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CERTIFICATE OF ANALYSIS FOR

COPPER-GOLD OXIDE ORE

CERTIFIED REFERENCE MATERIAL

OREAS 905

Summary Statistics for Key Analytes (see Table 1 for additional certified values).

Constituent (ppm)	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Pb Fire Assay						
Au, Gold	0.391	0.009	0.388	0.394	0.388*	0.394*
4-Acid Digestion						
Cu, Copper	1533	61	1513	1554	1498	1569
Mo, Molybdenum	3.27	0.262	3.19	3.35	3.12	3.42
Aqua Regia Digestion						
Au, Gold	0.395	0.019	0.387	0.403	0.392†	0.398†
Sulphuric Acid Leach						
Cu-Sol, Copper Soluble	1272	65	1245	1299	1249	1294

*Gold Tolerance Limits for typical 30g fire assay charge weight determined from 20 x 85mg NAA results and the Sampling Constant (Ingamells & Switzer, 1973);
†Gold Tolerance Limits for typical 25g aqua regia sample weight determined as above;
Please note: intervals may appear asymmetric due to rounding.

The homogeneity of OREAS 905 is of a level such that ***negligible sampling error exists*** for a conventional fire assay, 4-acid digestion, fusion, aqua regia digestion or sulphuric acid leach or pycnometry determination.

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 MATERIALS

Certified Reference Material (CRM) OREAS 905 was prepared from a blend of copper oxide ore and barren weathered rhyodacite. The ore was sourced from a copper rich zone within MMG's VMS Gossan Hill deposit at Golden Grove and the rhyodacite was obtained from a quarry approximately 30km east of Melbourne, Australia. The Gossan Hill deposit is located 338km NNE of Perth in the Murchison Province of the Archaen Yilgarn Craton in Western Australia.

The ore deposit is hosted within and underlain by a layered rhyodacitic volcanoclastic succession. The pre-oxidation mineralisation assemblage consisted of sphalerite, chalcopyrite and lesser galena with a gangue of pyrite, pyrrhotite and magnetite.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 905 was prepared in the following manner:

- drying to constant mass at 105°C;
- crushing and milling of the ore material to 100% minus 35 microns;
- crushing and milling of the barren material to 98% minus 75 microns;
- blending in appropriate proportions to achieve the desired grades;
- packaging in 10g, 60g and 100g units in laminated foil pouches and 500g units in plastic jars.

ANALYTICAL PROGRAM

Thirty-five commercial analytical laboratories participated in the program to certify the 168 elements reported in Table 1. The following methods were employed:

- Gold via 20-50g fire assay with AAS (10 labs), ICP-OES (17 labs), ICP-MS (3 labs) or NAA (1 lab) finish;
- Instrumental neutron activation analysis for Au on 85mg subsamples to confirm homogeneity (1 laboratory);
- 4-Acid digestion (HF-HNO_3-$HClO_4$-HCl) for full elemental suite ICP-OES and ICP-MS finishes (up to 30 laboratories depending on the element);
- Peroxide (21 labs) or borate (2 labs) fusion for full elemental suite ICP-OES and ICP-MS (up to 30 laboratories depending on the element);

- Aqua regia digestion (see note below) for full elemental suite ICP-OES and ICP-MS (up to 30 laboratories depending on the element);
- Gold via 15-50g aqua regia digestion with ICP-MS (16 labs) or AAS (3 labs) finish;
- 5% sulphuric acid leach with AAS (24 labs) or ICP-OES (3 labs) finish;
- Specific gravity by gas (15 labs) or liquid (4 labs) pycnometry.

