

**CERTIFICATE OF ANALYSIS FOR  
 NICKEL SULPHIDE ORE REFERENCE  
 MATERIAL OREAS 72a**

**SUMMARY STATISTICS**

Constituent	Recommended value	95% Confidence Interval		Tolerance limits 1- $\alpha$ =0.99, $\rho$ =0.95	
		Low	High	Low	High
<b><u>Lead fire assay</u></b>					
Gold, Au (ppb)	6	5	7	4	8
Palladium, Pd (ppb)	41	39	44	40	43
Platinum, Pt (ppb)	36	34	38	34	38
<b><u>4 Acid digest</u></b>					
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.7	13.3	14.1	13.5	14.0
Arsenic, As (ppm)	14.7	10.5	18.9	12.4	17.0
Chromium, Cr (ppm)	228	216	241	217	240
Cobalt, Co (ppm)	157	151	164	151	163
Copper, Cu (ppm)	316	309	323	304	327
Iron, Fe (wt.%)	9.63	9.55	9.70	9.46	9.79
Magnesium oxide, MgO (wt.%)	6.72	6.56	6.89	6.63	6.82
Nickel, Ni (wt.%)	0.693	0.683	0.704	0.670	0.716
Sulphur, S (wt.%)	1.74	1.65	1.84	1.66	1.82
<b><u>Fusion</u></b>					
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.6	13.3	13.9	13.5	13.7
Arsenic, As (ppm)	13.6	9.4	17.8	11.3	15.8
Chromium, Cr (ppm)	273	251	295	255	291
Cobalt, Co (ppm)	176	162	190	163	190
Copper, Cu (ppm)	333	330	336	294	372
Iron, Fe (wt.%)	9.54	9.45	9.62	9.45	9.63
Magnesium oxide, MgO (wt.%)	6.66	6.54	6.78	6.60	6.72
Nickel, Ni (wt.%)	0.692	0.675	0.708	0.660	0.723
Silicon dioxide, SiO <sub>2</sub> (wt.%)	48.9	47.9	49.8	48.3	49.4
Sulphur, S (wt.%)	1.67	1.57	1.76	1.58	1.76
<b><u>IR Combustion</u></b>					
Sulphur, S (wt.%)	1.66	1.61	1.70	1.59	1.72

\*IND = Indeterminate; values may appear asymmetric due to rounding

Prepared by:  
*Ore Research & Exploration Pty Ltd*  
 November 2006

REPORT 05/562A

## 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 72a is a low grade nickel sulphide ore prepared from a blend of high grade nickel ore from the Cosmos nickel mine, Leinster region of Western Australia, and barren alkali olivine basalt from Epping, Victoria, Australia. It is one of a suite of six nickel sulphide CRMs (OREAS 72a to OREAS 77a). The Cosmos nickel mine is operated by Jubilee Mines NL and is located in the Kathleen Valley area approximately 30km north of Leinster in Western Australia. It lies within the Agnew-Wiluna portion of the Norseman-Wiluna greenstone belt. This portion of the belt is strongly attenuated and characterised by large scale faults, complex folding and typically steep dips. It is a typical Kambalda-style, komatiite-associated, massive sulphide deposit representing an essentially in-situ accumulation of primary magmatic Ni-Fe sulphides with minor by-products including Cu, Co and platinum group elements (PGE's). The Cosmos deposit comprises one discrete zone of massive and semi-massive sulphides extending over a strike length of 240m. Mineralisation is strata bound between the overlying ultramafic unit and the underlying dolerite and felsic volcanic rocks. Continuity of grade and width of mineralisation are strong both along strike and down dip.

## COMMUNITION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 72a was prepared in the following manner:

- a) *drying to constant mass at 65°C (Ni ore) and 105°C (basalt);*
- b) *crushing;*
- c) *milling of the high grade Cosmos ore to 100% minus 25 microns;*
- d) *milling of the barren basalt to 98% minus 75 microns;*
- e) *combining in appropriate proportions to achieve the desired grade;*
- f) *homogenisation;*
- g) *packaging in 10g units sealed under nitrogen, in laminated foil pouches.*

## ANALYTICAL PROGRAM FOR OREAS 72a

Fifteen commercial laboratories participated in the analytical program to certify Au, Pt, Pd, Al<sub>2</sub>O<sub>3</sub>, As, Cr, Co, Cu, Fe, MgO, Ni, SiO<sub>2</sub> and S by fire assay, fusion and four acid 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<sup>3</sup>) are presented in an appendix (Tables A2 – A24). 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.

Table 1. Approximate major and trace element composition of nickel sulphide reference material OREAS 72a; wt.% - weight percent; ppm - parts per million.

Constituent	wt.%	Constituent	ppm	Constituent	ppm	Constituent	ppm
TiO <sub>2</sub>	1.70	Ag	<1	Ho	0.77	Sm	4.7
MnO	0.13	Ba	209	In	0.07	Sn	2
CaO	8.28	Be	1.1	La	16	Sr	338
K <sub>2</sub> O	0.72	Bi	<1	Li	7.5	Ta	1
P <sub>2</sub> O <sub>5</sub>	0.3	Cd	<1	Lu	0.22	Tb	0.7
Na <sub>2</sub> O	2.91	Ce	31	Mo	1.5	Te	<1
LOI	1.70	Cs	0.75	Nb	19	Th	2.3
C	0.10	Dy	4.1	Nd	18	U	0.7
		Er	2.1	Pb	2	W	0.75
		Eu	1.5	Pr	3.9	Y	18
		Ga	17	Rb	20	Yb	1.6
		Gd	4.7	Sb	<1	Zn	83
		Hf	3	Sc	18	Zr	108

The intent of the certification program was to characterise the analytes by a) fire assay ICP-MS, b) total acid digest methods (mainly HF-HCl-HNO<sub>3</sub>-HClO<sub>4</sub>) with ICP-OES, ICP-MS and AAS finish, and b) sodium peroxide or lithium borate fusion with ICP-OES, ICP-MS, AAS or XRF finish. S was also analysed by Leco IR combustion furnace. 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 110g 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 72a

### 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

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

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

where

- $x_{ij}$  is the  $j$ th 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  $i$ ;
- $\bar{x}$  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 ( $p-1$ ).

