3*
Hg	ppm	*0.36*	Si	wt.%	*15.50*			

Table 2 continued.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Infrared Combustion								
C	wt.%	*0.062*						
Borate Fusion XRF								
Al_2O_3	wt.%	*7.67*	MgO	wt.%	*1.48*	Sr	ppm	*28.3*
BaO	ppm	*298*	MnO	wt.%	*0.090*	TiO_2	wt.%	*0.320*
CaO	wt.%	*0.483*	Na_2O	wt.%	*0.167*	V_2O_5	ppm	*95*
Cr_2O_3	ppm	*70*	Ni	ppm	*15.8*	Zr	ppm	*50*
K_2O	wt.%	*1.62*	P_2O_5	wt.%	*0.098*			
LOI^{1000}	wt.%	*7.28*	Sn	ppm	*138*			
Thermogravimetry								
H_2O-	wt.%	*0.070*						
Peroxide Fusion ICP								
Al	wt.%	*4.03*	Ho	ppm	*0.53*	Sc	ppm	*7.26*
Ba	ppm	*204*	In	ppm	*14.9*	Sm	ppm	*3.97*
Be	ppm	*< 5*	K	wt.%	*1.29*	Sr	ppm	*25.9*
Ca	wt.%	*0.358*	La	ppm	*23.0*	Ta	ppm	*0.60*
Cd	ppm	*1.51*	Li	ppm	*15.0*	Tb	ppm	*0.51*
Ce	ppm	*49.9*	Lu	ppm	*0.22*	Th	ppm	*8.58*
Cr	ppm	*43.1*	Mg	wt.%	*0.866*	Ti	wt.%	*0.199*
Cs	ppm	*6.00*	Mn	wt.%	*0.075*	Tl	ppm	*0.55*
Dy	ppm	*2.93*	Mo	ppm	*2.20*	Tm	ppm	*0.23*
Er	ppm	*1.48*	Nb	ppm	*6.99*	U	ppm	*2.08*
Eu	ppm	*0.90*	Nd	ppm	*21.6*	V	ppm	*46.3*
Ga	ppm	*13.5*	Ni	ppm	*156*	W	ppm	*35.8*
Gd	ppm	*3.37*	P	wt.%	*0.490*	Y	ppm	*12.6*
Ge	ppm	*2.80*	Pr	ppm	*5.88*	Yb	ppm	*1.32*
Hf	ppm	*2.28*	Rb	ppm	*89*	Zr	ppm	*74*

STATISTICAL ANALYSIS

Certified Values, Standard Deviations, Confidence and Tolerance Limits have been determined for each analytical method following removal of individual and laboratory outliers (Table 1). Certified Values are the mean of means after outlier filtering. The 95% Confidence Limit is a measure of the reliability of the certified value, i.e. the narrower the Confidence Interval the greater the certainty in the Certified Value. It should not be used as a control limit for laboratory performance.

Standard Deviation values (1SDs) are reported in Table 1 and provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. They take into account errors attributable to measurement uncertainty and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. The Standard Deviation values include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability. The SD for each analyte's certified value is calculated from the same filtered data set used to determine the certified value, i.e. after removal of all individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than

arising from inhomogeneity of the CRM. The standard deviation is then calculated for each analyte from the pooled accepted analyses generated from the certification program.
Performance Gates (Table 3) are calculated for two and three standard deviations. As a guide these intervals may be regarded as warning or rejection for multiple 2SD outliers, or rejection for individual 3SD outliers in QC monitoring, although their precise application should be at the discretion of the QC manager concerned.

A second method utilises a 5% window calculated directly from the certified value. Standard deviation is also shown in relative per cent for one, two and three relative standard deviations (1RSD, 2RSD and 3RSD) to facilitate an appreciation of the magnitude of these numbers and a comparison with the 5% window. Caution should be exercised when concentration levels approach lower limits of detection of the analytical methods employed as performance gates calculated from standard deviations tend to be excessively wide whereas those determined by the 5% method are too narrow.