It is important to note that in the analytical industry there is no standardisation of the aqua regia digestion process. Aqua regia is a partial empirical digest and differences in recoveries for various analytes are commonplace. These are caused by variations in the digest conditions which can include the ratio of nitric to hydrochloric acids, acid strength, temperatures, leach times and secondary digestions. Recoveries for sulphide-hosted base metal sulphides approach total values, however, other analytes, in particular the lithophile elements, show greater sensitivity to method parameters. This can result in lack of consensus in an inter-laboratory certification program for these elements. The approach applied here is to report certified values in those instances where reasonable agreement exists amongst a majority of participating laboratories. The results of specific laboratories may differ significantly from the certified values, but will, nonetheless, be valid and reproducible in the context of the specifics of the aqua regia method in use. Users of this reference material should, therefore, be mindful of this limitation when applying the certified values in a quality control program.

For the round robin program twenty 1kg lot samples were taken at predetermined intervals during the bagging stage, immediately following final blending and are considered representative of the entire batch. The six samples received by each laboratory were obtained by taking two 110g scoop splits from each of three separate 1kg lots. 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 168 certified values together with their associated 1SD's, 95% confidence and tolerance limits and Table 2 shows 43 indicative values. Table 3 shows the gold neutron activation analysis (NAA) results for twenty 85mg subsamples determined by the Australian Nuclear Science & Technology Organisation (ANSTO) located in Lucas Heights, NSW, Australia. Table 4 provides performance gate intervals for the certified values of each method group based on their pooled 1SD's. Tabulated results of all elements together with uncorrected means, medians, standard deviations, relative standard deviations and per cent deviation of lab means from the corrected mean of means (PDM^3) are presented in the detailed certification data for this CRM (**OREAS 905 Datapack.xlsx**).

STATISTICAL ANALYSIS

Certified Values, Confidence Limits, Standard Deviations and Tolerance Limits (Table 1) have been determined for each analytical method following the removal of individual, laboratory dataset (batch) and 3SD outliers (single iteration). For individual outliers within a laboratory batch the z-score test is used in combination with a second method that determines the per cent deviation of the individual value from the batch median. Outliers in general are selected on the basis of z-scores > 2.5 and with per cent deviations (i) > 3 and (ii) more than three times the average absolute per cent deviation for the batch. In certain instances statistician's prerogative has been employed in discriminating outliers. Each laboratory data set mean is tested for outlying status based on z-score discrimination and rejected if > 2.5. After individual and laboratory data set

(batch) outliers have been eliminated a non-iterative 3 standard deviation filter is applied, with those values lying outside this window also relegated to outlying status.

Certified Values are the means of accepted laboratory means after outlier filtering. The NAA data is omitted from determination of the certified value for gold and is used solely for the calculation of Tolerance Limits and homogeneity evaluation of OREAS 905.

Indicative Values (Table 2) are provided where the number of laboratories reporting a particular analyte is insufficient (< 5) to support certification or inter-laboratory consensus is poor.

95% Confidence Limits are inversely proportional to the number of participating laboratories and inter-laboratory agreement. It is a measure of the reliability of the certified value. A 95% confidence interval indicates a 95% probability that the true value of the analyte under consideration lies between the upper and lower limits. *95% Confidence Limits should not be used as control limits for laboratory performance.*

Standard Deviation values (1SDs) are reported in Table 1 and provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. The SD's 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 SD values thus include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability. OREAS prepared reference materials have a level of homogeneity such that the observed variance from repeated analysis has its origin almost exclusively in the analytical process rather than the reference material itself.

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 any 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.**

In the application of SD's in monitoring performance it is important to note that not all laboratories function at the same level of proficiency and that different methods in use at a particular laboratory have differing levels of precision. Each laboratory has its own inherent SD (for a specific concentration level and analyte-method pair) based on the analytical process and this SD is not directly related to the round robin program.

The majority of data generated in the round robin program was produced by a selection of world class laboratories. The SD's thus generated are more constrained than those that would be produced across a randomly selected group of laboratories. To produce more generally achievable SD's the 'pooled' SD's provided in this report include inter-lab bias. This 'one size fits all' approach may require revision at the discretion of the QC manager concerned following careful scrutiny of QC control charts.

Table 4 shows **Performance Gates** 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 percent 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 via 4-acid digestion where 99% of the time (1-α=0.99) at least 95% of subsamples (ρ=0.95) will have concentrations lying between 1498 and 1569 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).

