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CERTIFICATE OF ANALYSIS FOR

COPPER ORE REFERENCE MATERIAL OREAS 93

SUMMARY STATISTICS OREAS 93

Constituent	Recommended value	95% Confidence Interval		Tolerance limits 1-α=0.99, ρ=0.95	
		Low	High	Low	High
4 Acid					
Silver, Ag (ppm)	1.69	1.58	1.80	1.65	1.73
Bismuth, Bi (ppm)	4.60	4.38	4.83	4.43	4.78
Cobalt, Co (ppm)	18.8	18.1	19.5	18.2	19.5
Copper, Cu (ppm)	5817	5717	5917	5720	5913
Lead, Pb (ppm)	18.3	17.3	19.3	17.3	19.2
Sulphur, S (ppm)	7082	6912	7253	6873	7291
Antimony, Sb (ppm)	1.70	1.60	1.79	1.62	1.77
Selenium, Se (ppm)	7.49	6.12	8.85	6.87	8.11
Tin, Sn (ppm)	14.9	14.5	15.3	14.4	15.5
Zinc, Zn (ppm)	118	114	122	115	121
Aqua Regia					
Silver, Ag (ppm)	1.76	1.68	1.84	1.72	1.80
Bismuth, Bi (ppm)	4.79	4.54	5.03	4.59	4.98
Cobalt, Co (ppm)	18.5	17.6	19.4	18.0	19.0
Copper, Cu (ppm)	5761	5637	5884	5670	5852
Lead, Pb (ppm)	17.8	16.9	18.8	17.5	18.2
Sulphur, S (ppm)	6849	6546	7152	6735	6963
Antimony, Sb (ppm)	1.06	0.89	1.22	1.02	1.09
Selenium, Se (ppm)	6.94	6.33	7.55	6.76	7.12
Tin, Sn (ppm)	9.1	8.7	9.4	8.9	9.2
Zinc, Zn (ppm)	109	105	114	107	111

* values may appear asymmetric due to rounding

Prepared by:
Ore Research & Exploration Pty Ltd
February 2006

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INTRODUCTION

OREAS certified reference materials (CRMs) are intended to provide a low cost method of evaluating and improving the quality of precious and base metal analysis of geological samples. To the analyst they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures. 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.

SOURCE MATERIAL

Reference material OREAS 93 is one of a suite of nine copper CRMs (OREAS 90 to OREAS 98) prepared from material from the CSA mine located near the town 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.

Table 1. Indicative (uncertified) major and trace element composition of OREAS 93 (values are means of duplicate determinations; SiO_2 to C in wt.%, As to Zr in ppm).

Constituent	Mean value	Constituent	Mean value	Constituent	Mean value
SiO_2	66.1	As	8.5	Ni	45.0
Al_2O_3	14.5	Ba	418	Pr	10.1
CaO	0.74	Be	2.8	Rb	198
Fe_2O_3	7.0	Cd	<0.5	Re	<0.1
K_2O	3.4	Ce	90	Sb	1.75
MgO	2.5	Cs	6.6	Sc	13.5
Na_2O	0.75	Dy	5.1	Sm	7.1
P_2O_5	0.15	Er	2.9	Sr	33.8
SO_3	1.76	Eu	1.3	Ta	0.95
TiO_2	0.72	Ga	15.3	Tb	0.90
MnO	0.09	Gd	6.0	Te	<0.2
LOI	2.8	Hf	3.8	Th	17.7
		Ho	1.0	Tl	1.0
C	0.10	In	0.64	Tm	0.41
		La	43.6	U	3.4
		Li	24.8	W	2.5
		Lu	0.40	Y	26.0
		Mo	<0.5	Yb	2.8
		Nb	13.3	Zr	122
		Nd	37.3		

The approximate major and trace element composition of OREAS 93 has been determined by various total methods. These values, presented in Table 1, are based on the means of duplicate determinations at one laboratory and are uncertified. The constituents SiO_2 to MnO (excluding Na_2O) have been determined by borate fusion X-ray fluorescence analysis, LOI by thermo-gravimetric analysis, C by total combustion analysis, Na_2O, Co, Ni and Sc by 4-acid ICPOES and the remaining trace constituents by 4-acid ICP-MS.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 93 was prepared in the following manner:

a) drying to constant mass at 65^0 C;
b) crushing;
c) milling to minus 75 microns;
d) homogenisation;
e) packaging into 10g lots under nitrogen in laminated foil pouches.

ANALYTICAL PROGRAM FOR OREAS 93

Sixteen commercial laboratories participated in the analytical program to certify Ag, Bi, Co, Cu, Pb, S, Sb, Se, Sn and Zn by both total and partial methods. Their results together with uncorrected means, medians, one sigma standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM^3) are presented in an appendix (Tables A2 – A21). The analytical methods employed by each laboratory are indicated as codes at the head of each laboratory data set and explained in Table A1 of the appendix.

The intent of the certification program was to characterise the analytes by a) total methods (mainly HF-HCl-HNO_3-$HClO_4$ digest ICP-OES and ICP-MS), and b) aqua regia digest ICP-OES, ICP-MS or AAS. A batch of five dried and vacuum-packed samples were submitted to each of the participating laboratories for analysis. Each batch was composed of two 10g sub-samples scoop-split from each of two separate 1kg test units taken during the bagging stage and immediately following homogenisation. This two-stage nested design for the interlaboratory programme was amenable to analysis of variance (ANOVA) treatment and enables a comparative assessment of within- and between-unit homogeneity. A fifth randomly chosen sample was included from a third 1kg test unit to make up batches of five samples.

STATISTICAL EVALUATION OF OREAS 93

Recommended Value and Confidence Limits
The certified value is the mean of means of accepted replicate values of accepted participating laboratories computed according to the formulae

$$\bar{x}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} x_{ij}$$

$$\ddot{x} = \frac{1}{p} \sum_{i=1}^{p} \bar{x}_i$$

where

x_{ij} *is the jth result reported by laboratory i;*
p is the number of participating laboratories;
n_i *is the number of results reported by laboratory i;*
$\bar{x}_i$ *is the mean for laboratory i;*
$\ddot{x}$ *is the mean of means.*

The confidence limits were obtained by calculation of the variance of the consensus value (mean of means) and reference to Student's-*t* distribution with degrees of freedom (*p*-1).

$$\hat{V}(\ddot{x}) = \frac{1}{p(p-1)} \sum_{i=1}^{p} (\bar{x}_i - \ddot{x})^2$$

$$\textit{Confidence limits} = \ddot{x} \pm t_{1-x/2}(p-1)(\hat{V}(\ddot{x}))^{1/2}$$

where $t_{1-x/2}(p-1)$ *is the 1-x/2 fractile of the t-distribution with (p-1) degrees of freedom.*

The distribution of the values are assumed to be symmetrical about the mean in the calculation of the confidence limits.