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

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

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

The distributions 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

$$S = 1.483 \text{ median}_{j=1, \dots, n} / x_j - \text{median}_{i=1, \dots, n} (x_i) /$$

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

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 72a

Constituent	Recommended value	95% Confidence Interval	
		Low	High
<b>Lead fire assay</b>			
Gold, Au (ppb)	6	5	7
Palladium, Pd (ppb)	41	39	44
Platinum, Pt (ppb)	36	34	38
<b>4 Acid digest</b>			
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.7	13.3	14.1
Arsenic, As (ppm)	14.7	10.5	18.9
Chromium, Cr (ppm)	228	216	241
Cobalt, Co (ppm)	157	151	164
Copper, Cu (ppm)	316	309	323
Iron, Fe (wt.%)	9.63	9.55	9.70
Magnesium oxide, MgO (wt.%)	6.72	6.56	6.89
Nickel, Ni (wt.%)	0.693	0.683	0.704
Sulphur, S (wt.%)	1.74	1.65	1.84
<b>Fusion</b>			
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.6	13.3	13.9
Arsenic, As (ppm)	13.6	9.4	17.8
Chromium, Cr (ppm)	273	251	295
Cobalt, Co (ppm)	176	162	190
Copper, Cu (ppm)	333	330	336
Iron, Fe (wt.%)	9.54	9.45	9.62
Magnesium oxide, MgO (wt.%)	6.66	6.54	6.78
Nickel, Ni (wt.%)	0.692	0.675	0.708
Silicon dioxide, SiO <sub>2</sub> (wt.%)	48.9	47.9	49.8
Sulphur, S (wt.%)	1.67	1.57	1.76
<b>IR Combustion</b>			
Sulphur, S (wt.%)	1.66	1.61	1.70

\*IND - indeterminate; intervals 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  $j$ th raw result reported by laboratory  $i$ ;
- $x'_{ij}$  is the  $j$ th 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

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

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 ( $m, \alpha$  unknown);
- $s''_g$  is the corrected grand standard deviation

The meaning of these tolerance limits may be illustrated for nickel by 4 acid digest, where 99% of the time at least 95% of subsamples will have concentrations lying between 0.67 and 0.72 percent (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 (ISO 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

- $1 - (\frac{s_i}{s'_g})$  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

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

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

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  $1 - s_l / 2s'_g < 0$ ).

Table 3. Recommended values and tolerance limits for OREAS 72a

Constituent	Recommended value	Tolerance limits 1- $\alpha$ =0.99, $\rho$ =0.95	
		Low	High
<b><u>Lead fire assay</u></b>			
Gold, Au (ppb)	6	4	8
Palladium, Pd (ppb)	41	40	43
Platinum, Pt (ppb)	36	34	38
<b><u>4 Acid digest</u></b>			
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.7	13.5	14.0
Arsenic, As (ppm)	14.7	12.4	17.0
Chromium, Cr (ppm)	228	217	240
Cobalt, Co (ppm)	157	151	163
Copper, Cu (ppm)	316	304	327
Iron, Fe (wt.%)	9.63	9.46	9.79
Magnesium oxide, MgO (wt.%)	6.72	6.63	6.82
Nickel, Ni (wt.%)	0.693	0.670	0.716
Sulphur, S (wt.%)	1.74	1.66	1.82
<b><u>Fusion</u></b>			
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.6	13.5	13.7
Arsenic, As (ppm)	13.6	11.3	15.8
Chromium, Cr (ppm)	273	255	291
Cobalt, Co (ppm)	176	163	190
Copper, Cu (ppm)	333	294	372
Iron, Fe (wt.%)	9.54	9.45	9.63
Magnesium oxide, MgO (wt.%)	6.66	6.60	6.72
Nickel, Ni (wt.%)	0.692	0.660	0.723
Silicon dioxide, SiO <sub>2</sub> (wt.%)	48.9	48.3	49.4
Sulphur, S (wt.%)	1.67	1.58	1.76
<b><u>IR Combustion</u></b>			
Sulphur, S (wt.%)	1.66	1.59	1.72

Note - intervals may appear asymmetric due to rounding

## 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 (SDs) of the accepted pool of certification data and are presented in Table 4. As a guide these intervals may be regarded as informational (1SD), warning or rejection for multiple outliers (2SD), or rejection for individual outliers (3SD) in QC monitoring although their precise application should be at the discretion of the QC manager concerned.

Table 4. Proposed performance gates for OREAS 72a

Constituent	Recommended value	Performance Gates							
		1SD		2SD		3SD		5%	
		Low	High	Low	High	Low	High	Low	High
<b>Lead fire assay</b>									
Gold, Au (ppb)	6	4	8	2	10	0.24	12	6	6
Palladium, Pd (ppb)	41	38	45	34	49	30	52	39	43
Platinum, Pt (ppb)	36	33	39	30	42	27	45	34	38
<b>4 Acid digest</b>									
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.7	13.1	14.3	12.5	14.9	11.9	15.5	13.0	14.4
Arsenic, As (ppm)	14.7	9.0	20.3	3.4	25.9	IND	IND	13.9	15.4
Chromium, Cr (ppm)	228	211	246	193	263	176	281	217	240
Cobalt, Co (ppm)	157	145	169	133	181	122	193	149	165
Copper, Cu (ppm)	316	300	331	285	346	269	362	300	331
Iron, Fe (wt.%)	9.63	9.41	9.84	9.20	10.0	8.99	10.3	9.15	10.1
Magnesium oxide, MgO (wt.%)	6.72	6.45	7.00	6.17	7.27	5.90	7.55	6.39	7.06
Nickel, Ni (wt.%)	0.693	0.668	0.718	0.643	0.743	0.618	0.769	0.659	0.728
Sulphur, S (wt.%)	1.74	1.61	1.88	1.47	2.02	1.33	2.16	1.66	1.83
<b>Fusion</b>									
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub> (wt.%)	13.6	13.1	14.1	12.5	14.6	12.0	15.2	12.9	14.3
Arsenic, As (ppm)	13.6	IND	IND	IND	IND	IND	IND	12.9	14.3
Chromium, Cr (ppm)	273	234	312	195	351	155	390	259	286
Cobalt, Co (ppm)	176	154	199	131	221	109	243	167	185
Copper, Cu (ppm)	333	315	352	296	370	278	388	317	350
Iron, Fe (wt.%)	9.54	9.37	9.70	9.21	9.9	9.05	10.0	9.06	10.0
Magnesium oxide, MgO (wt.%)	6.66	6.46	6.87	6.25	7.08	6.04	7.29	6.33	7.00
Nickel, Ni (wt.%)	0.692	0.657	0.726	0.622	0.761	0.587	0.796	0.657	0.726
Silicon dioxide, SiO <sub>2</sub> (wt.%)	48.9	47.3	50.4	45.7	52.0	44.2	53.6	46.4	51.3
Sulphur, S (wt.%)	1.67	1.58	1.76	1.50	1.84	1.41	1.93	1.59	1.75
<b>IR Combustion</b>									
Sulphur, S (wt.%)	1.66	1.57	1.75	1.47	1.84	1.38	1.93	1.57	1.74

\*IND - indeterminate; intervals may appear asymmetric due to rounding

For the second method a  $\pm 5\%$  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.