For gold, tolerance can be determined by NAA using the reduced analytical subsample method which utilises the known relationship between standard deviation and analytical subsample weight (Ingamells and Switzer, 1973). In this approach the latter parameter is substantially reduced to a point where most of the variability in replicate assays is due to inhomogeneity of the reference material and measurement error becomes negligible. In this instance a subsample weight of 85 milligrams was employed and the 1RSD of 4.42% (or 0.24% at a 30g charge weight) confirms the high level of gold homogeneity in OREAS 905 (see Table 3 below).

The homogeneity of OREAS 905 has also been evaluated in a **nested ANOVA** of the round robin program. Each of the thirty-five round robin laboratories received six samples per CRM and these samples were made up of paired samples from three different, non-adjacent sampling intervals. The purpose of the ANOVA evaluation is to test that no statistically significant difference exists in the variance between-units to that of the variance within-units. This allows an assessment of homogeneity across the entire prepared batch of OREAS 905. The test was performed using the following parameters:

- Significance Level α = P (type I error) = 0.05;
- Null Hypothesis, H_0: Between-unit variance is no greater than within-unit variance (reject H_0 if *p*-value < 0.05);
- Alternative Hypothesis, H_1: Between-unit variance is greater than within-unit variance.

P-values are a measure of probability where values less than 0.05 indicate a greater than 95% probability that the observed differences in within-unit and between-unit variances are real. The dataset was filtered for both individual and laboratory data set (batch) outliers prior to the calculation of the *p*-value. This process derived no significant *p*-values for all 168 certified values and the Null Hypothesis is retained.

It is important to note that ANOVA is not an absolute measure of homogeneity. Rather, it establishes whether or not the analytes are distributed in a similar manner throughout the packaging run of OREAS 905 and whether the variance between two subsamples from the same unit is statistically distinguishable to the variance from two subsamples taken from any two separate units. A reference material therefore, can possess poor absolute

homogeneity yet still pass a relative homogeneity test if the within-unit heterogeneity is large and similar across all units.

Based on the statistical analysis of the results of the inter-laboratory certification program it can be concluded that OREAS 905 is fit-for-purpose as a certified reference material (see 'Intended Use' below). Furthermore, the homogeneity of OREAS 905 is of a level such that ***negligible sampling error exists*** for a conventional fire assay, 4-acid digestion, fusion, aqua regia digestion, sulphuric acid leach or pycnometry determination.

PARTICIPATING LABORATORIES

1. Actlabs, Ancaster, Ontario, Canada
2. ALS, Brisbane, QLD, Australia
3. ALS, Johannesburg, South Africa
4. ALS, Lima, Peru
5. ALS, Loughrea, Galway, Ireland
6. ALS, Perth, WA, Australia
7. ALS, Reno, Nevada, USA
8. ALS, Vancouver, BC, Canada
9. American Assay Laboratories, Sparks, Nevada, USA
10. ANSTO, Lucas Heights, NSW, Australia
11. Bureau Veritas Commodities Canada Ltd, Vancouver, BC, Canada
12. Bureau Veritas Geoanalytical, Adelaide, SA, Australia
13. Bureau Veritas Geoanalytical, Perth, WA, Australia
14. Bureau Veritas Minerals, Santiago, Chile
15. CIMM TyS S.A., Antofagasta, Chile
16. Inspectorate (BV), Lima, Peru
17. Inspectorate America Corporation (BV), Sparks, Nevada, USA
18. Intertek Genalysis, Adelaide, SA, Australia
19. Intertek Genalysis, Perth, WA, Australia
20. Intertek Testing Services, Cupang, Muntinlupa, Philippines
21. Intertek Testing Services, Shunyi, Beijing, China
22. McClelland Laboratories Inc., Sparks, Nevada, USA
23. PT Geoservices Ltd, Cikarang, Jakarta Raya, Indonesia
24. PT Intertek Utama Services, Jakarta Timur, DKI Jakarta, Indonesia
25. SGS, Sudbury, Ontario, Canada
26. SGS Australia Mineral Services, Perth (Newburn), WA, Australia
27. SGS Canada Inc., Vancouver, BC, Canada
28. SGS del Peru, Lima, Peru
29. SGS Geosol Laboratorios Ltda, Vespasiano, Minas Gerais, Brazil
30. SGS Lakefield Research Ltd, Lakefield, Ontario, Canada
31. SGS Mineral Services, Townsville, QLD, Australia
32. SGS Minerals, Santiago, Chile
33. SGS South Africa Pty Ltd, Booysens, Gauteng, South Africa
34. Skyline, Sparks, Nevada, USA
35. TSL Laboratories Inc., Saskatoon, Saskatchewan, Canada