The test for rejection of individual outliers from each laboratory data set was based on *z* scores (rejected if $|z_i| > 2.5$) computed from the robust estimators of location and scale, *T* and *S*, respectively, according to the formulae

$$S = 1.483 \underset{j=1.\ldots n}{\text{median}} / x_j - \underset{i=1.\ldots n}{\text{median}} (x_i) /$$

$$z_i = \frac{x_i - T}{S}$$

where

T is the median value in a data set;
S is the median of all absolute deviations from the sample median multiplied by 1.483, a correction factor to make the estimator consistent with the usual parameter of a normal distribution.

Individual outliers and, more rarely, laboratory means deemed to be outlying are shown in bold in the tabulated results (Appendix) and have been omitted in the determination of recommended values. The magnitude of the confidence interval is inversely proportional to

the number of participating laboratories and interlaboratory agreement. It is a measure of the reliability of the recommended value, i.e. the narrower the confidence interval the greater the certainty in the recommended value.

Table 2. Recommended values and 95% confidence intervals for OREAS 93

Constituent	Recommended value	95% Confidence Interval	
		Low	High
4 Acid			
Silver, Ag (ppm)	1.69	1.58	1.80
Bismuth, Bi (ppm)	4.60	4.38	4.83
Cobalt, Co (ppm)	18.8	18.1	19.5
Copper, Cu (ppm)	5817	5717	5917
Lead, Pb (ppm)	18.3	17.3	19.3
Sulphur, S (ppm)	7082	6912	7253
Antimony, Sb (ppm)	1.70	1.60	1.79
Selenium, Se (ppm)	7.49	6.12	8.85
Tin, Sn (ppm)	14.9	14.5	15.3
Zinc, Zn (ppm)	118	114	122
Aqua Regia			
Silver, Ag (ppm)	1.76	1.68	1.84
Bismuth, Bi (ppm)	4.79	4.54	5.03
Cobalt, Co (ppm)	18.5	17.6	19.4
Copper, Cu (ppm)	5761	5637	5884
Lead, Pb (ppm)	17.8	16.9	18.8
Sulphur, S (ppm)	6849	6546	7152
Antimony, Sb (ppm)	1.06	0.89	1.22
Selenium, Se (ppm)	6.94	6.33	7.55
Tin, Sn (ppm)	9.1	8.7	9.4
Zinc, Zn (ppm)	109	105	114

*IND - indeterminate; values may appear asymmetric due to rounding

Statement of Homogeneity

The standard deviation of each laboratory data set includes error due to both the imprecision of the analytical method employed and to possible inhomogeneity of the material analysed. The standard deviation of the pooled individual analyses of all participating laboratories includes error due to the imprecision of each analytical method, to possible inhomogeneity of the material analysed and, in particular, to deficiencies in accuracy of each analytical method. In determining tolerance intervals the component of error attributable to measurement inaccuracy was eliminated by transformation of the individual results of each data set to a common mean (the uncorrected grand mean) according to the formula:

$$x'_{ij} = x_{ij} - \bar{x}_i + \frac{\sum_{i=1}^{p} \sum_{j=1}^{n_i} x_{ij}}{\sum_{i=1}^{p} n_i}$$

where

x_{ij} *is the jth raw result reported by laboratory i*;

x'_{ij} *is the jth transformed result reported by laboratory i*;

n_i *is the number of results reported by laboratory i*;

p *is the number of participating laboratories*;

$\bar{x}_i$ *is the raw mean for laboratory i.*

The homogeneity of each constituent was determined from tables of factors for two-sided tolerance limits for normal distributions (ISO 3207) in which

$$\text{Lower limit is } \ddot{x} - k'_2(n, p, 1-\alpha)s''_g$$
$$\text{Upper limit is } \ddot{x} + k'_2(n, p, 1-\alpha)s''_g$$

where

n *is the number of results*;

$1-\alpha$ *is the confidence level*;

p *is the proportion of results expected within the tolerance limits*;

k'_2 *is the factor for two-sided tolerance limits* (m, α *unknown*);

s''_g *is the corrected grand standard deviation.*

The meaning of these tolerance limits may be illustrated for copper by 4 acid digest, where 99% of the time at least 95% of subsamples will have concentrations lying between 5720 and 5913 ppm (see Table 3). 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 (IS0 Guide 35).

The corrected grand standard deviation, s_g'', used to compute the tolerance intervals is the weighted means of standard deviations of all data sets for a particular constituent according to the formula:

$$s''_g = \frac{\sum_{i=1}^{p}(s_i(1-\frac{s_i}{s'_g}))}{\sum_{i=1}^{p}(1-\frac{s_i}{s'_g})}$$

where

$1-(\frac{s_i}{2s'_g})$ *is the weighting factor for laboratory i ;*

s'_g *is the grand standard deviation computed from the transformed (i.e. means - adjusted) results*

according to the formula:

$$s'_g = \left[\frac{\sum_{i=j}^{p} \sum_{j=i}^{n_i} (x'_{ij} - \bar{x}'_i)^2}{\sum_{i=1}^{p} n_i - 1} \right]^{1/2}$$

where $\bar{x}'_i$ is the transformed mean for laboratory i

Table 3. Recommended values and tolerance limits for OREAS 93

Constituent	Recommended value	Tolerance limits 1-α=0.99, ρ=0.95	
		Low	High
4 Acid			
Silver, Ag (ppm)	1.69	1.65	1.73
Bismuth, Bi (ppm)	4.60	4.43	4.78
Cobalt, Co (ppm)	18.8	18.2	19.5
Copper, Cu (ppm)	5817	5720	5913
Lead, Pb (ppm)	18.3	17.3	19.2
Sulphur, S (ppm)	7082	6873	7291
Antimony, Sb (ppm)	1.70	1.62	1.77
Selenium, Se (ppm)	7.49	6.87	8.11
Tin, Sn (ppm)	14.9	14.4	15.5
Zinc, Zn (ppm)	118	115	121
Aqua Regia			
Silver, Ag (ppm)	1.76	1.72	1.80
Bismuth, Bi (ppm)	4.79	4.59	4.98
Cobalt, Co (ppm)	18.5	18.0	19.0
Copper, Cu (ppm)	5761	5670	5852
Lead, Pb (ppm)	17.8	17.5	18.2
Sulphur, S (ppm)	6849	6735	6963
Antimony, Sb (ppm)	1.06	1.02	1.09
Selenium, Se (ppm)	6.94	6.76	7.12
Tin, Sn (ppm)	9.1	8.9	9.2
Zinc, Zn (ppm)	109	107	111

*IND - indeterminate; values may appear asymmetric due to rounding

The weighting factors were applied to compensate for the considerable variation in analytical precision amongst participating laboratories. Hence, weighting factors for each data set have been constructed so as to be inversely proportional to the standard deviation of that data set. A weighting factor of zero was applied to those data sets where $s_l / 2s_g' > 1$ (i.e. where the weighting factor $1 - s_l / 2s_g' < 0$). It should be noted that estimates of tolerance by this method are considered conservative as a significant proportion of the observed variance, even in those laboratories exhibiting the best analytical precision, can presumably be attributed to measurement error. Outliers were removed prior to the calculation of tolerance intervals and a weighting factor of zero was applied to those data sets where $s_l / 2s_g' > 1$ (i.e. where the weighting factor $1 - s_l / 2s_g' < 0$).