## 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  
SGS, Welshpool, WA, Australia  
SGS Geosol, Brazil, Sth America  
Ultra Trace Laboratories, Canning Vale, WA, Australia

## PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

The nickel sulphide ore reference material OREAS 72a has been prepared and certified and is supplied by:

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

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

## INTENDED USE

OREAS 72a is a reference material intended for the following:

- i) for the calibration of instruments used in the determination of the concentration of Ni, Au, Pt, Pd, Fe, Cu, Cr, Co, MgO, Al<sub>2</sub>O<sub>3</sub>, As, SiO<sub>2</sub> and S;
- ii) for the verification of analytical methods for Ni, Au, Pt, Pd, Fe, Cu, Cr, Co, MgO, Al<sub>2</sub>O<sub>3</sub>, As, SiO<sub>2</sub> and S
- iii) for the preparation of secondary reference materials of similar composition;

## STABILITY AND STORAGE INSTRUCTIONS

OREAS 72a has been prepared from high grade nickel sulphide ore and barren basalt. Because of its low sulphide content and packaging in robust foil laminate 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 72a refer to the concentration levels of Ni, Au, Pt, Pd, Fe, Cu, Cr, Co, MgO, Al<sub>2</sub>O<sub>3</sub>, As, SiO<sub>2</sub> and S after removal of hygroscopic moisture (~0.55 wt.%) by drying in air to constant mass at 65<sup>0</sup> C. If the reference material is not dried prior to analysis, the recommended values 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**

November 22, 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 72a**

Table A1. Explanation of abbreviations used in Tables A2 – A24.

Abbreviation	Explanation
Std. Dev	one sigma standard deviation
Rel.Std.Dev.	one sigma relative standard deviation
PDM <sup>3</sup>	percent deviation of lab mean from corrected mean of means
4A	four acid (HF-HNO <sub>3</sub> –HClO <sub>4</sub> -HCl) digestion
AAS	atomic absorption spectrometry
OES	inductively coupled plasma optical emission spectrometry
MS	inductively coupled plasma mass spectrometry
PPP	inductively coupled plasma optical emission spectrometry
XRF	x-ray fluorescence
BF	lithium metaborate fusion
PF	sodium peroxide fusion
LECO	Leco infrared furnace
HG	Hydride generation

Table A2. Analytical results for gold in OREAS 72a (abbreviations as in Table A1; values in ppb).

Replicate No.	Lab A FA*MS	Lab B FA*MS	Lab C FA*MS	Lab D -	Lab E FA*MS	Lab F FA*MS	Lab G FA*MS	Lab H FA*MS	Lab I -	Lab J FA*MS	Lab K FA*MS	Lab L FA*OES	Lab M FA*MS	Lab N FA*MS	Lab O FA*MS
1	6	6	5	NR	6	4	9	8	NR	46	3	5	9	4	6
2	6	7	5	NR	6	4	8	7	NR	36	6	7	10	4	10
3	7	8	5	NR	8	4	9	7	NR	32	5	5	8	5	8
4	6	6	5	NR	6	3	7	5	NR	37	23	5	8	3	8
5	6	5	5	NR	9	2	9	7	NR	24	4	5	9	3	6
Mean	6	6	5		7	3	8	7		35	8	5	9	4	8
Median	6	6	5		6	4	9	7		36	5	5	9	4	8
Std.Dev.	0	1	0		1	1	1	1		8	8	1	1	1	2
Rel.Std.Dev.	7.21%	17.8%	0.00%		20.2%	26.3%	10.6%	16.1%		22.9%	102%	21.5%	9.51%	22.0%	22.0%
PDM <sup>3</sup>	1.71%	4.99%	-18.0%		14.8%	-44.2%	37.8%	11.6%		474%	34.5%	-13.1%	44.4%	-37.7%	24.7%

Table A3. Analytical results for palladium in OREAS 72a (abbreviations as in Table A1; values in ppb).

Replicate No.	Lab A FA*MS	Lab B FA*MS	Lab C FA*MS	Lab D -	Lab E FA*MS	Lab F FA*MS	Lab G FA*MS	Lab H FA*MS	Lab I -	Lab J FA*MS	Lab K FA*MS	Lab L FA*OES	Lab M FA*MS	Lab N FA*MS	Lab O FA*MS
1	39	<b>36</b>	43	NR	42	36.7	<b>40.7</b>	37	NR	46	<b>10</b>	36.7	41	42	48
2	40	42	44	NR	41	36.5	41.6	37	NR	46	22	36.2	44	42	47
3	40	41	43	NR	<b>45</b>	36.6	41.8	38	NR	48	25	36.2	41	40	46
4	41	40	44	NR	40	36.2	42.0	37	NR	50	23	36.3	45	41	48
5	40	41	41	NR	42	<b>38.5</b>	<b>43.2</b>	37	NR	43	<b>10</b>	<b>41.4</b>	46	41	48
Mean	40	40	43		42	36.9	41.9	37.2		46.6	<b>18.0</b>	37.4	43.4	41.2	47.4
Median	40	41	43		42	36.6	41.8	37.0		46.0	22.0	36.3	44.0	41.0	48.0
Std.Dev.	0.71	2.35	1.22		1.87	0.91	0.90	0.45		2.6	7.38	2.27	2.30	0.84	0.89
Rel.Std.Dev.	1.77%	5.86%	2.85%		4.45%	2.48%	2.15%	1.20%		5.60%	41.0%	6.07%	5.30%	2.03%	1.89%
PDM <sup>3</sup>	-3.17%	-3.17%	4.10%		1.67%	-10.7%	1.34%	-9.95%		12.8%	-56.4%	-9.56%	5.06%	-0.26%	14.7%

Table A4. Analytical results for platinum in OREAS 72a (abbreviations as in Table A1; values in ppb).

