ORE RESEARCH & EXPLORATION

OREAS Reference Materials ABN 28006859856
37A Hosie Street · Bayswater North · Vic 3153 · Australia
61 3 9729 0333 61 3 9729 8338
info@ore.com.au www.ore.com.au

CERTIFICATE OF ANALYSIS FOR

COPPER BEARING SILTSTONE REFERENCE MATERIAL

OREAS 921

Table 1. Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 921

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
4-Acid Digestion						
Ag, Silver (ppm)	0.152	0.029	0.143	0.161	IND	IND
Al, Aluminium (wt.%)	7.62	0.444	7.40	7.84	7.42	7.82
As, Arsenic (ppm)	5.15	0.90	4.80	5.50	4.56	5.74
Ba, Barium (ppm)	537	24.7	525	549	526	548
Be, Beryllium (ppm)	2.83	0.202	2.72	2.94	2.72	2.95
Bi, Bismuth (ppm)	1.20	0.17	1.13	1.27	0.98	1.41
Ca, Calcium (wt.%)	0.496	0.027	0.484	0.508	0.479	0.513
Cd, Cadmium (ppm)	< 0.2	IND	IND	IND	IND	IND
Ce, Cerium (ppm)	91	3.3	89	93	89	92
Co, Cobalt (ppm)	16.5	0.98	16.0	17.0	16.0	17.1
Cr, Chromium (ppm)	79	7.5	76	82	74	84
Cs, Cesium (ppm)	8.53	0.501	8.24	8.81	8.30	8.75
Cu, Copper (ppm)	274	8.9	271	277	266	282
Dy, Dysprosium (ppm)	6.25	0.323	6.06	6.45	6.02	6.49
Er, Erbium (ppm)	3.61	0.142	3.57	3.65	3.49	3.72
Eu, Europium (ppm)	1.48	0.084	1.43	1.54	1.43	1.54
Fe, Iron (wt.%)	4.30	0.147	4.23	4.38	4.21	4.39
Ga, Gallium (ppm)	21.3	1.33	20.7	22.0	20.8	21.9
Gd, Gadolinium (ppm)	6.83	0.432	6.58	7.07	6.54	7.11
Ge, Germanium (ppm)	< 2	IND	IND	IND	IND	IND
Hf, Hafnium (ppm)	4.45	0.323	4.29	4.60	4.20	4.69
Ho, Holmium (ppm)	1.23	0.063	1.19	1.27	1.20	1.26
In, Indium (ppm)	0.11	0.009	0.10	0.11	0.10	0.12
K, Potassium (wt.%)	2.84	0.098	2.79	2.88	2.76	2.91
La, Lanthanum (ppm)	45.9	1.97	44.8	47.0	44.6	47.1
Li, Lithium (ppm)	28.9	1.54	28.1	29.7	27.9	29.9
Lu, Lutetium (ppm)	0.49	0.027	0.47	0.51	0.46	0.51
Mg, Magnesium (wt.%)	1.42	0.048	1.41	1.44	1.39	1.46
Mn, Manganese (wt.%)	0.064	0.002	0.063	0.065	0.062	0.066

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
4-Acid Digestion continued						
Mo, Molybdenum (ppm)	0.50	0.07	0.46	0.55	0.46	0.55
Na, Sodium (wt.%)	0.607	0.023	0.594	0.619	0.591	0.623
Nb, Niobium (ppm)	17.1	0.95	16.5	17.6	16.7	17.4
Nd, Neodymium (ppm)	39.8	1.84	38.4	41.1	38.6	40.9
Ni, Nickel (ppm)	41.1	2.69	39.9	42.3	39.4	42.8
P, Phosphorus (wt.%)	0.070	0.005	0.068	0.073	0.068	0.073
Pb, Lead (ppm)	28.0	1.61	27.3	28.6	26.6	29.3
Pr, Praseodymium (ppm)	10.7	0.35	10.5	11.0	10.5	11.0
Rb, Rubidium (ppm)	176	12.7	168	184	171	181
Re, Rhenium (ppb)	< 2	IND	IND	IND	IND	IND
S, Sulphur (wt.%)	0.067	0.006	0.064	0.069	0.064	0.070
Sb, Antimony (ppm)	1.44	0.071	1.42	1.47	1.37	1.52
Sc, Scandium (ppm)	14.2	1.29	13.4	14.9	13.9	14.4
Se, Selenium (ppm)	< 2	IND	IND	IND	IND	IND
Sm, Samarium (ppm)	7.70	0.468	7.32	8.08	7.50	7.90
Sn, Tin (ppm)	5.82	0.64	5.38	6.26	5.65	5.98
Sr, Strontium (ppm)	78	4.8	76	80	76	80
Ta, Tantalum (ppm)	1.32	0.23	1.18	1.47	1.24	1.41
Tb, Terbium (ppm)	1.05	0.051	1.01	1.08	1.02	1.07
Te, Tellurium (ppm)	< 0.05	IND	IND	IND	IND	IND
Th, Thorium (ppm)	18.7	1.27	18.1	19.4	18.2	19.3
Ti, Titanium (wt.%)	0.467	0.041	0.444	0.490	0.452	0.483
Tl, Thallium (ppm)	0.91	0.051	0.89	0.94	0.87	0.95
Tm, Thulium (ppm)	0.53	0.046	0.49	0.56	0.51	0.54
U, Uranium (ppm)	3.69	0.154	3.61	3.76	3.57	3.81
V, Vanadium (ppm)	97	5.6	94	100	93	100
W, Tungsten (ppm)	3.05	0.233	2.91	3.19	2.83	3.27
Y, Yttrium (ppm)	32.7	2.22	31.5	33.9	31.9	33.6
Yb, Ytterbium (ppm)	3.22	0.186	3.11	3.33	3.09	3.35
Zn, Zinc (ppm)	132	6.2	130	135	128	137
Zr, Zirconium (ppm)	147	10.2	142	152	140	154
Aqua Regia Digestion						
Ag, Silver (ppm)	0.164	0.029	0.146	0.182	0.129	0.199
Al, Aluminium (wt.%)	2.48	0.186	2.38	2.58	2.43	2.53
As, Arsenic (ppm)	4.46	0.400	4.26	4.66	4.14	4.78
Au, Gold (ppb)	< 5	IND	IND	IND	IND	IND
B, Boron (ppm)	< 10	IND	IND	IND	IND	IND
Ba, Barium (ppm)	*75**	*4.3**	*71**	*79**	*73**	*77**
Be, Beryllium (ppm)	0.74	0.09	0.69	0.79	0.68	0.80
Bi, Bismuth (ppm)	1.25	0.14	1.19	1.31	1.11	1.39
Ca, Calcium (wt.%)	0.322	0.013	0.315	0.329	0.310	0.334