Table 3. Performance Gates for OREAS 935

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
4-Acid Digestion											
Ag, ppm	46.1	6.4	33.4	58.8	27.0	65.2	13.80%	27.60%	41.40%	43.8	48.4
Al, wt.%	3.55	0.50	2.54	4.55	2.04	5.06	14.20%	28.40%	42.60%	3.37	3.72
As, ppm	8.72	1.10	6.52	10.93	5.41	12.03	12.65%	25.29%	37.94%	8.29	9.16
Be, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Bi, ppm	709	60	588	830	528	890	8.52%	17.04%	25.56%	674	745
Ca, wt.%	0.320	0.015	0.290	0.351	0.275	0.366	4.74%	9.48%	14.22%	0.304	0.337
Cd, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Co, ppm	77	4.1	69	86	65	90	5.32%	10.63%	15.95%	73	81
Cr, ppm	37.6	4.5	28.5	46.6	24.0	51.1	11.99%	23.98%	35.98%	35.7	39.4
Cu, wt.%	12.55	0.388	11.78	13.33	11.39	13.72	3.09%	6.18%	9.27%	11.92	13.18
Fe, wt.%	22.89	1.607	19.67	26.10	18.06	27.71	7.02%	14.04%	21.06%	21.74	24.03
La, ppm	23.0	2.5	18.1	27.9	15.6	30.4	10.73%	21.46%	32.19%	21.8	24.1
Li, ppm	12.9	2.3	8.3	17.6	5.9	19.9	18.00%	35.99%	53.99%	12.3	13.6
Mg, wt.%	0.802	0.055	0.691	0.913	0.636	0.969	6.92%	13.83%	20.75%	0.762	0.842
Mn, wt.%	0.070	0.004	0.061	0.078	0.057	0.082	5.96%	11.93%	17.89%	0.066	0.073
Nb, ppm	6.53	0.73	5.06	8.00	4.32	8.73	11.25%	22.51%	33.76%	6.20	6.86
Ni, ppm	29.7	3.3	23.1	36.4	19.8	39.7	11.17%	22.34%	33.51%	28.3	31.2
P, wt.%	< 0.05	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Pb, ppm	225	22	181	270	158	292	9.92%	19.84%	29.76%	214	236
S, wt.%	11.83	2.29	7.25	16.42	4.96	18.71	19.36%	38.72%	58.08%	11.24	12.43
Sb, ppm	2.70	0.38	1.95	3.46	1.57	3.83	13.95%	27.90%	41.85%	2.57	2.84
Se, ppm	88	15	58	118	43	133	16.94%	33.87%	50.81%	83	92

Table 3 continued.

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
4-Acid Digestion continued											
Sn, ppm	108	7	93	122	86	129	6.63%	13.27%	19.90%	102	113
Sr, ppm	24.2	2.8	18.5	29.8	15.7	32.6	11.63%	23.26%	34.88%	23.0	25.4
Th, ppm	7.90	1.18	5.54	10.26	4.36	11.44	14.93%	29.86%	44.80%	7.51	8.30
Ti, wt.%	0.182	0.014	0.154	0.209	0.140	0.223	7.62%	15.23%	22.85%	0.173	0.191
V, ppm	< 60	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
W, ppm	36.0	4.3	27.3	44.7	23.0	49.0	12.06%	24.12%	36.17%	34.2	37.8
Y, ppm	12.3	1.3	9.6	14.9	8.3	16.2	10.78%	21.57%	32.35%	11.6	12.9
Zn, ppm	692	51	590	795	539	846	7.38%	14.76%	22.14%	658	727
Zr, ppm	47.4	5.5	36.5	58.4	31.0	63.8	11.54%	23.09%	34.63%	45.0	49.8
Aqua Regia Digestion											
Ag, ppm	43.7	5.4	32.8	54.5	27.4	60.0	12.45%	24.90%	37.35%	41.5	45.9
Al, wt.%	1.65	0.126	1.40	1.90	1.27	2.03	7.63%	15.27%	22.90%	1.57	1.73
As, ppm	8.77	1.59	5.59	11.95	3.99	13.54	18.15%	36.30%	54.45%	8.33	9.21
Bi, ppm	680	43	595	765	552	808	6.26%	12.52%	18.78%	646	714
Ca, wt.%	0.240	0.012	0.217	0.263	0.205	0.274	4.80%	9.61%	14.41%	0.228	0.252
Co, ppm	77	4.4	68	86	63	90	5.79%	11.59%	17.38%	73	81
Cr, ppm	20.4	1.15	18.1	22.7	16.9	23.8	5.66%	11.33%	16.99%	19.3	21.4
Cu, wt.%	12.48	0.413	11.66	13.31	11.24	13.72	3.31%	6.62%	9.93%	11.86	13.11
Fe, wt.%	22.76	1.619	19.52	26.00	17.90	27.62	7.12%	14.23%	21.35%	21.62	23.90
K, wt.%	0.217	0.019	0.178	0.256	0.158	0.275	8.98%	17.97%	26.95%	0.206	0.228
Mg, wt.%	0.665	0.045	0.576	0.755	0.531	0.800	6.73%	13.45%	20.18%	0.632	0.699
Mn, wt.%	0.064	0.006	0.053	0.076	0.047	0.082	9.02%	18.04%	27.06%	0.061	0.067
Mo, ppm	< 1.6	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Na, wt.%	< 0.03	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ni, ppm	26.2	2.8	20.5	31.8	17.6	34.7	10.88%	21.77%	32.65%	24.8	27.5
Pb, ppm	222	16	190	254	175	270	7.13%	14.26%	21.39%	211	233
Sb, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Se, ppm	86	10	66	107	55	117	11.97%	23.94%	35.90%	82	91
Sn, ppm	96	8.4	80	113	71	122	8.72%	17.44%	26.16%	92	101
Sr, ppm	13.8	0.94	11.9	15.7	11.0	16.6	6.78%	13.56%	20.34%	13.1	14.5
Ti, wt.%	0.041	0.007	0.027	0.056	0.020	0.063	17.43%	34.86%	52.29%	0.039	0.043
W, ppm	30.1	4.7	20.7	39.5	16.0	44.2	15.59%	31.18%	46.77%	28.6	31.6