Replicate No.	Lab A FA*MS	Lab B FA*MS	Lab C FA*MS	Lab D -	Lab E FA*MS	Lab F FA*MS	Lab G FA*MS	Lab H FA*MS	Lab I -	Lab J FA*MS	Lab K FA*MS	Lab L FA*OES	Lab M FA*MS	Lab N FA*MS	Lab O FA*MS
1	36	38	36.1	NR	36.2	30.9	32.2	33.0	NR	<b>&lt; 10</b>	<b>8.00</b>	34.9	37.0	41.0	37.0
2	36	39	37.0	NR	37.6	32.7	32.2	33.0	NR	31.0	36.0	34.4	40.0	39.0	37.0
3	37	37	35.7	NR	<b>40.9</b>	31.8	32.9	35.0	NR	17.0	35.0	34.3	37.0	41.0	35.0
4	36	37	36.6	NR	34.1	31.3	33.2	33.0	NR	23.0	35.0	34.2	40.0	43.0	37.0
5	35	<b>33</b>	<b>34.2</b>	NR	37.0	32.4	32.2	34.0	NR	14.0	<b>9.00</b>	34.3	42.0	43.0	37.0
Mean	36.0	36.8	35.9		37.2	31.8	32.5	33.6		<b>21.3</b>	24.6	34.4	39.2	41.4	36.6
Median	36.0	37	36.1		37	31.8	32.2	33.0		20.0	35.0	34.3	40.0	41.0	37.0
Std.Dev.	0.71	2.28	1.08		2.47	0.75	0.48	0.89		7.5	14.7	0.28	2.17	1.67	0.89
Rel.Std.Dev.	1.96%	6.20%	3.01%		6.66%	2.35%	1.47%	2.66%		35.3%	59.8%	0.81%	5.53%	4.04%	2.44%
PDM <sup>3</sup>	0.18%	2.40%	-0.05%		3.40%	-11.5%	-9.45%	-6.50%		-40.9%	-31.5%	-4.22%	9.08%	15.2%	1.85%

Table A5. Analytical results for 4 acid aluminium oxide in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J -	Lab K -	Lab L -	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	13.5	13.5	13.0	13.8	13.9	12.4	13.6	6.22	14.1	NR	NR	NR	13.9	14.5	14.0
2	14.0	13.5	13.6	13.7	14.6	12.4	13.7	6.22	14.3	NR	NR	NR	13.9	14.5	14.0
3	13.9	13.5	13.5	13.5	<b>12.8</b>	12.5	13.6	6.33	14.2	NR	NR	NR	14.1	14.6	14.2
4	13.6	13.2	12.8	13.4	14.3	12.2	<b>14.2</b>	<b>6.08</b>	14.1	NR	NR	NR	13.7	14.6	14.1
5	13.6	13.4	12.8	14.0	14.1	12.6	13.6	6.19	<b>14.6</b>	NR	NR	NR	<b>13.0</b>	14.4	14.1
Mean	13.7	13.4	13.1	13.7	13.9	12.4	13.7	<b>6.21</b>	14.3				13.7	14.5	14.1
Median	13.6	13.5	13.0	13.7	14.1	12.4	13.6	6.22	14.2				13.9	14.5	14.1
Std.Dev.	0.22	0.13	0.40	0.24	0.67	0.16	0.26	0.09	0.21				0.41	0.07	0.08
Rel.Std.Dev.	1.58%	0.94%	3.04%	1.75%	4.79%	1.29%	1.90%	1.44%	1.45%				3.01%	0.51%	0.59%
PDM <sup>3</sup>	0.03%	-2.19%	-4.22%	-0.26%	1.42%	-9.46%	0.18%	-54.7%	3.97%				0.18%	5.69%	2.80%

Table A6. Analytical results for 4 acid arsenic in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J HG*AAS	Lab K -	Lab L -	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	20	8	<50	<10	<b>&lt;10</b>	<200	25	<b>11.2</b>	18	12	NR	NR	<50	18	12
2	20	<b>&lt;5</b>	<50	<10	10	<200	19	12.2	17	14	NR	NR	<50	18	10
3	25	6	<50	<b>10</b>	10	<200	18	12.4	18	<b>17</b>	NR	NR	<50	18	11
4	25	8	<50	<10	10	<200	15	12.5	20	13	NR	NR	<50	20	9
5	30	6	<50	<10	<b>&lt;10</b>	<200	15	12.1	19	11	NR	NR	<50	20	11
Mean	24.0	7.0	<50	<10	10.0	<200	18.4	12.1	18.4	13.4			<50	18.8	10.6
Median	25.0	7.0	<50	<10	10.0	<200	18.0	12.2	18.0	13.0			<50	18.0	11.0
Std.Dev.	4.2	1.2	-			-	4.1	0.5	1.1	2.3			-	1.1	1.1
Rel.Std.Dev.	17.4%	16.5%	-			-	22.3%	4.28%	6.20%	17.2%			-	5.83%	10.8%
PDM <sup>3</sup>	63.6%	-52.3%	-			-	25.5%	-17.6%	25.5%	-8.64%			-	28.2%	-27.7%

Table A7. Analytical results for 4 acid chromium in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H -	Lab I 4A*OES	Lab J -	Lab K -	Lab L -	Lab M 4A*OES	Lab N 4A*OES	Lab O -
1	200	251	240	180	240	200	230	NR	235	NR	NR	NR	245	286	NR
2	200	251	220	180	250	200	230	NR	240	NR	NR	NR	240	290	NR
3	220	252	210	180	220	200	250	NR	240	NR	NR	NR	240	290	NR
4	230	236	230	170	250	200	240	NR	235	NR	NR	NR	235	<b>269</b>	NR
5	220	234	190	170	220	210	230	NR	235	NR	NR	NR	240	296	NR
Mean	214	244.8	218	<b>176</b>	236	202	236		237				240	<b>286</b>	
Median	220	251	220	180	240	200	230		235				240	290	
Std.Dev.	13	9	19	5	15	4	9		3				4	10	
Rel.Std.Dev.	6.27%	3.67%	8.82%	3.11%	6.43%	2.21%	3.79%		1.16%				1.47%	3.58%	
PDM <sup>3</sup>	-6.34%	7.15%	-4.58%	-23.0%	3.29%	-11.6%	3.29%		3.73%				5.04%	25.3%	

Table A8. Analytical results for 4 acid cobalt in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*AAS	Lab K -	Lab L AR*OES	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	165	146	150	140	140	150	168	158	180	154	NR	146	160	173	160
2	160	144	170	140	150	150	166	149	175	155	NR	141	160	171	160
3	155	148	160	150	130	150	173	151	185	155	NR	148	160	173	160
4	160	148	150	150	150	150	165	<b>169</b>	180	155	NR	146	160	172	170
5	155	148	150	140	150	160	162	151	185	158	NR	142	180	<b>180</b>	160
Mean	159	147	156	144	144	152	167	156	181	155.4		145	164	174	162
Median	160	148	150	140	150	150	166	151	180	155		146	160	173	160
Std.Dev.	4	2	9	5	9	4	4	8	4	2		3	9	4	4
Rel.Std.Dev.	2.63%	1.22%	5.73%	3.80%	6.21%	2.94%	2.45%	5.29%	2.31%	0.98%		2.05%	5.45%	2.05%	2.76%
PDM <sup>3</sup>	1.18%	-6.59%	-0.73%	-8.37%	-8.37%	-3.28%	6.14%	-0.99%	15.2%	-1.11%		-7.99%	4.36%	10.6%	3.09%