Performance Gates

Performance gates provide an indication of a level of performance that might reasonably be expected for a particular analyte from a laboratory being monitored by this standard in a QA/QC program. They incorporate errors attributable to measurement (analytical bias and precision) and standard variability. For an effective standard the contribution of the latter should be negligible in comparison to measurement errors. Two methods have been employed to calculate performance gates.

The first method uses the standard deviation of the pooled individual analyses generated from the certification program. All individual and lab dataset (batch) outliers are removed prior to determination of the standard deviation. These outliers can only be removed if they can be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. Performance gates have been calculated for one, two and three standard deviations of the accepted pool of certification data and are presented in Table 4. As a guide these intervals may be regarded as informational (1σ), warning or rejection for multiple outliers (2σ), or rejection for individual outliers (3σ) in QC monitoring although their precise application should be at the discretion of the QC manager concerned.

For the second method a ±5% error bar on the recommended value is used as the window of acceptability (refer Table 4).

Both methods should be used with caution 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 4. Performance gates for OREAS 93

Constituent	Recommended value	Performance Gates							
		1σ		2σ		3σ		5%	
		Low	High	Low	High	Low	High	Low	High
4 Acid									
Silver, Ag (ppm)	1.69	1.49	1.89	1.29	2.09	1.09	2.29	1.61	1.78
Bismuth, Bi (ppm)	4.60	4.21	5.00	3.81	5.40	3.41	5.80	4.37	4.83
Cobalt, Co (ppm)	18.8	17.5	20.1	16.2	21.4	14.9	22.7	17.9	19.8
Copper, Cu (ppm)	5817	5628	6006	5439	6195	5250	6384	5526	6108
Lead, Pb (ppm)	18.3	16.3	20.2	14.4	22.2	12.4	24.1	17.4	19.2
Sulphur, S (ppm)	7082	6794	7370	6506	7658	6218	7946	6728	7436
Antimony, Sb (ppm)	1.70	1.45	1.94	1.21	2.18	0.97	2.42	1.61	1.78
Selenium, Se (ppm)	7.49	5.25	9.72	3.01	12.0	0.78	14.2	7.11	7.86
Tin, Sn (ppm)	14.9	14.2	15.7	13.4	16.4	12.7	17.2	14.2	15.7
Zinc, Zn (ppm)	118	111	126	103	133	95.8	141	112	124
Aqua Regia									
Silver, Ag (ppm)	1.76	1.61	1.90	1.46	2.05	1.31	2.20	1.67	1.84
Bismuth, Bi (ppm)	4.79	4.34	5.23	3.90	5.67	3.46	6.11	4.55	5.03
Cobalt, Co (ppm)	18.5	16.8	20.2	15.2	21.9	13.5	23.5	17.6	19.4
Copper, Cu (ppm)	5761	5540	5982	5319	6203	5098	6423	5473	6049
Lead, Pb (ppm)	17.8	16.0	19.7	14.2	21.5	12.3	23.4	17.0	18.7
Sulphur, S (ppm)	6849	6318	7380	5787	7911	5256	8442	6507	7191
Antimony, Sb (ppm)	1.06	0.78	1.33	0.50	1.61	0.22	1.89	1.00	1.11
Selenium, Se (ppm)	6.94	5.85	8.03	4.76	9.12	3.68	10.21	6.59	7.29
Tin, Sn (ppm)	9.06	8.48	9.64	7.90	10.2	7.32	10.8	8.61	9.51
Zinc, Zn (ppm)	109	101	118	93	126	85	134	104	115

*IND - indeterminate; values may appear asymmetric due to rounding

PARTICIPATING LABORATORIES

Acme Analytical Laboratories, Vancouver, BC, Canada
Activation Laboratories, Ancaster, ON, Canada
Actlabs Pacific, Redcliffe, WA, Australia
ALS Chemex, Malaga, WA, Australia
ALS Chemex, Stafford, QLD, Australia
ALS Chemex, North Vancouver, BC, Canada
Amdel Laboratories, Thebarton, SA, Australia
Amdel Laboratories, Wangara, WA, Australia
Genalysis Laboratory Services, Maddington, WA, Australia
Intertek Testing Services, Jakarta, Indonesia
Kalgoorlie Assay Laboratories, Kalgoorlie WA, Australia
McPhar Geoservices (Phil.) Inc., Makati, Philippines
OMAC Laboratories, Loughrea, Co. Galway, Ireland
SGS, Don Mills, Ontario, Canada
SGS, Welshpool, WA, Australia
Ultra Trace Laboratories, Canning Vale, WA, Australia

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

The siltstone reference material OREAS 93 has been prepared and certified and is supplied by:

Ore Research & Exploration Pty Ltd
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AUSTRALIA

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It is available in unit sizes of 10g in laminated foil packets.

INTENDED USE

OREAS 93 is a reference material intended for the following:

i) for the calibration of instruments used in the determination of the concentration of Ag, Bi, Co, Cu, Pb, S, Sb, Se, Sn and Zn;
ii) for the verification of analytical methods for Ag, Bi, Co, Cu, Pb, S, Sb, Se, Sn and Zn;
iii) for the preparation of secondary reference materials of similar composition;

STABILITY AND STORAGE INSTRUCTIONS

OREAS 93 has been prepared from a sediment-hosted sulphide-bearing copper ore. To prolong its shelf life it has been packaged under nitrogen in robust foil laminate pouches. It is considered to have long-term stability under normal storage conditions.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

The recommended values for OREAS 93 refer to the concentration levels of Ag, Bi, Co, Cu, Pb, S, Sb, Se, Sn and Zn after removal of hygroscopic moisture by drying in air to constant mass at the reduced temperature of 65^0 C. If the reference material is not dried prior to analysis, the recommended value should be corrected to the moisture-bearing basis.

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

Dr Paul Hamlyn

CERTIFICATION DATE

February 25, 2006

REFERENCES

ISO Guide 35 (1985), Certification of reference materials - General and statistical principals.
ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.
Kleeman, A. W. (1967), *J. Geol. Soc. Australia*,

APPENDIX

Analytical Results for OREAS 93

Table A1. Explanation of abbreviations used in Tables A2 – A21.