*Statistics presented above for Ba via aqua regia digestion are based on a consensus of 11 labs. A second consensus of 5 labs exists at ~118ppm with a 1RSD of 15%. This data separation was necessary due to the bi-modal nature of the results received.

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Aqua Regia Digestion continued						
Cd, Cadmium (ppm)	0.085	0.009	0.082	0.087	IND	IND
Ce, Cerium (ppm)	69	4.1	66	72	67	71
Co, Cobalt (ppm)	15.5	0.78	15.1	15.8	15.0	15.9
Cr, Chromium (ppm)	42.4	1.85	41.5	43.3	41.0	43.7
Cs, Cesium (ppm)	2.04	0.35	1.83	2.25	1.97	2.11
Cu, Copper (ppm)	278	10.1	274	283	270	287
Dy, Dysprosium (ppm)	< 6	IND	IND	IND	IND	IND
Er, Erbium (ppm)	< 3	IND	IND	IND	IND	IND
Eu, Europium (ppm)	< 1.5	IND	IND	IND	IND	IND
Fe, Iron (wt.%)	3.83	0.111	3.77	3.88	3.75	3.90
Ga, Gallium (ppm)	7.03	0.563	6.72	7.33	6.80	7.26
Gd, Gadolinium (ppm)	< 7	IND	IND	IND	IND	IND
Ge, Germanium (ppm)	< 0.2	IND	IND	IND	IND	IND
Hf, Hafnium (ppm)	0.62	0.07	0.56	0.67	0.58	0.65
Hg, Mercury (ppm)	< 0.02	IND	IND	IND	IND	IND
Ho, Holmium (ppm)	< 1	IND	IND	IND	IND	IND
In, Indium (ppm)	0.053	0.005	0.050	0.056	0.050	0.056
K, Potassium (wt.%)	0.433	0.065	0.399	0.468	0.419	0.448
La, Lanthanum (ppm)	36.4	3.8	34.4	38.4	35.2	37.7
Li, Lithium (ppm)	21.4	0.93	20.9	22.0	20.8	22.1
Lu, Lutetium (ppm)	< 0.4	IND	IND	IND	IND	IND
Mg, Magnesium (wt.%)	1.15	0.060	1.12	1.18	1.12	1.18
Mn, Manganese (wt.%)	0.056	0.002	0.055	0.058	0.055	0.058
Mo, Molybdenum (ppm)	0.45	0.06	0.41	0.49	0.42	0.48
Na, Sodium (wt.%)	0.029	0.006	0.025	0.032	0.026	0.031
Nb, Niobium (ppm)	0.42	0.07	0.36	0.48	0.37	0.47
Nd, Neodymium (ppm)	31.2	5.3	26.5	36.0	29.9	32.6
Ni, Nickel (ppm)	38.0	2.15	36.9	39.1	36.8	39.2
P, Phosphorus (wt.%)	0.068	0.004	0.066	0.071	0.066	0.070
Pb, Lead (ppm)	26.0	1.80	25.3	26.7	24.7	27.3
Pr, Praseodymium (ppm)	7.98	0.98	6.90	9.05	7.64	8.31
Rb, Rubidium (ppm)	24.2	2.5	22.4	25.9	23.3	25.1
Re, Rhenium (ppb)	< 1	IND	IND	IND	IND	IND
S, Sulphur (wt.%)	0.068	0.007	0.064	0.072	0.065	0.070
Sb, Antimony (ppm)	0.61	0.08	0.56	0.66	0.57	0.65
Sc, Scandium (ppm)	2.85	0.50	2.53	3.17	2.71	2.99
Se, Selenium (ppm)	1.04	0.20	0.91	1.18	IND	IND
Sm, Samarium (ppm)	5.60	1.08	4.66	6.55	5.29	5.92
Sn, Tin (ppm)	1.45	0.23	1.29	1.61	1.33	1.57
Sr, Strontium (ppm)	16.4	0.69	16.1	16.8	16.0	16.9
Ta, Tantalum (ppm)	< 0.05	IND	IND	IND	IND	IND
Tb, Terbium (ppm)	< 1	IND	IND	IND	IND	IND
Te, Tellurium (ppm)	< 0.05	IND	IND	IND	IND	IND