Table 3 continued.

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
Aqua Regia Digestion continued											
Zn, ppm	666	59	547	784	488	843	8.88%	17.76%	26.63%	632	699
Infrared Combustion											
S, wt.%	14.36	0.339	13.69	15.04	13.35	15.38	2.36%	4.72%	7.07%	13.65	15.08
Borate Fusion XRF											
Co, ppm	< 100	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Cu, wt.%	12.54	0.296	11.94	13.13	11.65	13.42	2.36%	4.72%	7.08%	11.91	13.16
Fe_2O_3, wt.%	33.80	1.047	31.70	35.89	30.66	36.94	3.10%	6.19%	9.29%	32.11	35.49
Pb, ppm	255	49	156	354	107	403	19.39%	38.78%	58.17%	242	268
S, wt.%	14.60	0.383	13.83	15.36	13.45	15.74	2.62%	5.24%	7.87%	13.87	15.33
SiO_2, wt.%	31.25	0.703	29.85	32.66	29.14	33.36	2.25%	4.50%	6.75%	29.69	32.81
Zn, ppm	688	37	615	761	578	798	5.34%	10.68%	16.02%	654	722
Peroxide Fusion ICP											
Ag, ppm	43.7	4.10	35.5	51.9	31.4	56.0	9.37%	18.74%	28.11%	41.5	45.9
As, ppm	< 20	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Bi, ppm	679	28	623	734	595	762	4.10%	8.19%	12.29%	645	713
Co, ppm	85	10	64	105	53	116	12.38%	24.75%	37.13%	80	89
Cu, wt.%	12.43	0.370	11.69	13.17	11.32	13.54	2.98%	5.96%	8.94%	11.80	13.05
Fe, wt.%	23.59	1.153	21.28	25.90	20.13	27.05	4.89%	9.78%	14.67%	22.41	24.77
Pb, ppm	233	33	168	299	136	331	13.99%	27.97%	41.96%	222	245
S, wt.%	14.59	0.340	13.91	15.27	13.57	15.61	2.33%	4.66%	6.99%	13.86	15.32
Sb, ppm	2.79	0.42	1.96	3.63	1.54	4.04	14.97%	29.93%	44.90%	2.65	2.93
Se, ppm	105	11	83	126	73	137	10.18%	20.35%	30.53%	100	110
Si, wt.%	14.75	0.271	14.21	15.29	13.94	15.56	1.84%	3.67%	5.51%	14.02	15.49
Sn, ppm	119	9	101	137	92	146	7.56%	15.11%	22.67%	113	125
Zn, ppm	721	43	634	808	591	851	6.00%	12.01%	18.01%	685	757

Note: intervals may appear asymmetric due to rounding

Tolerance Limits (ISO Guide 3207) were determined using an analysis of precision errors method and are considered a conservative estimate of true homogeneity. The meaning of tolerance limits may be illustrated for copper by 4-acid digestion, where 99% of the time (1-α=0.99) at least 95% of subsamples (ρ=0.95) will have concentrations lying between between 12.31 and 12.79 wt.%. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (ISO Guide 35).