Abbreviation	Explanation
Std.Dev.	one sigma standard deviation
Rel.Std.Dev.	one sigma relative standard deviation
PDM[3]	percent deviation of lab mean from corrected mean of means
-	outlying values shown in bold
AF	alkali fusion
BF	borate fusion
4A	four acid (HF-HNO3 -HClO4 -HCl) digestion
AR	aqua regia digest
OES	inductively coupled plasma optical emission spectrometry
MS	inductively coupled plasma mass spectrometry
AAS	atomic absorption spectrometry
Leco	Leco infrared furnace

Table A2. Analytical results for 4 acid silver in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*MS	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P 4A*AAS
1	1.5	1.7	**2.03**	1.33	1.81	1.86	1.8	1.54	1.63	2.13	1.32	1.71	2.0	1.9	1.57	NR
2	1.5	**2.5**	1.86	1.42	1.91	1.88	1.9	1.43	1.64	2.26	1.38	1.71	1.9	2.0	1.63	NR
3	1.5	1.7	1.77	1.46	1.82	1.86	1.9	1.37	1.81	2.27	1.35	1.71	1.8	1.9	1.60	NR
4	1.5	1.7	1.85	1.38	1.76	1.84	1.9	1.58	1.76	2.38	1.38	1.70	1.8	2.0	1.68	NR
5	1.5	1.7	1.90	1.39	1.83	1.79	1.9	1.33	1.85	2.32	1.39	1.71	1.7	2.0	1.60	NR
Mean	1.50	1.86	1.88	1.40	1.83	1.85	1.88	1.45	1.74	**2.27**	1.36	1.71	1.84	1.96	1.616	
Median	1.50	1.70	1.86	1.39	1.82	1.86	1.90	1.43	1.76	2.27	1.38	1.71	1.80	2.00	1.600	
Std.Dev.	0.00	0.36	0.10	0.05	0.05	0.03	0.04	0.11	0.10	0.09	0.03	0.00	0.11	0.05	0.04	
Rel.Std.Dev.	0.00%	19.23%	5.06%	3.46%	2.96%	1.75%	2.38%	7.50%	5.72%	4.03%	2.35%	0.26%	6.20%	2.79%	2.57%	
PDM[3]	-11.3%	10.0%	11.3%	-17.4%	8.00%	9.23%	11.2%	-14.3%	2.80%	34.4%	-19.3%	1.02%	8.83%	15.9%	-4.42%	

Table A3. Analytical results for 4 acid bismuth in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*MS	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P 4A*AAS
1	4.5	4.46	4.85	4.37	4.85	5.03	4.4	4.34	4.62	**3.96**	4.09	5.20	6.5	NR	5.32	NR
2	4.7	4.46	4.85	4.63	5.09	4.97	4.5	3.70	4.63	4.24	4.18	5.35	5.9	NR	4.55	NR
3	4.6	4.27	**4.54**	4.25	4.71	4.94	4.5	4.24	4.70	4.27	4.18	5.33	5.7	NR	4.41	NR
4	4.3	4.53	4.85	4.57	4.83	5.22	4.7	3.95	4.92	4.34	4.24	5.10	6.2	NR	4.85	NR
5	4.6	4.56	4.75	4.23	5.22	5.13	4.5	3.40	4.73	4.26	4.26	5.27	5.7	NR	4.52	NR
Mean	4.54	4.46	4.77	4.41	4.94	5.06	4.52	3.92	4.72	4.21	4.19	5.25	**6.00**		4.73	
Median	4.60	4.46	4.85	4.37	4.85	5.03	4.50	3.95	4.70	4.26	4.18	5.27	5.90		4.55	
Std.Dev.	0.15	0.11	0.13	0.18	0.21	0.12	0.11	0.39	0.12	0.15	0.07	0.10	0.35		0.37	
Rel.Std.Dev.	3.34%	2.53%	2.82%	4.14%	4.22%	2.29%	2.42%	9.88%	2.56%	3.50%	1.60%	1.95%	5.77%		7.78%	
PDM[3]	-1.36%	-3.19%	3.59%	-4.19%	7.33%	9.89%	-1.80%	-14.7%	2.55%	-8.52%	-9.01%	14.1%	30.4%		2.8%	

Table A4. Analytical results for 4 acid cobalt in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*MS	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P 4A*AAS
1	18	19.8	18.2	17.3	20.1	21.0	20.4	18.5	20.0	17.1	17.4	18.2	**21.7**	20	17.2	NR
2	18	19.7	18.4	17.9	20.7	20.5	20.2	17.0	19.0	17.7	18.0	18.2	20.7	20	17.8	NR
3	19	18.8	**17.5**	17.0	19.9	20.4	20.6	17.5	19.0	17.4	17.3	**19.0**	19.2	20	18.3	NR
4	17	19.5	18.3	17.0	**18.8**	19.8	21.8	17.7	19.0	17.6	17.6	18.3	19.5	20	17.9	NR
5	18	19.3	18.6	17.0	20.0	20.1	21.2	17.0	20.5	17.4	18.2	17.9	19.4	21	17.2	NR
Mean	18.0	19.4	18.2	17.2	19.9	20.4	20.8	17.5	19.5	17.5	17.7	18.3	20.1	20.2	17.7	
Median	18.0	19.5	18.3	17.0	20.0	20.4	20.6	17.5	19.0	17.4	17.6	18.2	19.5	20.0	17.8	
Std.Dev.	0.7	0.4	0.4	0.4	0.7	0.5	0.7	0.6	0.7	0.2	0.4	0.4	1.1	0.4	0.5	
Rel.Std.Dev.	3.93%	2.04%	2.30%	2.27%	3.46%	2.21%	3.14%	3.48%	3.63%	1.39%	2.29%	2.23%	5.32%	2.21%	2.69%	
PDM[3]	-4.37%	3.17%	-3.31%	-8.41%	5.72%	8.17%	10.7%	-6.80%	3.60%	-7.29%	-5.92%	-2.67%	6.79%	7.32%	-6.07%	

Table A5. Analytical results for 4 acid copper in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*MS	Lab D 4A*OES	Lab E 4A*OES	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES	Lab K 4A*OES	Lab L 4A*OES	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES	Lab P 4A*AAS
1	6060	5805	5600	5860	4930	5951	5750	5970	5880	5892	5482	5693	6310	5932	**4870**	NR
2	6010	5811	5490	5910	5030	6047	5780	5840	5900	5938	5503	5670	5990	5988	5100	NR
3	6010	**5791**	5430	5940	4910	6007	5620	5910	5870	5892	5467	**5786**	5540	5914	4990	NR
4	**5920**	5810	5530	5620	4960	6013	5830	6070	5860	5824	5627	5639	5820	6011	5080	NR
5	6030	5820	5570	5760	**5150**	5915	**5360**	5960	5840	5951	**5680**	5637	5520	6016	5060	NR
Mean	6006	5807	5524	5818	**4996**	5987	5668	5950	5870	5899	5552	5685	5836	5972	**5020**	
Median	6010	5810	5530	5860	4960	6007	5750	5960	5870	5892	5503	5670	5820	5988	5060	
Std.Dev.	52	11	67	130	97	53	189	85	22	50	96	61	330	47	94	
Rel.Std.Dev.	0.87%	0.18%	1.21%	2.24%	1.95%	0.88%	3.33%	1.42%	0.38%	0.85%	1.72%	1.07%	5.66%	0.78%	1.86%	
PDM[3]	3.25%	-0.16%	-5.03%	0.02%	-14.1%	2.92%	-2.56%	2.29%	0.91%	1.42%	-4.56%	-2.27%	0.33%	2.67%	-13.7%	