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Aqua Regia Digestion continued						
Th, Thorium (ppm)	15.0	0.88	14.5	15.5	14.5	15.5
Ti, Titanium (wt.%)	0.116	0.018	0.104	0.127	0.108	0.124
Tl, Thallium (ppm)	0.15	0.03	0.13	0.17	0.13	0.16
Tm, Thulium (ppm)	< 0.5	IND	IND	IND	IND	IND
U, Uranium (ppm)	2.08	0.21	1.94	2.21	2.02	2.13
V, Vanadium (ppm)	26.2	1.88	25.1	27.3	24.8	27.6
W, Tungsten (ppm)	< 0.8	IND	IND	IND	IND	IND
Y, Yttrium (ppm)	18.3	2.8	16.6	19.9	17.3	19.2
Yb, Ytterbium (ppm)	< 3	IND	IND	IND	IND	IND
Zn, Zinc (ppm)	124	7.3	120	127	120	128
Zr, Zirconium (ppm)	21.4	1.71	20.5	22.2	19.8	23.0
Peroxide Fusion ICP						
Al, Aluminium (wt.%)	7.86	0.557	7.50	8.22	7.61	8.12
As, Arsenic (ppm)	< 5	IND	IND	IND	IND	IND
Ba, Barium (ppm)	549	23.1	536	563	530	569
Be, Beryllium (ppm)	< 4	IND	IND	IND	IND	IND
Bi, Bismuth (ppm)	< 2	IND	IND	IND	IND	IND
Ca, Calcium (wt.%)	0.537	0.089	0.478	0.596	0.498	0.576
Cd, Cadmium (ppm)	< 2	IND	IND	IND	IND	IND
Ce, Cerium (ppm)	93	5.0	89	97	90	96
Co, Cobalt (ppm)	17.3	1.67	16.3	18.3	16.2	18.3
Cr, Chromium (ppm)	97	14	87	108	90	104
Cs, Cesium (ppm)	8.81	0.420	8.55	9.08	8.32	9.30
Cu, Copper (ppm)	293	10.7	287	298	273	312
Dy, Dysprosium (ppm)	6.28	0.271	6.06	6.49	6.03	6.52
Er, Erbium (ppm)	3.72	0.38	3.41	4.03	3.57	3.88
Eu, Europium (ppm)	1.58	0.130	1.49	1.68	IND	IND
Fe, Iron (wt.%)	4.46	0.204	4.37	4.56	4.34	4.59
Ga, Gallium (ppm)	21.2	1.43	20.0	22.4	20.3	22.0
Gd, Gadolinium (ppm)	7.42	0.634	6.89	7.95	7.15	7.70
Ge, Germanium (ppm)	< 5	IND	IND	IND	IND	IND
Hf, Hafnium (ppm)	7.22	1.08	5.89	8.55	IND	IND
Ho, Holmium (ppm)	1.32	0.114	1.23	1.40	IND	IND
In, Indium (ppm)	< 0.2	IND	IND	IND	IND	IND
K, Potassium (wt.%)	2.86	0.119	2.79	2.92	2.72	2.99
La, Lanthanum (ppm)	47.6	2.15	46.6	48.7	45.8	49.4
Li, Lithium (ppm)	27.5	3.2	25.6	29.4	25.6	29.4
Lu, Lutetium (ppm)	0.56	0.06	0.49	0.63	IND	IND
Mg, Magnesium (wt.%)	1.43	0.074	1.39	1.48	1.39	1.47
Mn, Manganese (wt.%)	0.067	0.003	0.065	0.068	0.064	0.069
Mo, Molybdenum (ppm)	< 1	IND	IND	IND	IND	IND
Nb, Niobium (ppm)	17.2	2.5	15.1	19.4	16.6	17.8
Nd, Neodymium (ppm)	41.0	1.55	40.0	42.0	39.8	42.2