The homogeneity of OREAS 935 has also been evaluated in an ANOVA study for all certified analytes. This study tests the null hypothesis that no statistically significant difference exists between the *between-unit variance* and the *within-unit variance* (i.e. p-values <0.05 indicate rejection of the null hypothesis). Of the 76 certified values, no failures were observed indicating no evidence to reject the null hypothesis.

Based on the statistical analysis of the results of the inter-laboratory certification program it can be concluded that OREAS 935 is fit-for-purpose as a certified reference material (see 'Intended Use' below).

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Reference material OREAS 935 has been prepared and certified by:

ORE Research & Exploration Pty Ltd
37A Hosie Street
Bayswater North VIC 3153
AUSTRALIA

Tel: +613-9729 0333
Fax: +613-9729 8338
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It has been packaged in 10g units sealed under nitrogen in laminated foil pouches.

PARTICIPATING LABORATORIES

1. Accurassay, Thunder Bay, Ontario, Canada
2. Acme (BV), Santiago, Chile
3. Acme (BV), Vancouver, BC, Canada
4. Actlabs, Ancaster, Ontario, Canada
5. Actlabs, Kamloops, BC, Canada
6. Actlabs, Thunder Bay, Ontario, Canada
7. ALS, Brisbane, QLD, Australia
8. ALS, Burnie, TAS, Australia
9. ALS, Vancouver, BC, Canada
10. Amdel (BV), Cardiff, NSW, Australia
11. Intertek Genalysis, Adelaide, SA, Australia
12. Intertek Genalysis, Johannesburg, South Africa
13. Intertek Genalysis, Perth, WA, Australia
14. Intertek Testing Services, Cupang, Muntinlupa, Philippines
15. Intertek Testing Services, Jakarta, Indonesia
16. Intertek Testing Services, Shunyi, Beijing, China
17. Labtium Oy, Saarenkylä, Rovaniemi, Finland
18. MINTEK Analytical Services, Randburg, South Africa
19. OMAC, Loughrea, Galway, Ireland

20. PT Geoservices Ltd, Cikarang, Jakarta Raya, Indonesia
21. SGS Canada Inc., Vancouver, BC, Canada
22. SGS Didipio , Makati City, Quirino, Philippines
23. SGS Geosol Laboratorios Ltda, Vespasiano, Minas Gerais, Brazil
24. SGS Lakefield Research Ltd, Lakefield, Ontario, Canada
25. SGS Nui Phao, Ba Dinh District, Ha Noi, Vietnam
26. SGS South Africa Pty Ltd, Booysens, Gauteng, South Africa
27. Shiva Analyticals Ltd, Bangalore North, Karnataka, India
28. Ultra Trace Pty Ltd (BV), Perth, WA, Australia

INTENDED USE

OREAS 935 is intended for the following uses:

- for the monitoring of laboratory performance in the analysis of geological samples for the analytes reported in Table 1;
- for the verification of analytical methods for analytes reported in Table 1;
- for the calibration of instruments used in the determination of the concentration of analytes reported in Table 1.

STABILITY AND STORAGE INSTRUCTIONS

OREAS 935 has been prepared from mineralised and altered carbonaceous siltstones and mudstones from the CSA mine located near the town of Cobar in central western New South Wales, Australia. To prolong its shelf life it has been packaged under nitrogen in robust foil laminate pouches. Under normal storage conditions it is considered to have long-term stability beyond 10 years.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

The certified values for OREAS 935 refer to the concentration level in its packaged state. It should not be dried prior to weighing and analysis.

HANDLING INSTRUCTIONS

Fine powders pose a risk to eyes and lungs and therefore standard precautions such as the use of safety glasses and dust masks are advised.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof

releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

DOCUMENT HISTORY

Revision No.	Date	Changes applied
1	4th July, 2025	Revision of selected certified values for silver and some trace elements.
0	8th April, 2014	First publication.

CERTIFYING OFFICER

Craig Hamlyn (B.Sc. Hons - Geology), Technical Manager – (ORE P/L)

REFERENCES

ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.

ISO Guide 35 (2006), Certification of reference materials - General and statistical principals.