Table A6. Analytical results for 4 acid lead in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*OES	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P 4A*AAS
1	15	18	17.7	16.8	17.0	17.9	18	19.2	20	**17.3**	14.2	21	19.1	20	19.9	NR
2	16	19	17.5	17.2	18.0	17.8	17	19.2	22	20.0	14.8	21	19.6	18	18.3	NR
3	16	18	17.0	16.4	17.8	17.5	17	17.9	21	19.8	13.9	21	18.9	19	17.3	NR
4	15	18	18.0	16.4	17.0	18.0	19	24.0	20	19.7	14.2	21	17.5	20	17.8	NR
5	17	19	17.8	16.4	18.7	17.6	18	18.4	22	20.0	15.1	21	**16.1**	20	17.6	NR
Mean	15.8	18.4	17.6	16.6	17.7	17.8	17.8	19.7	21.0	19.4	14.4	21.0	18.2	19.4	18.2	
Median	16.0	18.0	17.7	16.4	17.8	17.8	18.0	19.2	21.0	19.8	14.2	21.0	18.9	20.0	17.8	
Std.Dev.	0.8	0.5	0.4	0.4	0.7	0.2	0.8	2.4	1.0	1.2	0.5	0.0	1.4	0.9	1.0	
Rel.Std.Dev.	5.30%	2.98%	2.16%	2.15%	4.07%	1.12%	4.70%	12.4%	4.76%	6.12%	3.42%	0.00%	7.83%	4.61%	5.66%	
PDM[3]	-13.5%	0.68%	-3.70%	-8.95%	-3.15%	-2.80%	-2.60%	8.02%	14.91%	5.98%	-21.0%	14.9%	-0.20%	6.15%	-0.52%	

Table A7. Analytical results for 4 acid and Leco (2 labs) sulphur in OREAS 93 (abbreviations as in Table 1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*MS	Lab D 4A*OES	Lab E 4A*OES	Lab F LECO	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES	Lab K 4A*OES	Lab L 4A*OES	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES	Lab P LECO
1	7140	7102	6700	7100	6800	7000	7670	8009	7400	5971	10096	6990	7660	6900	6000	7000
2	7220	7157	6600	7100	7000	7000	7630	7777	7700	6176	10618	7010	7190	7000	6200	7000
3	7180	7086	6500	7200	6800	7000	7550	8116	7600	6055	9702	7080	6820	6600	6200	7000
4	7080	7124	6700	6800	6900	7000	7540	8024	7500	5851	10507	6950	7090	6700	6200	7000
5	7240	7115	6800	7000	7100	6900	7460	7890	7700	5881	11842	7020	6830	6900	6200	7000
Mean	7172	7117	6660	7040	6920	6980	7570	**7963**	7580	**5987**	**10553**	7010	7118	6820	**6160**	7000
Median	7180	7115	6700	7100	6900	7000	7550	8009	7600	5971	10507	7010	7090	6900	6200	7000
Std.Dev.	64	27	114	152	130	45	82	131	130	133	806	47	343	164	89	0.00
Rel.Std.Dev.	0.89%	0.37%	1.71%	2.15%	1.88%	0.64%	1.09%	1.65%	1.72%	2.22%	7.64%	0.68%	4.82%	2.41%	1.45%	0.00%
PDM[3]	1.27%	0.49%	-5.96%	-0.60%	-2.29%	-1.44%	6.89%	12.4%	7.03%	-15.5%	49.0%	-1.02%	0.51%	-3.70%	-13.0%	-1.2%

Table A8. Analytical results for 4 acid antimony in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*MS	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P XRF*PPP
1	1.8	1.7	1.74	1.58	1.68	1.74	1.9	1.88	1.62	1.45	1.37	1.6	1.2	NR	1.58	1
2	1.7	1.8	1.73	1.76	1.74	1.75	1.8	1.84	1.55	1.44	1.43	1.6	1.3	NR	1.59	3
3	1.9	1.7	1.70	1.59	1.66	1.65	2.1	1.81	1.56	1.47	1.45	1.6	1.1	NR	1.73	2
4	1.6	1.8	1.75	**1.94**	1.60	1.71	1.9	2.18	1.59	1.59	1.39	1.6	1.2	NR	1.65	2
5	1.7	1.7	1.76	1.58	1.74	1.58	1.8	1.84	1.61	1.57	1.41	1.6	1.0	NR	1.58	2
Mean	1.74	1.75	1.74	1.69	1.68	1.69	1.90	1.91	1.59	1.50	1.41	1.60	**1.16**		1.63	2.00
Median	1.70	1.73	1.74	1.59	1.68	1.71	1.90	1.84	1.59	1.47	1.41	1.60	1.20		1.59	2.00
Std.Dev.	0.11	0.05	0.02	0.16	0.06	0.07	0.12	0.15	0.03	0.07	0.03	0.00	0.11		0.07	0.71
Rel.Std.Dev.	6.55%	2.73%	1.33%	9.43%	3.50%	4.21%	6.45%	7.97%	1.92%	4.78%	2.24%	0.00%	9.83%		4.00%	35.4%
PDM[3]	2.53%	3.01%	2.30%	-0.41%	-0.77%	-0.65%	12.0%	12.6%	-6.54%	-11.4%	-16.9%	-5.72%	-31.6%		-4.18%	17.9%

Table A9. Analytical results for 4 acid selenium in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*MS	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P XRF*PPP
1	5	12	9	8.1	9	NR	<10	6.3	5.8	5.4	7.4	4.4	12.8	NR	6	9
2	5	12	9	8.3	10	NR	<10	5.8	5.8	5.8	7.3	4.3	11.0	NR	7	8
3	5	11	8	7.9	9	NR	<10	5.9	5.7	6.0	6.5	4.2	9.4	NR	7	8
4	5	12	9	7.8	9	NR	<10	6.8	5.7	5.7	7.1	4.5	11.6	NR	7	7
5	5	12	9	8.0	9	NR	<10	6.1	5.6	5.7	6.9	4.1	10.0	NR	6	8
Mean	5.0	11.8	8.8	8.0	9.2			6.2	5.7	5.7	7.0	4.3	11.0		6.6	8.0
Median	5.0	12.0	9.0	8.0	9.0			6.1	5.7	5.7	7.1	4.3	11.0		7.0	8.0
Std.Dev.	0.0	0.4	0.4	0.2	0.4			0.4	0.1	0.2	0.3	0.2	1.3		0.5	0.7
Rel.Std.Dev.	0.00%	3.79%	5.08%	2.40%	4.86%			6.17%	1.66%	4.10%	4.86%	3.68%	12.2%		8.30%	8.84%
PDM[3]	-33.2%	57.6%	17.5%	7.13%	22.9%			-17.6%	-23.7%	-23.4%	-6.1%	-42.6%	46.4%		-11.8%	6.9%