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Peroxide Fusion ICP continued						
Ni, Nickel (ppm)	41.9	4.17	38.5	45.3	32.8	51.1
P, Phosphorus (wt.%)	0.071	0.007	0.065	0.076	0.066	0.075
Pb, Lead (ppm)	27.1	4.1	23.8	30.4	23.0	31.1
Pr, Praseodymium (ppm)	11.2	0.37	11.0	11.3	10.8	11.6
Rb, Rubidium (ppm)	178	7.3	172	184	174	183
S, Sulphur (wt.%)	0.078	0.016	0.062	0.094	IND	IND
Sb, Antimony (ppm)	< 2	IND	IND	IND	IND	IND
Si, Silicon (wt.%)	30.68	0.643	30.14	31.22	29.61	31.75
Sm, Samarium (ppm)	7.93	0.369	7.75	8.11	7.53	8.33
Sn, Tin (ppm)	< 10	IND	IND	IND	IND	IND
Sr, Strontium (ppm)	78	6.3	73	82	74	82
Ta, Tantalum (ppm)	1.42	0.20	1.25	1.59	IND	IND
Tb, Terbium (ppm)	1.10	0.085	1.03	1.17	IND	IND
Th, Thorium (ppm)	19.3	0.64	18.9	19.7	18.7	19.9
Ti, Titanium (wt.%)	0.484	0.022	0.470	0.498	0.469	0.499
Tl, Thallium (ppm)	0.96	0.058	0.91	1.00	IND	IND
Tm, Thulium (ppm)	0.57	0.046	0.53	0.61	IND	IND
U, Uranium (ppm)	4.03	0.244	3.83	4.23	3.90	4.15
V, Vanadium (ppm)	97	5.9	93	101	93	102
W, Tungsten (ppm)	< 5	IND	IND	IND	IND	IND
Y, Yttrium (ppm)	33.4	2.12	31.9	34.9	32.6	34.2
Yb, Ytterbium (ppm)	3.50	0.229	3.30	3.70	3.32	3.68
Zn, Zinc (ppm)	139	10.2	132	146	121	157

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 921 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 921 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 in laminated foil pouches.

ANALYTICAL PROGRAM

Twenty two 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 (19 laboratories);
- Aqua regia digestion with ICP-OES, ICP-MS or AAS finish (19 laboratories);
- Peroxide fusion with ICP-OES, ICP-MS or AAS finish (12 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 (**Datapack for OREAS 921.xlsx**).

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. Indicative values (Table 2) are provided where i) the number of laboratories reporting a particular analyte is insufficient (< 5) to support certification; ii) interlaboratory consensus is poor; or iii) a significant proportion of results are outlying or results are multimodal.

Table 2. Indicative Values for OREAS 921

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
4-Acid Digestion								
B	ppm	*6.83*	Hg	ppm	*< 1*	Ru	ppm	*< 0.1*
Aqua Regia Digestion								
Pd	ppb	*12*	Pt	ppb	*< 5*	Ru	ppm	*< 0.005*
Infrared Combustion								
S	wt.%	*0.069*						
Peroxide Fusion ICP								
Ag	ppm	*< 1*	Sc	ppm	*13.5*	Zr	ppm	*247*
B	ppm	*55*	Se	ppm	*< 20*			
Re	ppm	*< 0.1*	Te	ppm	*< 6*			

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.

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 ($1-\alpha=0.99$) at least 95% of subsamples ($\rho=0.95$) will have concentrations lying between

between 266 and 282 ppm. 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 921 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 177 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 921 is fit-for-purpose as a certified reference material (see 'Intended Use' below).

PARTICIPATING LABORATORIES

Accurassay, Thunder Bay, ON, Canada
Acme, Santiago, Chile
Acme, Vancouver, BC, Canada
Actlabs, Ancaster, Ontario, Canada
Actlabs, Kamloops, BC, Canada
Actlabs, Thunder Bay, Ontario, Canada
ALS, Brisbane, QLD, Australia
ALS, Burnie, TAS, Australia
ALS, Loughrea, County Galway, Ireland
ALS, Vancouver, BC, Canada
Amdel (BV), Cardiff, NSW, Australia
Intertek Genalysis, Perth, WA, Australia
Intertek Testing Services, Adelaide, SA, Australia
Intertek Testing Services, Beijing, China
Intertek Testing Services, Jakarta Selatan, Indonesia
Intertek Genalysis, Johannesburg, Sth Africa
Intertek Testing Services, Muntinlupa, Philippines
Labtium Oy, Rovaniemi, Finland
MINTEK, Randburg, Sth Africa
PT. Geoservices, Cikarang, Indonesia
SGS, Booysens, Gauteng, South Africa
SGS Didipio, Makati City, Philippines
SGS, Lakefield, Ontario, Canada
SGS Nui Phao, Ha Noi, Vietnam
SGS, Vancouver, BC, Canada
SGS, Vespasiano, MG, Brazil
Shiva Analyticals, Bangalore North, Karnataka, India
Ultra Trace (BV), Perth, WA, Australia