Table A9. Analytical results for 4 acid copper in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*AAS	Lab K -	Lab L AR*OES	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	360	<b>315</b>	350	300	320	310	329	305	305	300	NR	318	315	315	316
2	332	321	340	300	330	290	318	284	300	294	NR	299	330	318	330
3	318	326	320	330	<b>280</b>	300	332	290	305	302	NR	318	325	321	321
4	332	326	320	320	320	310	319	<b>332</b>	295	297	NR	300	310	316	333
5	312	324	310	300	330	330	311	290	300	306	NR	310	350	<b>330</b>	319
Mean	331	322	328	310	316	308	322	300	301	300		309	326	320	324
Median	332	324	320	300	320	310	319	290	300	300		310	325	318	321
Std.Dev.	19	5	16	14	21	15	9	19	4	5		9	16	6	7
Rel.Std.Dev.	5.60%	1.43%	5.01%	4.56%	6.56%	4.82%	2.67%	6.46%	1.39%	1.54%		3.00%	4.78%	1.89%	2.26%
PDM <sup>3</sup>	4.84%	2.18%	3.96%	-1.75%	0.15%	-2.38%	1.99%	-4.85%	-4.60%	-4.98%		-2.06%	3.32%	1.42%	2.63%

Table A10. Analytical results for 4 acid iron in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J -	Lab K -	Lab L -	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	10.1	10.0	9.48	9.19	9.49	9.56	9.70	9.64	8.53	NR	NR	NR	9.04	9.60	9.56
2	10.0	9.90	10.0	9.13	9.85	9.42	9.50	<b>9.21</b>	8.61	NR	NR	NR	9.06	9.66	9.59
3	9.82	10.0	9.85	9.26	9.64	9.33	9.89	9.51	8.59	NR	NR	NR	8.83	9.54	9.61
4	9.52	9.93	9.3	9.15	9.73	9.54	10.00	9.76	8.64	NR	NR	NR	8.86	9.58	9.68
5	9.52	9.98	9.02	9.26	9.46	9.74	9.46	9.60	8.54	NR	NR	NR	9.21	9.50	9.68
Mean	9.79	<b>9.97</b>	9.53	<b>9.20</b>	9.63	9.52	9.71	9.54	<b>8.58</b>				<b>9.00</b>	9.58	9.62
Median	9.82	9.98	9.48	9.19	9.64	9.54	9.70	9.60	8.59				9.04	9.58	9.61
Std.Dev.	0.27	0.06	0.40	0.06	0.16	0.16	0.24	0.21	0.05				0.16	0.06	0.05
Rel.Std.Dev.	2.73%	0.56%	4.19%	0.66%	1.70%	1.63%	2.43%	2.17%	0.54%				1.74%	0.63%	0.56%
PDM <sup>3</sup>	1.72%	3.59%	-1.00%	-4.45%	0.08%	-1.13%	0.87%	-0.86%	-10.8%				-6.51%	-0.52%	-0.03%



Table A11. Analytical results for 4 acid magnesium oxide in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J -	Lab K -	Lab L -	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	6.68	6.57	6.45	6.28	6.35	6.91	7.02	7.15	<b>6.82</b>	NR	NR	NR	6.87	6.86	6.72
2	6.86	6.51	6.75	6.25	6.59	6.85	7.10	7.33	6.86	NR	NR	NR	6.78	6.98	6.70
3	6.83	6.54	6.70	6.15	6.48	6.88	7.01	7.29	6.87	NR	NR	NR	6.59	6.94	6.70
4	6.62	6.43	6.38	6.10	6.52	6.78	<b>7.35</b>	6.87	6.89	NR	NR	NR	6.68	6.90	6.73
5	6.68	6.49	6.12	6.35	6.38	6.96	7.03	6.98	6.87	NR	NR	NR	6.72	6.87	6.77
Mean	6.73	6.51	6.48	6.23	6.46	6.88	7.10	7.12	6.86				6.73	6.91	6.72
Median	6.68	6.51	6.45	6.25	6.48	6.88	7.03	7.15	6.87				6.72	6.90	6.72
Std.Dev.	0.10	0.05	0.26	0.10	0.10	0.07	0.14	0.20	0.03				0.11	0.05	0.03
Rel.Std.Dev.	1.56%	0.82%	3.94%	1.62%	1.53%	1.00%	2.01%	2.77%	0.38%				1.56%	0.72%	0.41%
PDM <sup>3</sup>	0.15%	-3.21%	-3.63%	-7.40%	-3.86%	2.29%	5.62%	5.95%	2.06%				0.06%	2.77%	-0.03%

Table A12. Analytical results for 4 acid nickel in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G 4A*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*AAS	Lab K -	Lab L AR*OES	Lab M 4A*OES	Lab N 4A*OES	Lab O 4A*OES
1	<b>0.76</b>	0.68	0.71	0.63	0.68	0.68	0.66	<b>0.76</b>	0.70	0.70	NR	0.69	0.63	0.70	0.66
2	0.73	0.70	0.74	0.62	0.72	0.65	0.66	0.79	0.70	0.72	NR	0.69	0.68	0.69	0.72
3	0.70	0.73	0.71	0.70	<b>0.62</b>	0.65	0.68	0.80	0.71	0.74	NR	0.67	0.65	0.70	0.70
4	0.69	0.71	0.68	0.69	0.70	0.67	0.67	<b>0.84</b>	0.69	0.72	NR	0.69	0.64	0.69	0.73
5	0.69	0.70	0.69	0.63	0.70	0.74	0.68	0.80	0.70	0.72	NR	0.67	0.72	0.71	0.70
Mean	0.71	0.70	0.71	<b>0.65</b>	0.68	0.68	0.67	<b>0.80</b>	0.70	0.72		0.68	0.66	0.70	0.70
Median	0.70	0.70	0.71	0.63	0.70	0.67	0.67	0.80	0.70	0.72		0.69	0.65	0.70	0.70
Std.Dev.	0.03	0.02	0.02	0.04	0.04	0.04	0.01	0.03	0.00	0.02		0.01	0.04	0.01	0.03
Rel.Std.Dev.	4.65%	2.27%	3.09%	5.78%	5.62%	5.58%	1.39%	3.59%	0.70%	2.31%		1.34%	5.30%	1.20%	3.78%
PDM <sup>3</sup>	2.57%	1.53%	1.82%	-5.65%	-1.33%	-2.19%	-3.69%	15.1%	1.01%	3.91%		-1.69%	-4.15%	0.69%	0.98%