Table A10. Analytical results for 4 acid tin in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*MS	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*MS	Lab E 4A*OES	Lab F 4A*MS	Lab G 4A*MS	Lab H 4A*MS	Lab I 4A*MS	Lab J 4A*MS	Lab K 4A*MS	Lab L 4A*MS	Lab M 4A*MS	Lab N 4A*MS	Lab O 4A*MS	Lab P XRF*PPP
1	13	15.1	15.0	15.0	14.8	15.8	15.2	14.3	14	**15.9**	18.8	15.2	16.3	NR	13.8	13.0
2	14	15.4	15.2	15.2	15.0	15.4	15.6	13.3	14	17.0	19.4	15.0	15.6	NR	14.4	13.0
3	13	14.4	15.0	14.8	14.6	15.9	15.6	13.4	16	17.2	19.0	15.0	14.7	NR	14.2	14.0
4	12	14.8	15.3	14.4	14.0	15.2	16.6	14.4	16	16.9	19.0	15.0	15.9	NR	14.5	14.0
5	14	15.0	15.5	14.6	14.9	14.5	15.6	13.2	16	17.47	18.8	14.9	14.7	NR	13.8	11.0
Mean	**13.2**	14.9	15.2	14.8	14.7	15.4	15.7	13.7	15.2	**16.9**	**19.0**	15.0	15.4		14.1	**13.0**
Median	13.0	15.0	15.2	14.8	14.8	15.4	15.6	13.4	16.0	17.0	19.0	15.0	15.6		14.2	13.0
Std.Dev.	0.8	0.4	0.2	0.3	0.4	0.6	0.5	0.6	1.1	0.6	0.3	0.1	0.7		0.3	1.2
Rel.Std.Dev.	6.34%	2.49%	1.40%	2.14%	2.71%	3.64%	3.32%	4.12%	7.21%	3.49%	1.33%	0.73%	4.66%		2.32%	9.42%
PDM[3]	-11.6%	0.09%	1.83%	-0.85%	-1.78%	2.91%	5.32%	-8.15%	1.83%	13.2%	27.3%	0.63%	3.44%		-5.3%	-12.9%

Table A11. Analytical results for 4 acid zinc in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*MS	Lab D 4A*OES	Lab E 4A*OES	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES	Lab K 4A*OES	Lab L 4A*OES	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES	Lab P 4A*AAS
1	118	152	110	112	114	132	130	122	115	129	104	110	123	117	118	NR
2	118	150	112	112	114	132	127	119	120	129	110	110	118	118	120	NR
3	120	152	107	115	107	127	124	121	125	127	108	111	111	117	117	NR
4	120	150	112	110	110	133	132	122	120	128	115	111	116	120	120	NR
5	122	151	110	112	114	132	123	122	130	130	112	110	110	120	117	NR
Mean	120	**151**	110	112	112	131	127	121	122	129	110	110	116	118	118	
Median	120	151	110	112	114	132	127	122	120	129	110	110	116	118	118	
Std.Dev.	2	1	2	2	3	2	4	1	6	1	4	1	5	1	2	
Rel.Std.Dev.	1.40%	0.66%	1.86%	1.59%	2.86%	1.82%	3.01%	1.08%	4.67%	0.93%	3.60%	0.50%	4.60%	1.20%	1.28%	
PDM[3]	1.09%	27.6%	-6.85%	-5.16%	-5.50%	10.9%	7.52%	2.66%	3.12%	8.63%	-7.24%	-6.68%	-2.29%	-0.26%	0.08%	

Table A12. Analytical results for aqua regia silver in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*MS	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	1.70	1.60	1.86	1.42	1.76	1.66	2.0	1.78	1.75	1.89	1.99	1.70	1.69	2.0	**1.21**	1.5
2	1.65	1.64	1.82	**2.06**	1.74	1.62	2.0	1.72	1.78	1.86	1.89	1.74	1.77	2.0	1.80	1.5
3	1.65	1.64	**1.73**	1.58	1.80	1.62	1.9	1.70	1.81	1.87	1.94	1.79	1.72	2.1	1.76	1.5
4	1.65	1.69	1.80	1.54	1.78	1.59	1.9	1.73	1.76	1.84	1.92	1.78	1.87	2.0	1.78	1.5
5	1.65	**1.96**	1.82	1.54	1.80	1.60	2.0	1.67	1.81	1.84	**1.79**	1.70	1.82	2.0	1.79	1.5
Mean	1.66	1.71	1.81	1.63	1.78	1.62	1.96	1.72	1.78	1.86	1.90	1.74	1.77	2.02	1.67	1.50
Median	1.65	1.64	1.82	1.54	1.78	1.62	2.00	1.72	1.78	1.86	1.92	1.74	1.77	2.00	1.78	1.50
Std.Dev.	0.02	0.15	0.05	0.25	0.03	0.03	0.05	0.04	0.03	0.02	0.08	0.04	0.07	0.04	0.26	0.00
Rel.Std.Dev.	1.35%	8.53%	2.64%	15.28%	1.47%	1.56%	2.79%	2.20%	1.56%	1.05%	3.96%	2.45%	4.12%	2.21%	15.4%	0.00%
PDM[3]	-5.52%	-2.90%	2.79%	-7.34%	1.08%	-7.96%	11.6%	-2.10%	1.42%	5.78%	8.32%	-0.86%	0.97%	15.0%	-5.07%	-14.6%

Table A13. Analytical results for aqua regia bismuth in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*MS	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	4.54	4.33	4.15	4.23	4.91	5.12	5.2	4.82	5.59	4.46	4.90	4.80	5.2	NR	**3.65**	NR
2	4.66	4.35	3.99	4.10	4.79	5.02	5.5	4.80	5.55	**5.09**	4.94	4.86	5.5	NR	5.00	NR
3	4.44	4.42	4.10	4.39	4.90	5.25	5.1	4.61	5.37	4.74	4.90	4.96	5.4	NR	5.07	NR
4	4.44	4.30	3.91	4.22	4.76	5.23	5.2	5.10	5.30	4.38	4.94	4.92	5.5	NR	5.03	NR
5	4.70	**4.74**	3.99	4.32	4.87	5.24	5.2	4.99	5.28	4.32	**3.80**	4.84	5.5	NR	**5.32**	NR
Mean	4.56	4.43	4.03	4.25	4.85	5.17	5.24	4.86	5.42	4.597	4.70	4.88	5.42		4.81	
Median	4.54	4.35	3.99	4.23	4.87	5.23	5.20	4.82	5.37	4.459	4.90	4.86	5.50		5.03	
Std.Dev.	0.12	0.18	0.10	0.11	0.07	0.10	0.15	0.19	0.14	0.32	0.50	0.06	0.13		0.66	
Rel.Std.Dev.	2.66%	4.06%	2.38%	2.58%	1.39%	1.93%	2.89%	3.85%	2.65%	6.92%	10.7%	1.31%	2.41%		13.8%	
PDM[3]	-4.81%	-7.48%	-15.8%	-11.2%	1.25%	8.06%	9.48%	1.62%	13.2%	-3.95%	-1.89%	1.88%	13.2%		0.6%	