Table 1. Certified Values, SD's, 95% Confidence and Tolerance Limits for OREAS 905.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Pb Fire Assay						
Au, Gold (ppm)	0.391	0.009	0.388	0.394	0.388*	0.394*
4-Acid Digestion						
Ag, Silver (ppm)	0.518	0.095	0.478	0.558	0.489	0.546
Al, Aluminium (wt.%)	7.42	0.266	7.33	7.52	7.22	7.63
As, Arsenic (ppm)	34.7	1.74	34.1	35.3	33.4	36.0
Ba, Barium (ppm)	2699	126	2652	2747	2651	2747
Be, Beryllium (ppm)	3.04	0.32	2.93	3.16	2.91	3.18
Bi, Bismuth (ppm)	5.72	0.337	5.56	5.87	5.57	5.86
Ca, Calcium (wt.%)	0.590	0.028	0.580	0.600	0.575	0.605
Cd, Cadmium (ppm)	0.36	0.04	0.34	0.38	0.33	0.39
Ce, Cerium (ppm)	92	4.3	90	94	89	95
Co, Cobalt (ppm)	14.8	0.80	14.5	15.1	14.5	15.2
Cr, Chromium (ppm)	19.2	3.1	17.9	20.4	17.4	20.9
Cs, Cesium (ppm)	6.78	0.407	6.60	6.96	6.60	6.96
Cu, Copper (ppm)	1533	61	1513	1554	1498	1569
Dy, Dysprosium (ppm)	3.72	0.216	3.58	3.87	3.53	3.92
Er, Erbium (ppm)	1.12	0.046	1.09	1.14	1.05	1.19
Eu, Europium (ppm)	1.42	0.115	1.34	1.51	1.33	1.52
Fe, Iron (wt.%)	4.08	0.156	4.02	4.13	3.97	4.18
Ga, Gallium (ppm)	25.1	1.02	24.7	25.5	24.3	26.0
Gd, Gadolinium (ppm)	5.90	0.364	5.60	6.19	5.58	6.22
Hf, Hafnium (ppm)	6.84	0.377	6.68	7.01	6.61	7.07
Ho, Holmium (ppm)	0.50	0.046	0.47	0.53	0.47	0.53
In, Indium (ppm)	0.64	0.047	0.62	0.66	0.61	0.66
K, Potassium (wt.%)	2.88	0.116	2.84	2.91	2.80	2.95
La, Lanthanum (ppm)	46.0	2.97	44.8	47.1	44.4	47.5
Li, Lithium (ppm)	20.0	1.60	19.4	20.7	19.4	20.7
Lu, Lutetium (ppm)	0.10	0.01	0.09	0.11	IND	IND
Mg, Magnesium (wt.%)	0.276	0.016	0.271	0.282	0.267	0.285
Mn, Manganese (wt.%)	0.038	0.002	0.037	0.038	0.037	0.039
Mo, Molybdenum (ppm)	3.27	0.262	3.19	3.35	3.12	3.42
Na, Sodium (wt.%)	2.40	0.112	2.36	2.44	2.35	2.45
Nb, Niobium (ppm)	18.1	1.10	17.7	18.6	17.5	18.8
Nd, Neodymium (ppm)	39.1	1.55	38.3	39.8	37.6	40.5
Ni, Nickel (ppm)	9.54	0.844	9.27	9.81	8.97	10.12
P, Phosphorus (wt.%)	0.028	0.002	0.027	0.028	0.026	0.029
Pb, Lead (ppm)	30.4	2.10	29.7	31.2	29.3	31.5
Pr, Praseodymium (ppm)	10.5	0.64	10.1	11.0	10.2	10.9
Rb, Rubidium (ppm)	138	6	136	141	134	142
S, Sulphur (wt.%)	0.066	0.006	0.064	0.068	0.063	0.069