Table A13. Analytical results for 4 acid sulphur in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*MS	Lab E 4A*AAS	Lab F 4A*OES	Lab G -	Lab H 4A*OES	Lab I 4A*OES	Lab J -	Lab K -	Lab L AR*OES	Lab M 4A*OES	Lab N -	Lab O -
1	1.82	1.62	1.70	1.61	1.78	1.57	NR	1.67	1.85	NR	NR	1.72	1.96	NR	NR
2	1.79	1.61	1.90	1.57	1.90	1.49	NR	1.46	1.91	NR	NR	1.73	1.99	NR	NR
3	1.60	1.68	1.80	1.74	1.79	1.49	NR	1.56	1.92	NR	NR	1.72	1.98	NR	NR
4	1.66	1.70	1.70	1.70	1.85	1.56	NR	1.84	1.94	NR	NR	1.74	<b>1.90</b>	NR	NR
5	1.66	1.71	1.80	1.61	1.89	1.78	NR	1.59	1.89	NR	NR	1.69	<b>2.14</b>	NR	NR
Mean	1.71	1.66	1.78	1.65	1.84	1.58		1.62	1.90			1.72	1.99		
Median	1.66	1.68	1.80	1.61	1.85	1.56		1.59	1.91			1.72	1.98		
Std.Dev.	0.09	0.04	0.08	0.07	0.06	0.12		0.14	0.03			0.02	0.09		
Rel.Std.Dev.	5.52%	2.69%	4.70%	4.31%	3.01%	7.49%		8.76%	1.80%			0.92%	4.45%		
PDM <sup>3</sup>	-2.15%	-4.57%	2.10%	-5.59%	5.65%	-9.59%		-6.85%	9.09%			-1.46%	14.4%		

Table A14. Analytical results for fusion aluminium oxide in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I BF*OES	Lab J BF*XRF	Lab K BF*OES	Lab L PF*OES	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	13.5	13.3	13.7	14.4	12.7	13.7	<b>14.4</b>	13.7	13.8	14.0	12.9	13.6	13.6	14.6	13.2
2	13.6	13.1	13.5	<b>13.7</b>	12.7	13.6	15.3	13.6	13.9	13.8	12.7	13.6	13.8	14.6	13.2
3	13.5	13.1	13.8	14.3	12.3	13.6	15.2	13.6	14.2	13.9	<b>13.8</b>	13.7	13.8	14.7	13.3
4	13.6	13.2	13.3	14.2	12.5	13.7	15.3	13.6	14.0	13.8	12.6	13.6	13.7	14.5	13.2
5	13.6	13.4	13.6	14.2	12.5	13.7	15.6	13.7	13.9	13.9	12.6	13.6	13.7	14.4	13.3
Mean	13.6	13.2	13.6	14.1	12.5	13.7	<b>15.2</b>	13.6	14.0	13.9	12.9	13.6	13.7	14.6	13.2
Median	13.6	13.2	13.6	14.2	12.5	13.7	15.3	13.6	13.9	13.9	12.7	13.6	13.7	14.6	13.2
Std.Dev.	0.05	0.13	0.19	0.26	0.17	0.07	0.45	0.05	0.15	0.08	0.52	0.01	0.11	0.12	0.05
Rel.Std.Dev.	0.37%	0.96%	1.42%	1.86%	1.33%	0.52%	2.97%	0.33%	1.09%	0.60%	4.05%	0.11%	0.80%	0.83%	0.41%
PDM <sup>3</sup>	-0.20%	-2.73%	-0.06%	4.14%	-7.64%	0.55%	11.7%	0.43%	2.82%	2.23%	-4.84%	0.37%	1.06%	7.23%	-2.49%

Table A15. Analytical results for fusion arsenic in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I -	Lab J -	Lab K BF*OES	Lab L PF*MS	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	10	<100	<100	<b>100</b>	20	20	30	NR	NR	NR	12	10.5	NR	16	8
2	10	<100	<b>100</b>	<100	10	20	<b>180</b>	NR	NR	NR	13	10	NR	16	7
3	<b>&lt;10</b>	<100	<100	<100	20	20	30	NR	NR	NR	15	9.5	NR	16	10
4	<b>0</b>	<100	<b>100</b>	<100	20	20	40	NR	NR	NR	13	9.8	NR	15	7
5	10	<100	<100	<100	20	20	<30	NR	NR	NR	13	10.7	NR	16	<b>19</b>
Mean	8	<100	100	<100	18	20	<b>70</b>				13	10		16	10
Median	10	<100	100	<100	20	20	35				13	10		16	8
Std.Dev.	5	-	0	-	4	0	73				1	0		0	5
Rel.Std.Dev.	66.7%	-	0.00%	-	24.8%	0.00%	105%				8.30%	4.90%		2.83%	49.7%
PDM <sup>3</sup>	-44.8%	-	636%	-	32.5%	47.21%	415%				-2.84%	-25.7%		16.3%	-24.9%

Table A16. Analytical results for fusion chromium in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I BF*OES	Lab J -	Lab K BF*OES	Lab L PF*OES	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	250	<b>281</b>	300	300	293	253	330	300	260	NR	200	262	240	300	200
2	250	268	300	200	301	267	370	300	255	NR	200	270	280	281	400
3	250	269	300	200	301	267	350	300	260	NR	200	264	290	299	300
4	255	270	300	300	278	253	370	300	250	NR	200	260	260	285	500
5	250	273	300	200	290	246	340	300	255	NR	200	265	270	298	400
Mean	251	272	300	240	293	257	352	300	256		200	264	268	293	<b>360</b>
Median	250	270	300	200	293	253	350	300	255		200	264	270	298	400
Std.Dev.	2	5	0	55	10	9	18	0	4		0	4	19	9	114
Rel.Std.Dev.	0.89%	1.93%	0.00%	22.8%	3.25%	3.57%	5.08%	0.00%	1.63%		0.00%	1.43%	7.18%	3.04%	31.7%
PDM <sup>3</sup>	-7.92%	-0.14%	10.1%	-12.0%	7.34%	-5.63%	29.1%	10.1%	-6.09%		-26.6%	-3.08%	-1.68%	7.34%	32.1%