Table A14. Analytical results for aqua regia cobalt in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*MS	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	19.0	20.9	19.7	15.3	18.2	19.8	19.6	22.15	19.5	19.57	17.72	16.0	17.6	19	17.2	16
2	18.5	**22.2**	19.5	14.8	18.0	18.5	19.6	22.06	19.0	19.26	17.58	16.4	17.6	20	17.9	17
3	19.0	20.6	19.0	14.9	17.9	19.2	19.2	21.37	20.0	19.13	17.41	16.8	17.8	20	17.5	17
4	18.5	20.8	19.2	14.6	17.9	18.6	19.7	21.23	19.5	19.63	17.84	16.2	17.9	20	18.1	17
5	18.0	20.7	19.2	15.0	18.1	18.6	20.0	20.88	19.5	18.43	17.37	15.8	**18.8**	20	17.6	17
Mean	18.6	21.0	19.3	14.9	18.0	18.9	19.6	21.5	19.5	19.2	17.6	16.2	17.9	19.8	17.7	16.8
Median	18.5	20.8	19.2	14.9	18.0	18.6	19.6	21.4	19.5	19.3	17.6	16.2	17.8	20.0	17.6	17.0
Std.Dev.	0.42	0.66	0.28	0.26	0.13	0.55	0.29	0.55	0.35	0.48	0.20	0.38	0.50	0.45	0.35	0.45
Rel.Std.Dev.	2.25%	3.13%	1.44%	1.73%	0.72%	2.93%	1.46%	2.55%	1.81%	2.50%	1.14%	2.37%	2.78%	2.26%	1.99%	2.66%
PDM[3]	0.47%	13.6%	4.36%	-19.4%	-2.67%	2.30%	5.98%	16.3%	5.33%	3.73%	-5.02%	-12.3%	-3.10%	6.95%	-4.61%	-9.26%

Table A15. Analytical results for aqua regia copper in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*OES	Lab B AR*OES	Lab C AR*MS	Lab D AR*OES	Lab E AR*OES	Lab F AR*OES	Lab G AR*OES	Lab H AR*OES	Lab I AR*MS	Lab J AR*OES	Lab K AR*OES	Lab L AR*OES	Lab M AR*OES	Lab N AR*OES	Lab O AR*OES	Lab P AR*AAS
1	5930	5976	**6020**	5900	5000	5685	5900	6087	5950	5806	5747	5513	5320	5830	5560	5110
2	5980	6110	5760	5610	5080	5635	5900	6229	6020	5847	5704	5608	5430	5824	5420	5130
3	5970	5777	5790	5480	5080	5630	5840	6170	6050	5842	5668	5784	5400	5880	5510	5150
4	5860	5891	5800	5280	5130	5625	5610	6116	5980	5814	5706	5581	5320	5888	5420	5130
5	5830	5865	5840	5650	5090	5709	5630	**5770**	6070	5843	5660	5521	5270	5896	5560	5130
Mean	5914	5924	5842	5584	**5076**	5657	5776	6074	6014	5831	5697	5601	5348	5864	5494	**5130**
Median	5930	5891	5800	5610	5080	5635	5840	6116	6020	5842	5704	5581	5320	5880	5510	5130
Std.Dev.	67	126	104	228	47	38	145	178	49	19	35	110	65	34	71	14
Rel.Std.Dev.	1.13%	2.13%	1.77%	4.08%	0.93%	0.67%	2.50%	2.94%	0.82%	0.33%	0.61%	1.96%	1.22%	0.58%	1.28%	0.28%
PDM[3]	2.66%	2.83%	1.41%	-3.07%	-11.9%	-1.81%	0.26%	5.45%	4.40%	1.21%	-1.11%	-2.77%	-7.17%	1.78%	-4.63%	-10.9%

Table A16. Analytical results for aqua regia lead in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*OES	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	17	17	16.8	15.2	16.0	16.3	19.0	20.3	19.0	16.2	9.9	20.3	18.6	19.0	**12.7**	18
2	17	17	16.2	14.8	16.4	15.6	19.0	20.0	20.0	16.5	9.2	20.9	17.6	19.0	17.4	18
3	17	17	16.0	15.0	16.2	15.9	18.0	21.2	18.5	16.7	7.9	21.7	17.7	20.0	18.7	18
4	17	17	16.1	14.6	16.2	16.4	19.0	20.5	19.5	15.9	9.2	21.9	18.2	21.0	21.4	18
5	17	17	16.4	14.7	16.2	16.6	19.0	19.5	18.5	15.8	9.9	21.1	17.6	20.0	17.8	18
Mean	17.0	17.0	16.3	14.9	16.2	16.2	18.8	20.3	19.1	16.2	**9.2**	21.2	17.9	19.8	17.6	18
Median	17.0	17.0	16.2	14.8	16.2	16.3	19.0	20.3	19.0	16.2	9.2	21.1	17.7	20.0	17.8	18
Std.Dev.	0.0	0.0	0.3	0.2	0.1	0.4	0.4	0.6	0.7	0.4	0.8	0.6	0.4	0.8	3.2	0.0
Rel.Std.Dev.	0.00%	0.00%	1.94%	1.62%	0.87%	2.46%	2.38%	3.11%	3.41%	2.47%	8.92%	3.03%	2.48%	4.23%	17.9%	0.00%
PDM[3]	-4.75%	-4.75%	-8.67%	-16.7%	-9.23%	-9.41%	5.34%	13.8%	7.02%	-9.07%	-48.5%	18.7%	0.52%	10.9%	-1.39%	0.85%

Table A17. Analytical results for aqua regia sulphur in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*OES	Lab C AR*MS	Lab D AR*OES	Lab E AR*OES	Lab F AR*MS	Lab G AR*OES	Lab H AR*MS	Lab I AR*MS	Lab J AR*OES	Lab K AR*MS	Lab L AR*OES	Lab M AR*OES	Lab N AR*MS	Lab O AR*OES	Lab P -
1	7000	6908	7000	7300	6900	6700	7310	6376	7500	5841	7910	**5720**	6180	7100	6600	NR
2	7150	7062	6800	7300	7300	6600	7290	6501	7300	5737	**7976**	5900	6090	7100	6900	NR
3	7000	6637	6800	7100	**8500**	6800	7260	6510	7400	5900	7897	6060	6140	7000	6800	NR
4	7050	6876	7000	7000	7600	6900	6990	6391	7300	5895	7917	6010	6230	7100	6900	NR
5	6950	6777	7000	7400	7300	6700	6960	**5921**	7100	5833	7859	6050	6210	7100	6700	NR
Mean	7030	6852	6920	7220	7520	6740	7162	6340	7320	5841	7912	5948	6170	7080	6780	
Median	7000	6876	7000	7300	7300	6700	7260	6391	7300	5841	7910	6010	6180	7100	6800	
Std.Dev.	76	158	110	164	602	114	172	242	148	66	42	142	56	45	130	
Rel.Std.Dev.	1.08%	2.30%	1.58%	2.28%	8.00%	1.69%	2.40%	3.82%	2.03%	1.12%	0.53%	2.39%	0.91%	0.63%	1.92%	
PDM[3]	2.64%	0.04%	1.04%	5.42%	9.80%	-1.59%	4.57%	-7.44%	6.88%	-14.7%	15.5%	-13.2%	-9.91%	3.37%	-1.01%	