Note: intervals may appear asymmetric due to rounding; *Gold Tolerance Limits for typical 30g fire assay charge weight determined from 20 x 85mg NAA results and the Sampling Constant (Ingamells & Switzer, 1973).

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
4-Acid Digestion continued						
Sb, Antimony (ppm)	1.95	0.128	1.90	2.01	1.85	2.05
Sc, Scandium (ppm)	4.90	0.459	4.73	5.06	4.71	5.09
Se, Selenium (ppm)	2.84	0.32	2.72	2.96	2.13	3.55
Sm, Samarium (ppm)	7.40	0.506	7.04	7.76	7.08	7.72
Sn, Tin (ppm)	3.96	0.271	3.85	4.06	3.78	4.13
Sr, Strontium (ppm)	157	7	155	159	152	162
Ta, Tantalum (ppm)	1.34	0.083	1.31	1.38	1.25	1.44
Tb, Terbium (ppm)	0.77	0.070	0.73	0.81	0.74	0.80
Te, Tellurium (ppm)	0.088	0.017	0.079	0.097	IND	IND
Th, Thorium (ppm)	14.6	0.76	14.3	14.9	14.2	15.1
Ti, Titanium (wt.%)	0.122	0.006	0.120	0.124	0.119	0.125
Tl, Thallium (ppm)	0.72	0.055	0.70	0.75	0.69	0.75
Tm, Thulium (ppm)	0.11	0.01	0.10	0.12	IND	IND
U, Uranium (ppm)	4.97	0.306	4.84	5.11	4.83	5.12
V, Vanadium (ppm)	10.1	0.97	9.8	10.5	IND	IND
W, Tungsten (ppm)	2.78	0.174	2.71	2.84	2.60	2.95
Y, Yttrium (ppm)	15.7	0.81	15.4	16.0	15.3	16.2
Yb, Ytterbium (ppm)	0.68	0.048	0.64	0.71	IND	IND
Zn, Zinc (ppm)	138	7	136	140	134	142
Zr, Zirconium (ppm)	252	12	248	256	246	258
Borate / Peroxide Fusion ICP						
Al, Aluminium (wt.%)	7.59	0.175	7.53	7.66	7.43	7.76
As, Arsenic (ppm)	36.2	4.6	34.0	38.4	32.7	39.7
Ba, Barium (ppm)	2795	105	2740	2850	2732	2859
Be, Beryllium (ppm)	3.08	0.52	2.75	3.41	2.91	3.25
Bi, Bismuth (ppm)	6.20	0.357	5.95	6.44	5.72	6.67
Ca, Calcium (wt.%)	0.608	0.029	0.596	0.620	0.576	0.640
Ce, Cerium (ppm)	96	5.9	93	99	92	100
Co, Cobalt (ppm)	15.3	2.1	14.6	15.9	14.8	15.8
Cs, Cesium (ppm)	7.10	0.439	6.85	7.35	6.84	7.35
Cu, Copper (ppm)	1571	53	1554	1589	1527	1616
Dy, Dysprosium (ppm)	3.78	0.340	3.55	4.02	3.57	4.00
Er, Erbium (ppm)	1.14	0.12	1.05	1.22	1.02	1.25
Eu, Europium (ppm)	1.46	0.089	1.40	1.51	1.35	1.56
Fe, Iron (wt.%)	4.23	0.094	4.19	4.26	4.13	4.32
Ga, Gallium (ppm)	25.8	1.42	25.1	26.5	24.7	27.0
Gd, Gadolinium (ppm)	6.43	0.75	5.86	7.00	6.13	6.72
Hf, Hafnium (ppm)	7.26	0.74	6.67	7.85	6.90	7.61
Ho, Holmium (ppm)	0.53	0.07	0.48	0.59	0.45	0.62
In, Indium (ppm)	0.62	0.08	0.57	0.67	IND	IND
K, Potassium (wt.%)	2.94	0.122	2.89	2.99	2.86	3.02
La, Lanthanum (ppm)	48.0	2.72	46.7	49.3	45.8	50.1