Table 3. Performance Gates for OREAS 921

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	0.152	0.029	0.094	0.209	0.066	0.238	18.94%	37.87%	56.81%	0.144	0.160
Al, wt.%	7.62	0.444	6.73	8.51	6.29	8.95	5.82%	11.65%	17.47%	7.24	8.00
As, ppm	5.15	0.90	3.35	6.95	2.45	7.85	17.46%	34.93%	52.39%	4.89	5.41
Ba, ppm	537	25	487	586	463	611	4.61%	9.22%	13.83%	510	564
Be, ppm	2.83	0.202	2.43	3.24	2.22	3.44	7.14%	14.29%	21.43%	2.69	2.97
Bi, ppm	1.20	0.17	0.85	1.54	0.68	1.71	14.44%	28.87%	43.31%	1.14	1.26
Ca, wt.%	0.496	0.027	0.442	0.549	0.416	0.576	5.40%	10.79%	16.19%	0.471	0.521
Cd, ppm	< 0.2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ce, ppm	91	3.3	84	97	81	101	3.67%	7.34%	11.01%	86	95
Co, ppm	16.5	0.98	14.5	18.5	13.6	19.4	5.93%	11.85%	17.78%	15.7	17.3
Cr, ppm	79	7.5	64	94	57	102	9.40%	18.80%	28.21%	75	83
Cs, ppm	8.53	0.501	7.52	9.53	7.02	10.03	5.88%	11.76%	17.64%	8.10	8.95
Cu, ppm	274	9	256	292	247	301	3.25%	6.49%	9.74%	260	288
Dy, ppm	6.25	0.323	5.61	6.90	5.28	7.22	5.17%	10.34%	15.52%	5.94	6.57
Er, ppm	3.61	0.142	3.32	3.89	3.18	4.03	3.93%	7.87%	11.80%	3.43	3.79
Eu, ppm	1.48	0.084	1.32	1.65	1.23	1.74	5.69%	11.38%	17.07%	1.41	1.56
Fe, wt.%	4.30	0.147	4.01	4.60	3.86	4.74	3.41%	6.83%	10.24%	4.09	4.52
Ga, ppm	21.3	1.33	18.7	24.0	17.3	25.3	6.25%	12.50%	18.75%	20.3	22.4
Gd, ppm	6.83	0.432	5.96	7.69	5.53	8.12	6.33%	12.65%	18.98%	6.49	7.17
Ge, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Hf, ppm	4.45	0.323	3.80	5.09	3.48	5.41	7.26%	14.51%	21.77%	4.22	4.67
Ho, ppm	1.23	0.063	1.10	1.36	1.04	1.42	5.12%	10.24%	15.35%	1.17	1.29
In, ppm	0.11	0.009	0.09	0.13	0.08	0.13	7.95%	15.90%	23.85%	0.10	0.11
K, wt.%	2.84	0.098	2.64	3.03	2.54	3.13	3.45%	6.89%	10.34%	2.69	2.98
La, ppm	45.9	1.97	41.9	49.8	40.0	51.8	4.30%	8.60%	12.90%	43.6	48.2
Li, ppm	28.9	1.54	25.8	32.0	24.3	33.5	5.31%	10.62%	15.94%	27.5	30.3
Lu, ppm	0.49	0.027	0.43	0.54	0.41	0.57	5.60%	11.20%	16.79%	0.46	0.51
Mg, wt.%	1.42	0.048	1.33	1.52	1.28	1.57	3.36%	6.72%	10.07%	1.35	1.50
Mn, wt.%	0.064	0.002	0.060	0.069	0.057	0.071	3.46%	6.92%	10.37%	0.061	0.067
Mo, ppm	0.50	0.07	0.37	0.64	0.30	0.71	13.46%	26.92%	40.37%	0.48	0.53

Na, wt.%	0.607	0.023	0.560	0.653	0.537	0.677	3.85%	7.69%	11.54%	0.576	0.637
Nb, ppm	17.1	0.95	15.1	19.0	14.2	19.9	5.59%	11.18%	16.77%	16.2	17.9