Table A18. Analytical results for aqua regia antimony in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*MS	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	1.16	1.08	0.90	1.33	0.72	1.01	1.3	1.35	1.42	1.099	1.45	0.6	0.9	NR	0.58	NR
2	1.10	1.10	0.94	1.26	0.71	1.00	1.3	1.33	1.46	1.141	1.53	0.6	0.8	NR	0.71	NR
3	1.14	1.05	0.88	1.27	0.72	0.98	1.2	1.36	1.45	1.181	1.49	0.6	0.8	NR	0.66	NR
4	1.18	1.05	0.91	1.23	0.72	0.96	1.3	1.22	1.39	1.200	1.50	0.6	0.8	NR	0.66	NR
5	1.10	1.05	0.92	1.24	0.70	0.96	1.3	1.23	1.40	1.150	1.41	0.6	0.9	NR	0.63	NR
Mean	1.14	1.07	0.91	1.27	0.71	0.98	1.28	1.30	1.42	1.154	1.48	0.60	0.84		0.65	
Median	1.14	1.05	0.91	1.26	0.72	0.98	1.30	1.33	1.42	1.150	1.49	0.60	0.80		0.66	
Std.Dev.	0.04	0.02	0.02	0.04	0.01	0.02	0.04	0.07	0.03	0.04	0.05	0.00	0.05		0.05	
Rel.Std.Dev.	3.15%	2.16%	2.46%	3.09%	1.25%	2.32%	3.49%	5.41%	2.14%	3.36%	3.16%	0.00%	6.52%		7.35%	
PDM[3]	7.5%	0.9%	-13.9%	19.8%	-32.4%	-7.1%	21.1%	22.7%	34.8%	9.2%	39.8%	-43.2%	-20.5%		-38.7%	

Table A19. Analytical results for aqua regia selenium in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*MS	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	5	8	**8.6**	7.2	7.9	6.7	6	7.77	6.71	6.537	6.09	5.6	9.7	NR	5.00	NR
2	5	8	8.1	7.0	7.7	6.7	6	8.20	6.76	6.198	5.97	5.9	9.0	NR	7.00	NR
3	5	8	7.9	7.0	7.9	7.0	6	8.03	6.54	6.712	5.96	6.2	8.7	NR	7.00	NR
4	5	7	8.0	6.8	7.9	7.0	6	7.48	6.58	6.362	6.04	5.9	9.1	NR	8.00	NR
5	5	8	8.1	6.9	**7.5**	7.1	6	7.82	6.61	6.577	**6.75**	5.7	8.3	NR	7.00	NR
Mean	5.00	7.80	8.14	6.98	7.78	6.90	6.00	7.86	6.64	6.477	6.16	5.86	8.96		6.80	
Median	5.00	8.00	8.10	7.00	7.90	7.00	6.00	7.82	6.61	6.537	6.04	5.90	9.00		7.00	
Std.Dev.	0.00	0.45	0.27	0.15	0.18	0.19	0.00	0.27	0.09	0.20	0.33	0.23	0.52		1.10	
Rel.Std.Dev.	0.00%	5.73%	3.32%	2.12%	2.30%	2.71%	0.00%	3.46%	1.38%	3.09%	5.38%	3.93%	5.78%		16.11%	
PDM[3]	-28.0%	12.4%	17.3%	0.57%	12.1%	-0.6%	-13.6%	13.3%	-4.33%	-6.68%	-11.2%	-15.6%	29.1%		-2.02%	

Table A20. Analytical results for aqua regia tin in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*MS	Lab B AR*MS	Lab C AR*MS	Lab D AR*MS	Lab E AR*OES	Lab F AR*MS	Lab G AR*MS	Lab H AR*MS	Lab I AR*MS	Lab J AR*MS	Lab K AR*MS	Lab L AR*MS	Lab M AR*MS	Lab N AR*MS	Lab O AR*MS	Lab P AR*AAS
1	8.6	9.73	**9.3**	9.5	8.8	9.8	9	8.76	9.6	9.21	9.98	8.3	8.9	NR	**5.90**	NR
2	8.4	9.92	8.8	9.4	8.8	9.8	9	8.08	9.8	9.37	9.96	8.5	9.1	NR	8.30	NR
3	8.2	9.39	8.7	9.6	8.9	9.9	9	8.44	9.6	9.28	10.2	8.8	8.7	NR	8.20	NR
4	8.4	9.31	8.9	9.3	8.9	9.9	9	7.88	9.8	9.25	10.1	8.5	8.9	NR	8.20	NR
5	8.2	9.45	9.0	9.5	9.0	**10.3**	9	8.47	9.4	9.31	9.69	8.5	8.9	NR	8.20	NR
Mean	8.36	9.56	8.94	9.46	8.88	9.94	9.00	8.33	9.64	9.286	9.99	8.52	8.90		7.76	
Median	8.40	9.45	8.90	9.50	8.90	9.90	9.00	8.44	9.60	9.284	9.98	8.50	8.90		8.20	
Std.Dev.	0.17	0.26	0.23	0.11	0.08	0.21	0.00	0.35	0.17	0.06	0.19	0.18	0.14		1.04	
Rel.Std.Dev.	2.00%	2.68%	2.58%	1.21%	0.94%	2.09%	0.00%	4.19%	1.74%	0.66%	1.92%	2.10%	1.59%		13.4%	
PDM[3]	-7.73%	5.51%	-1.33%	4.41%	-1.99%	9.71%	-0.67%	-8.10%	6.40%	2.49%	10.3%	-5.97%	-1.77%		-14.4%	

Table A21. Analytical results for aqua regia zinc in OREAS 93 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A AR*OES	Lab B AR*OES	Lab C AR*MS	Lab D AR*OES	Lab E AR*OES	Lab F AR*OES	Lab G AR*OES	Lab H AR*OES	Lab I AR*OES	Lab J AR*OES	Lab K AR*OES	Lab L AR*OES	Lab M AR*OES	Lab N AR*OES	Lab O AR*OES	Lab P AR*AAS
1	105	112	**104**	105	90	111	121	120	120	117	122	101	107	113	113	102
2	105	114	99	103	93	108	119	**123**	120	117	122	103	103	116	109	101
3	105	108	100	103	92	109	121	120	125	117	121	106	103	114	109	100
4	107	112	101	98	94	110	113	120	120	117	122	108	104	117	109	101
5	104	107	100	105	**104**	110	112	**114**	115	116	121	107	103	116	106	100
Mean	105	111	101	103	95	110	117	119	120	117	122	105	104	115	109	101
Median	105	112	100	103	93	110	119	120	120	117	122	106	103	116	109	101
Std.Dev.	1	3	2	3	5	1	4	4	4	1	1	3	2	2	2	1
Rel.Std.Dev.	1.04%	2.68%	1.91%	2.79%	5.77%	1.04%	3.74%	2.95%	2.95%	0.48%	0.56%	2.78%	1.67%	1.43%	2.28%	0.83%
PDM[3]	-3.82%	1.12%	-7.84%	-6.01%	-13.5%	0.20%	7.15%	9.05%	9.71%	6.85%	11.1%	-4.00%	-4.92%	5.32%	-0.16%	-7.84%