Table A17. Analytical results for fusion cobalt in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I -	Lab J -	Lab K BF*OES	Lab L -	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	190	148	160	200	100	148	170	200	NR	NR	157	NR	160	171	200
2	180	159	160	200	100	202	220	200	NR	NR	141	NR	160	168	200
3	170	155	170	200	110	181	200	200	NR	NR	143	NR	170	168	200
4	175	151	150	200	100	147	200	200	NR	NR	161	NR	160	167	200
5	170	160	130	200	110	164	220	200	NR	NR	147	NR	170	167	200
Mean	177	155	154	200	<b>104</b>	168	202	200			150		164	168	200
Median	175	155	160	200	100	164	200	200			147		160	168	200
Std.Dev.	8	5	15	0	5	23	20	0			9		5	2	0
Rel.Std.Dev.	4.73%	3.32%	9.85%	0.00%	5.27%	13.9%	10.1%	0.00%			5.87%		3.34%	0.98%	0.00%
PDM <sup>3</sup>	0.46%	-12.2%	-12.6%	13.5%	-41.0%	-4.42%	14.7%	13.5%			-15.0%		-6.91%	-4.53%	13.5%

Table A18. Analytical results for fusion copper in OREAS 72a (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I -	Lab J -	Lab K BF*OES	Lab L -	Lab M BF*OES	Lab N BF*OES	Lab O -
1	360	322	330	400	270	302	350	300	NR	NR	343	NR	210	320	NR
2	350	341	340	500	270	368	330	300	NR	NR	312	NR	190	327	NR
3	320	312	360	300	280	343	390	300	NR	NR	316	NR	170	326	NR
4	320	330	340	300	290	299	390	300	NR	NR	361	NR	160	342	NR
5	320	352	320	300	270	361	440	300	NR	NR	323	NR	260	336	NR
Mean	334	331	338	<b>360</b>	<b>276</b>	335	<b>380</b>	<b>300</b>			331		<b>198</b>	330	
Median	320	330	340	300	270	343	390	300			323		190	327	
Std.Dev.	19	16	15	89	9	32	42	0			21		40	9	
Rel.Std.Dev.	5.84%	4.73%	4.39%	24.8%	3.24%	9.70%	11.2%	0.00%			6.22%		20.0%	2.64%	
PDM <sup>3</sup>	0.24%	-0.54%	1.44%	8.04%	-17.2%	0.42%	14.0%	-9.96%			-0.66%		-40.6%	-0.90%	

Table A19. Analytical results for fusion iron in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I BF*OES	Lab J BF*XRF	Lab K BF*OES	Lab L PF*OES	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	<b>9.69</b>	9.43	9.38	<b>9.85</b>	8.99	9.58	9.67	9.66	8.53	<b>9.79</b>	9.40	9.53	9.41	9.47	9.33
2	9.56	9.87	9.43	<b>10.5</b>	9.01	<b>10.4</b>	9.97	9.49	8.48	9.65	9.47	<b>9.72</b>	9.37	9.68	9.25
3	9.52	9.97	<b>9.75</b>	10.0	<b>8.83</b>	<b>10.2</b>	9.73	9.45	8.51	9.58	9.68	9.51	9.40	9.54	9.42
4	9.51	9.59	<b>9.12</b>	10.1	9.04	9.53	9.64	9.64	8.49	9.58	9.73	9.50	9.36	9.48	9.27
5	9.47	9.80	9.32	10.1	9.04	9.64	9.85	9.47	8.55	9.58	9.53	9.51	<b>9.52</b>	9.38	9.45
Mean	9.55	9.73	9.40	<b>10.09</b>	<b>8.98</b>	9.88	9.77	9.54	<b>8.51</b>	9.64	9.56	9.56	9.41	9.51	9.34
Median	9.52	9.80	9.38	10.05	9.01	9.64	9.73	9.49	8.51	9.58	9.53	9.51	9.40	9.48	9.33
Std.Dev.	0.09	0.22	0.23	0.22	0.09	0.42	0.14	0.10	0.03	0.09	0.14	0.10	0.06	0.11	0.09
Rel.Std.Dev.	0.89%	2.25%	2.43%	2.20%	0.98%	4.23%	1.40%	1.05%	0.34%	0.95%	1.46%	0.99%	0.68%	1.17%	0.95%
PDM <sup>3</sup>	0.14%	2.05%	-1.43%	5.81%	-5.81%	3.61%	2.47%	0.06%	-10.7%	1.1%	0.27%	0.20%	-1.30%	-0.27%	-2.01%

Table A20. Analytical results for fusion magnesium oxide in OREAS 72a (abbreviations as in Table A1; values wt.%).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I BF*OES	Lab J BF*XRF	Lab K BF*OES	Lab L PF*OES	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	6.62	6.65	6.34	6.85	6.37	6.86	7.21	6.41	6.72	6.90	6.66	6.67	6.56	6.86	6.52
2	6.63	6.65	6.32	<b>6.54</b>	6.39	6.71	7.37	6.41	6.75	6.90	6.71	6.69	6.67	7.00	6.63
3	6.64	6.47	6.45	6.92	6.17	6.67	7.45	6.43	6.81	6.90	<b>7.20</b>	6.70	6.65	6.94	6.61
4	6.64	6.60	6.30	6.95	6.28	6.84	7.53	6.42	6.79	7.00	6.69	6.66	6.57	6.94	6.53
5	6.65	6.65	6.39	6.97	6.28	6.87	7.62	<b>6.48</b>	6.81	7.00	6.80	6.66	6.66	7.06	6.66
Mean	6.64	6.60	6.36	6.85	6.30	6.79	<b>7.44</b>	6.43	6.78	6.94	6.81	6.68	6.62	6.96	6.59
Median	6.64	6.65	6.34	6.92	6.28	6.84	7.45	6.42	6.79	6.90	6.71	6.67	6.65	6.94	6.61
Std.Dev.	0.01	0.08	0.06	0.18	0.09	0.09	0.16	0.03	0.04	0.05	0.22	0.02	0.05	0.07	0.06
Rel.Std.Dev.	0.17%	1.20%	0.95%	2.59%	1.39%	1.37%	2.11%	0.45%	0.59%	0.79%	3.27%	0.27%	0.79%	1.08%	0.94%
PDM <sup>3</sup>	-0.44%	-0.93%	-4.57%	2.72%	-5.50%	1.88%	11.6%	-3.52%	1.67%	4.13%	2.21%	0.16%	-0.64%	4.43%	-1.12%