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											
Nd, ppm	39.8	1.84	36.1	43.4	34.2	45.3	4.63%	9.26%	13.88%	37.8	41.8
Ni, ppm	41.1	2.69	35.7	46.5	33.0	49.2	6.54%	13.09%	19.63%	39.1	43.2
P, wt.%	0.070	0.005	0.061	0.080	0.056	0.085	6.80%	13.61%	20.41%	0.067	0.074
Pb, ppm	28.0	1.61	24.7	31.2	23.1	32.8	5.77%	11.53%	17.30%	26.6	29.4
Pr, ppm	10.7	0.35	10.0	11.4	9.7	11.8	3.23%	6.47%	9.70%	10.2	11.3
Rb, ppm	176	13	151	202	138	214	7.21%	14.42%	21.62%	167	185
Re, ppb	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
S, wt.%	0.067	0.006	0.054	0.079	0.048	0.085	9.15%	18.30%	27.44%	0.063	0.070
Sb, ppm	1.44	0.071	1.30	1.59	1.23	1.66	4.90%	9.79%	14.69%	1.37	1.52
Sc, ppm	14.2	1.29	11.6	16.7	10.3	18.0	9.09%	18.17%	27.26%	13.4	14.9
Se, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Sm, ppm	7.70	0.468	6.76	8.64	6.30	9.11	6.08%	12.16%	18.24%	7.32	8.09
Sn, ppm	5.82	0.64	4.54	7.09	3.90	7.73	10.96%	21.92%	32.89%	5.53	6.11
Sr, ppm	78	4.8	69	88	64	92	6.10%	12.20%	18.29%	74	82
Ta, ppm	1.32	0.23	0.87	1.77	0.65	2.00	17.02%	34.05%	51.07%	1.26	1.39
Tb, ppm	1.05	0.051	0.94	1.15	0.89	1.20	4.92%	9.83%	14.75%	0.99	1.10
Te, ppm	< 0.05	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Th, ppm	18.7	1.27	16.2	21.3	14.9	22.6	6.78%	13.57%	20.35%	17.8	19.7
Ti, wt.%	0.467	0.041	0.385	0.550	0.343	0.591	8.83%	17.66%	26.49%	0.444	0.491
Tl, ppm	0.91	0.051	0.81	1.01	0.76	1.07	5.61%	11.22%	16.83%	0.87	0.96
Tm, ppm	0.53	0.046	0.43	0.62	0.39	0.66	8.76%	17.51%	26.27%	0.50	0.55
U, ppm	3.69	0.154	3.38	4.00	3.23	4.15	4.17%	8.34%	12.51%	3.50	3.87
V, ppm	97	5.6	85	108	80	114	5.84%	11.69%	17.53%	92	101
W, ppm	3.05	0.233	2.58	3.51	2.35	3.75	7.64%	15.27%	22.91%	2.90	3.20
Y, ppm	32.7	2.22	28.3	37.2	26.1	39.4	6.78%	13.55%	20.33%	31.1	34.4
Yb, ppm	3.22	0.186	2.85	3.59	2.66	3.78	5.78%	11.55%	17.33%	3.06	3.38
Zn, ppm	132	6	120	145	114	151	4.68%	9.35%	14.03%	126	139
Zr, ppm	147	10	127	168	117	178	6.96%	13.91%	20.87%	140	155
Aqua Regia Digestion											
Ag, ppm	0.164	0.029	0.106	0.222	0.077	0.252	17.78%	35.57%	53.35%	0.156	0.172

Al, wt.%	2.48	0.186	2.11	2.85	1.92	3.04	7.49%	14.98%	22.46%	2.36	2.60
As, ppm	4.46	0.400	3.66	5.26	3.26	5.66	8.98%	17.96%	26.94%	4.24	4.68

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											
Au, ppb	< 5	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
B, ppm	< 10	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ba, ppm	*75**	*4.3**	*66**	*83**	*62**	*88**	*5.71%*	*11.42%*	*17.13%*	*71*	*79*
Be, ppm	0.74	0.09	0.56	0.92	0.48	1.01	11.90%	23.80%	35.70%	0.70	0.78
Bi, ppm	1.25	0.14	0.96	1.54	0.82	1.68	11.52%	23.03%	34.55%	1.19	1.31
Ca, wt.%	0.322	0.013	0.297	0.347	0.284	0.360	3.92%	7.84%	11.77%	0.306	0.338
Cd, ppm	0.085	0.009	0.067	0.103	0.058	0.112	10.59%	21.18%	31.77%	0.081	0.089
Ce, ppm	69	4.1	61	77	57	81	5.89%	11.77%	17.66%	66	73
Co, ppm	15.5	0.78	13.9	17.0	13.1	17.8	5.02%	10.04%	15.06%	14.7	16.2
Cr, ppm	42.4	1.85	38.7	46.1	36.8	47.9	4.36%	8.72%	13.07%	40.3	44.5
Cs, ppm	2.04	0.35	1.34	2.74	0.99	3.09	17.12%	34.24%	51.36%	1.94	2.14
Cu, ppm	278	10	258	299	248	309	3.63%	7.25%	10.88%	264	292
Dy, ppm	< 6	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Er, ppm	< 3	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Eu, ppm	< 1.5	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Fe, wt.%	3.83	0.111	3.60	4.05	3.49	4.16	2.90%	5.79%	8.69%	3.63	4.02
Ga, ppm	7.03	0.563	5.90	8.15	5.34	8.72	8.02%	16.04%	24.05%	6.68	7.38
Gd, ppm	< 7	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ge, ppm	< 0.2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Hf, ppm	0.62	0.07	0.48	0.76	0.40	0.83	11.39%	22.78%	34.17%	0.58	0.65
Hg, ppm	< 0.02	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ho, ppm	< 1	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
In, ppm	0.053	0.005	0.043	0.063	0.038	0.068	9.53%	19.06%	28.59%	0.050	0.056
K, wt.%	0.433	0.065	0.304	0.563	0.240	0.627	14.91%	29.82%	44.73%	0.412	0.455
La, ppm	36.4	3.8	28.9	44.0	25.1	47.8	10.39%	20.78%	31.17%	34.6	38.3
Li, ppm	21.4	0.93	19.6	23.3	18.6	24.2	4.34%	8.69%	13.03%	20.3	22.5
Lu, ppm	< 0.4	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Mg, wt.%	1.15	0.060	1.03	1.27	0.97	1.33	5.24%	10.47%	15.71%	1.09	1.21
Mn, wt.%	0.056	0.002	0.052	0.061	0.049	0.063	4.16%	8.32%	12.48%	0.054	0.059
Mo, ppm	0.45	0.06	0.33	0.56	0.28	0.62	12.74%	25.47%	38.21%	0.43	0.47

Na, wt.%	0.029	0.006	0.016	0.042	0.009	0.048	22.48%	44.95%	67.43%	0.027	0.030

*Statistics presented above for Ba via aqua regia digestion are based on a consensus of 11 labs. A second consensus of 5 labs exists at ~118ppm with a 1RSD of 15%. This data separation was necessary due to the bi-modal nature of the results received.