Note: intervals may appear asymmetric due to rounding.

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Borate / Peroxide Fusion ICP continued						
Li, Lithium (ppm)	20.6	3.1	18.7	22.6	19.1	22.2
Mg, Magnesium (wt.%)	0.288	0.015	0.281	0.294	0.278	0.298
Mn, Manganese (wt.%)	0.039	0.001	0.039	0.040	0.038	0.041
Nb, Niobium (ppm)	18.5	2.7	16.9	20.1	16.1	20.9
Nd, Neodymium (ppm)	40.5	1.82	39.4	41.5	37.8	43.1
P, Phosphorus (wt.%)	0.028	0.003	0.027	0.030	0.026	0.031
Pb, Lead (ppm)	30.8	3.3	28.5	33.1	28.3	33.4
Pr, Praseodymium (ppm)	10.9	0.73	10.4	11.4	10.4	11.4
Rb, Rubidium (ppm)	137	5	135	140	134	141
S, Sulphur (wt.%)	0.071	0.013	0.066	0.077	IND	IND
Sb, Antimony (ppm)	1.96	0.32	1.77	2.14	1.61	2.30
Si, Silicon (wt.%)	32.33	1.133	31.68	32.98	31.76	32.90
Sm, Samarium (ppm)	7.64	0.286	7.51	7.77	7.25	8.02
Sn, Tin (ppm)	7.49	1.19	6.12	8.86	6.25	8.73
Sr, Strontium (ppm)	159	6	155	162	149	168
Ta, Tantalum (ppm)	1.38	0.14	1.29	1.47	1.17	1.58
Tb, Terbium (ppm)	0.81	0.10	0.74	0.89	0.71	0.92
Th, Thorium (ppm)	14.7	0.64	14.3	15.1	14.1	15.3
Ti, Titanium (wt.%)	0.128	0.005	0.125	0.130	0.123	0.132
Tl, Thallium (ppm)	0.74	0.044	0.72	0.77	IND	IND
Tm, Thulium (ppm)	0.14	0.03	0.13	0.15	IND	IND
U, Uranium (ppm)	5.00	0.411	4.72	5.29	4.78	5.23
V, Vanadium (ppm)	11.3	1.6	10.2	12.4	IND	IND
W, Tungsten (ppm)	3.02	0.46	2.84	3.19	2.57	3.47
Y, Yttrium (ppm)	16.6	1.42	15.9	17.3	16.1	17.1
Yb, Ytterbium (ppm)	0.76	0.073	0.70	0.81	IND	IND
Zn, Zinc (ppm)	139	10	134	144	132	146
Zr, Zirconium (ppm)	270	19	251	289	260	280
Aqua Regia Digestion						
Ag, Silver (ppm)	0.516	0.049	0.499	0.534	0.489	0.544
Al, Aluminium (wt.%)	0.817	0.049	0.797	0.838	0.796	0.839
As, Arsenic (ppm)	31.7	1.82	31.0	32.4	30.5	32.9
Au, Gold (ppm)	0.395	0.019	0.387	0.403	0.392†	0.398†
Ba, Barium (ppm)	249	15	243	255	242	256
Be, Beryllium (ppm)	0.93	0.079	0.90	0.96	0.87	1.00
Bi, Bismuth (ppm)	5.74	0.353	5.59	5.90	5.55	5.94
Ca, Calcium (wt.%)	0.337	0.018	0.330	0.344	0.327	0.346
Cd, Cadmium (ppm)	0.34	0.029	0.33	0.35	0.33	0.36
Ce, Cerium (ppm)	80	5.3	77	82	77	82
Co, Cobalt (ppm)	13.9	0.91	13.6	14.2	13.4	14.3