Table A21. Analytical results for fusion nickel in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I -	Lab J -	Lab K BF*OES	Lab L -	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	0.77	0.69	0.69	0.63	0.68	0.62	NR	0.75	NR	NR	0.68	NR	0.83	0.68	0.70
2	0.72	0.75	0.72	0.62	0.69	0.70	NR	0.69	NR	NR	0.67	NR	0.76	0.67	0.67
3	0.74	0.71	<b>0.76</b>	0.70	0.70	0.67	NR	0.67	NR	NR	0.69	NR	0.77	0.68	0.71
4	0.71	0.70	0.67	0.69	0.71	0.63	NR	0.75	NR	NR	<b>0.79</b>	NR	0.80	0.67	0.69
5	0.68	0.76	0.67	0.63	0.69	0.74	NR	0.70	NR	NR	0.68	NR	0.85	0.67	0.71
Mean	0.72	0.72	0.70	0.65	0.69	0.67		0.71			0.70		<b>0.80</b>	0.67	0.70
Median	0.72	0.71	0.69	0.63	0.69	0.67		0.70			0.68		0.80	0.67	0.70
Std.Dev.	0.03	0.03	0.04	0.04	0.01	0.05		0.04			0.05		0.04	0.01	0.02
Rel.Std.Dev.	4.73%	4.19%	5.14%	5.78%	1.61%	7.58%		5.10%			7.08%		4.94%	0.81%	2.40%
PDM <sup>3</sup>	4.53%	4.80%	1.43%	-5.45%	0.25%	-2.85%		2.94%			1.49%		15.6%	-2.56%	0.62%

Table A22. Analytical results for silicon dioxide in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F BF*OES	Lab G BF*OES	Lab H BF*OES	Lab I BF*OES	Lab J BF*XRF	Lab K -	Lab L PF*OES	Lab M BF*OES	Lab N BF*OES	Lab O BF*OES
1	49.0	49.4	51.0	50.3	46.4	49.1	53.3	49.3	45.4	50.5	NR	49.2	48.7	47.3	47.9
2	49.2	50.3	50.5	48.8	46.5	48.0	54.9	49.2	45.6	50.9	NR	49.4	<b>50.9</b>	48.1	48.0
3	49.1	49.6	51.9	49.7	45.9	48.4	51.2	49.5	46.6	50.8	NR	49.4	50.7	47.2	48.3
4	49.2	49.6	<b>49.5</b>	50.9	46.8	49.4	55.2	49.2	45.8	50.7	NR	49.1	48.9	46.8	47.9
5	49.3	49.6	50.8	51.4	45.8	49.0	53.9	49.6	46.6	50.6	NR	49.1	49.2	47.9	48.4
Mean	49.2	49.7	50.7	50.2	46.3	48.8	<b>53.7</b>	49.3	46.0	50.7		49.2	49.7	47.4	48.1
Median	49.2	49.6	50.8	50.3	46.4	49.0	53.9	49.3	45.8	50.7		49.2	49.2	47.3	48.0
Std.Dev.	0.1	0.3	0.9	1.0	0.4	0.5	1.6	0.2	0.6	0.2		0.2	1.1	0.5	0.2
Rel.Std.Dev.	0.23%	0.65%	1.71%	2.03%	0.91%	1.10%	2.96%	0.37%	1.23%	0.31%		0.31%	2.14%	1.10%	0.49%
PDM <sup>3</sup>	0.57%	1.73%	3.82%	2.76%	-5.31%	-0.19%	9.9%	0.94%	-5.88%	3.74%		0.70%	1.65%	-2.93%	-1.58%

Table A23. Analytical results for fusion sulphur in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B PF*OES	Lab C BF*OES	Lab D BF*OES	Lab E BF*XRF	Lab F -	Lab G -	Lab H -	Lab I -	Lab J -	Lab K -	Lab L -	Lab M -	Lab N -	Lab O -
1	<b>1.83</b>	1.65	1.58	1.76	1.55	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2	1.69	1.76	1.66	<b>2.50</b>	1.58	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3	1.68	1.70	1.72	1.77	1.57	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
4	1.67	1.68	1.48	1.72	1.61	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
5	<b>1.61</b>	1.77	1.58	1.82	1.62	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mean	1.70	1.71	1.60	1.91	1.58										
Median	1.68	1.70	1.58	1.77	1.58										
Std.Dev.	0.08	0.05	0.09	0.33	0.03										
Rel.Std.Dev.	4.81%	3.02%	5.67%	17.2%	1.89%										
PDM <sup>3</sup>	1.55%	2.57%	-3.90%	14.7%	-5.10%										

Table A24. Analytical results for sulphur by LECO in OREAS 72a (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A LECO	Lab B LECO	Lab C LECO	Lab D LECO	Lab E LECO	Lab F LECO	Lab G LECO	Lab H LECO	Lab I LECO	Lab J LECO	Lab K LECO	Lab L LECO	Lab M LECO	Lab N LECO	Lab O LECO
1	1.98	1.56	1.73	1.68	<b>2.10</b>	1.54	1.68	1.64	NR	1.65	1.56	1.65	1.62	1.49	1.67
2	1.76	1.66	1.77	1.65	1.90	1.56	1.67	1.56	NR	1.63	1.83	1.77	1.74	1.52	1.77
3	1.75	1.62	1.76	1.57	1.67	1.66	<b>1.77</b>	1.67	NR	1.69	1.77	1.73	1.70	1.53	1.70
4	1.84	1.57	1.78	1.65	1.67	1.57	1.67	<b>2.06</b>	NR	<b>1.88</b>	1.56	1.69	1.65	1.51	1.67
5	1.92	1.68	<b>1.92</b>	<b>1.81</b>	1.89	<b>1.69</b>	1.67	1.50	NR	1.65	1.64	1.55	1.67	1.53	1.70
Mean	<b>1.85</b>	1.62	1.79	1.67	1.85	1.60	1.69	1.69		1.70	1.67	1.68	1.68	1.52	1.70
Median	1.84	1.62	1.77	1.65	1.89	1.57	1.67	1.64		1.65	1.64	1.69	1.67	1.52	1.70
Std.Dev.	0.10	0.05	0.07	0.09	0.18	0.07	0.04	0.22		0.10	0.12	0.09	0.05	0.02	0.04
Rel.Std.Dev.	5.41%	3.28%	4.13%	5.22%	9.82%	4.15%	2.59%	13.0%		6.06%	7.37%	5.12%	2.75%	1.10%	2.40%
PDM <sup>3</sup>	11.6%	-2.36%	8.14%	0.90%	11.4%	-3.21%	2.10%	1.74%		2.59%	0.90%	1.15%	1.14%	-8.52%	2.71%