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											
Nb, ppm	0.42	0.07	0.28	0.56	0.21	0.63	16.76%	33.53%	50.29%	0.40	0.44
Nd, ppm	31.2	5.3	20.5	41.9	15.2	47.3	17.13%	34.26%	51.40%	29.7	32.8
Ni, ppm	38.0	2.15	33.7	42.3	31.5	44.4	5.66%	11.32%	16.97%	36.1	39.9
P, wt.%	0.068	0.004	0.061	0.076	0.057	0.080	5.61%	11.22%	16.82%	0.065	0.072
Pb, ppm	26.0	1.80	22.4	29.6	20.6	31.4	6.91%	13.83%	20.74%	24.7	27.3
Pr, ppm	7.98	0.98	6.01	9.94	5.03	10.92	12.31%	24.62%	36.93%	7.58	8.37
Rb, ppm	24.2	2.5	19.3	29.1	16.8	31.5	10.14%	20.29%	30.43%	23.0	25.4
Re, ppb	< 1	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
S, wt.%	0.068	0.007	0.053	0.083	0.046	0.090	10.94%	21.87%	32.81%	0.065	0.071
Sb, ppm	0.61	0.08	0.44	0.77	0.36	0.85	13.51%	27.03%	40.54%	0.58	0.64
Sc, ppm	2.85	0.50	1.85	3.86	1.34	4.36	17.63%	35.26%	52.90%	2.71	2.99
Se, ppm	1.04	0.20	0.64	1.44	0.44	1.64	19.18%	38.35%	57.53%	0.99	1.09
Sm, ppm	5.60	1.08	3.45	7.76	2.37	8.84	19.24%	38.49%	57.73%	5.32	5.88
Sn, ppm	1.45	0.23	1.00	1.91	0.77	2.13	15.59%	31.18%	46.76%	1.38	1.53
Sr, ppm	16.4	0.69	15.0	17.8	14.4	18.5	4.21%	8.41%	12.62%	15.6	17.3
Ta, ppm	< 0.05	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Tb, ppm	< 1	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Te, ppm	< 0.05	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Th, ppm	15.0	0.88	13.2	16.7	12.4	17.6	5.85%	11.69%	17.54%	14.2	15.7
Ti, wt.%	0.116	0.018	0.080	0.152	0.062	0.170	15.60%	31.21%	46.81%	0.110	0.121
Tl, ppm	0.15	0.03	0.10	0.20	0.07	0.23	17.76%	35.52%	53.29%	0.14	0.16
Tm, ppm	< 0.5	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
U, ppm	2.08	0.21	1.65	2.51	1.43	2.72	10.35%	20.71%	31.06%	1.97	2.18
V, ppm	26.2	1.88	22.5	30.0	20.6	31.8	7.15%	14.31%	21.46%	24.9	27.5
W, ppm	< 0.8	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Y, ppm	18.3	2.8	12.6	23.9	9.8	26.8	15.53%	31.05%	46.58%	17.3	19.2
Yb, ppm	< 3	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Zn, ppm	124	7	109	138	102	146	5.88%	11.76%	17.63%	118	130
Zr, ppm	21.4	1.71	18.0	24.8	16.2	26.5	7.99%	15.98%	23.96%	20.3	22.4

Peroxide Fusion ICP											
Al, wt.%	7.86	0.557	6.75	8.97	6.19	9.53	7.08%	14.16%	21.24%	7.47	8.25
As, ppm	< 5	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND

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
Peroxide Fusion ICP continued											
Ba, ppm	549	23	503	595	480	618	4.20%	8.39%	12.59%	522	577
Be, ppm	< 4	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Bi, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ca, wt.%	0.537	0.089	0.359	0.716	0.269	0.805	16.62%	33.25%	49.87%	0.510	0.564
Cd, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ce, ppm	93	5.0	83	103	78	108	5.43%	10.86%	16.29%	88	98
Co, ppm	17.3	1.67	13.9	20.6	12.3	22.3	9.68%	19.36%	29.04%	16.4	18.2
Cr, ppm	97	14	69	126	54	140	14.72%	29.44%	44.16%	92	102
Cs, ppm	8.81	0.420	7.97	9.65	7.55	10.07	4.76%	9.52%	14.29%	8.37	9.25
Cu, ppm	293	11	271	314	261	325	3.65%	7.31%	10.96%	278	307
Dy, ppm	6.28	0.271	5.73	6.82	5.46	7.09	4.32%	8.65%	12.97%	5.96	6.59
Er, ppm	3.72	0.38	2.97	4.48	2.59	4.86	10.14%	20.27%	30.41%	3.54	3.91
Eu, ppm	1.58	0.130	1.33	1.84	1.20	1.97	8.18%	16.37%	24.55%	1.51	1.66
Fe, wt.%	4.46	0.204	4.06	4.87	3.85	5.08	4.57%	9.14%	13.71%	4.24	4.69
Ga, ppm	21.2	1.43	18.3	24.0	16.9	25.5	6.74%	13.49%	20.23%	20.1	22.2
Gd, ppm	7.42	0.634	6.15	8.69	5.52	9.33	8.54%	17.09%	25.63%	7.05	7.79
Ge, ppm	< 5	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Hf, ppm	7.22	1.08	5.07	9.38	3.99	10.46	14.93%	29.86%	44.80%	6.86	7.58
Ho, ppm	1.32	0.114	1.09	1.55	0.97	1.66	8.68%	17.36%	26.03%	1.25	1.38
In, ppm	< 0.2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
K, wt.%	2.86	0.119	2.62	3.09	2.50	3.21	4.16%	8.32%	12.48%	2.71	3.00
La, ppm	47.6	2.15	43.3	51.9	41.2	54.1	4.52%	9.04%	13.56%	45.2	50.0
Li, ppm	27.5	3.2	21.2	33.9	18.0	37.0	11.53%	23.07%	34.60%	26.1	28.9
Lu, ppm	0.56	0.06	0.44	0.68	0.38	0.74	10.68%	21.36%	32.04%	0.53	0.59
Mg, wt.%	1.43	0.074	1.28	1.58	1.21	1.66	5.19%	10.39%	15.58%	1.36	1.50
Mn, wt.%	0.067	0.003	0.060	0.073	0.057	0.076	4.53%	9.06%	13.59%	0.063	0.070
Mo, ppm	< 1	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Nb, ppm	17.2	2.5	12.3	22.1	9.8	24.6	14.27%	28.55%	42.82%	16.4	18.1
Nd, ppm	41.0	1.55	37.9	44.1	36.4	45.6	3.78%	7.56%	11.33%	38.9	43.0

Ni, ppm	41.9	4.17	33.6	50.3	29.4	54.4	9.93%	19.87%	29.80%	39.8	44.0
P, wt.%	0.071	0.007	0.056	0.085	0.049	0.092	10.05%	20.10%	30.14%	0.067	0.074
Pb, ppm	27.1	4.1	18.9	35.3	14.7	39.5	15.20%	30.41%	45.61%	25.7	28.5

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
Peroxide Fusion ICP continued											
Pr, ppm	11.2	0.37	10.4	11.9	10.1	12.3	3.32%	6.63%	9.95%	10.6	11.7
Rb, ppm	178	7	164	193	156	200	4.08%	8.15%	12.23%	169	187
S, wt.%	0.078	0.016	0.046	0.110	0.029	0.127	20.75%	41.49%	62.24%	0.074	0.082
Sb, ppm	< 2	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Si, wt.%	30.68	0.643	29.39	31.97	28.75	32.61	2.10%	4.19%	6.29%	29.15	32.21
Sm, ppm	7.93	0.369	7.19	8.67	6.83	9.04	4.65%	9.30%	13.95%	7.54	8.33
Sn, ppm	< 10	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Sr, ppm	78	6.3	65	91	59	97	8.10%	16.20%	24.29%	74	82
Ta, ppm	1.42	0.20	1.02	1.81	0.83	2.01	13.94%	27.87%	41.81%	1.35	1.49
Tb, ppm	1.10	0.085	0.93	1.27	0.85	1.36	7.71%	15.42%	23.13%	1.05	1.16
Th, ppm	19.3	0.64	18.0	20.6	17.4	21.2	3.32%	6.64%	9.96%	18.3	20.3
Ti, wt.%	0.484	0.022	0.439	0.528	0.417	0.550	4.59%	9.18%	13.78%	0.460	0.508
Tl, ppm	0.96	0.058	0.84	1.07	0.78	1.13	6.05%	12.11%	18.16%	0.91	1.00
Tm, ppm	0.57	0.046	0.48	0.66	0.43	0.71	8.05%	16.09%	24.14%	0.54	0.60
U, ppm	4.03	0.244	3.54	4.51	3.29	4.76	6.06%	12.13%	18.19%	3.83	4.23
V, ppm	97	5.9	85	109	79	115	6.08%	12.16%	18.24%	92	102
W, ppm	< 5	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Y, ppm	33.4	2.12	29.2	37.6	27.0	39.8	6.36%	12.71%	19.07%	31.7	35.1
Yb, ppm	3.50	0.229	3.04	3.96	2.81	4.19	6.54%	13.09%	19.63%	3.33	3.68
Zn, ppm	139	10	118	159	108	170	7.37%	14.74%	22.11%	132	146

Note: intervals may appear asymmetric due to rounding

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Reference material OREAS 921 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
Web: www.ore.com.au
Email: info@ore.com.au

It has been packaged in 10g units in laminated foil pouches.

INTENDED USE

OREAS 921 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 921 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. It has been packaged in robust foil laminate pouches and under normal storage conditions has long-term stability beyond 10 years.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

The certified values for OREAS 921 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.

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.