Note: intervals may appear asymmetric due to rounding; †Gold Tolerance Limits for typical 25g aqua regia sample weight determined from 20 x 85mg NAA results and the Sampling Constant (Ingamells & Switzer, 1973).

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Aqua Regia Digestion continued						
Cs, Cesium (ppm)	1.32	0.16	1.24	1.40	1.25	1.38
Cu, Copper (ppm)	1562	47	1545	1578	1534	1590
Dy, Dysprosium (ppm)	1.73	0.32	1.47	1.99	1.63	1.83
Cr, Chromium (ppm)	17.6	1.8	16.9	18.3	16.2	19.0
Eu, Europium (ppm)	0.92	0.092	0.84	0.99	0.89	0.95
Fe, Iron (wt.%)	3.50	0.149	3.44	3.55	3.43	3.56
Ga, Gallium (ppm)	6.43	0.66	6.15	6.71	6.22	6.64
Gd, Gadolinium (ppm)	3.59	0.344	3.30	3.87	3.43	3.74
Ge, Germanium (ppm)	< 1	IND	IND	IND	IND	IND
Hf, Hafnium (ppm)	1.22	0.22	1.10	1.34	1.17	1.28
Hg, Mercury (ppm)	< 0.05	IND	IND	IND	IND	IND
Ho, Holmium (ppm)	0.22	0.04	0.19	0.25	0.21	0.23
In, Indium (ppm)	0.58	0.042	0.56	0.60	0.55	0.61
K, Potassium (wt.%)	0.322	0.023	0.313	0.331	0.312	0.332
La, Lanthanum (ppm)	39.8	2.46	38.9	40.7	38.7	40.9
Li, Lithium (ppm)	4.87	0.67	4.59	5.15	4.64	5.11
Lu, Lutetium (ppm)	0.034	0.005	0.031	0.037	IND	IND
Mg, Magnesium (wt.%)	0.158	0.012	0.154	0.163	0.154	0.163
Mn, Manganese (wt.%)	0.035	0.001	0.035	0.036	0.034	0.036
Mo, Molybdenum (ppm)	3.02	0.173	2.97	3.08	2.90	3.15
Na, Sodium (wt.%)	0.092	0.009	0.089	0.095	0.089	0.096
Nd, Neodymium (ppm)	30.5	3.5	27.7	33.2	29.5	31.5
Ni, Nickel (ppm)	8.90	0.637	8.69	9.11	8.29	9.51
P, Phosphorus (wt.%)	0.023	0.002	0.023	0.024	0.023	0.024
Pb, Lead (ppm)	17.1	1.67	16.5	17.6	16.4	17.7
Pr, Praseodymium (ppm)	8.42	0.698	7.90	8.94	8.10	8.74
Rb, Rubidium (ppm)	19.3	1.41	18.6	19.9	18.4	20.1
S, Sulphur (wt.%)	0.065	0.007	0.063	0.068	0.062	0.068
Sb, Antimony (ppm)	1.12	0.16	1.05	1.20	1.07	1.18
Sc, Scandium (ppm)	1.89	0.19	1.81	1.97	1.69	2.09
Se, Selenium (ppm)	2.32	0.44	2.12	2.51	2.08	2.55
Sm, Samarium (ppm)	5.05	0.455	4.63	5.47	4.88	5.22
Sn, Tin (ppm)	1.27	0.14	1.21	1.33	1.13	1.41
Sr, Strontium (ppm)	12.3	1.17	11.9	12.8	11.8	12.9
Tb, Terbium (ppm)	0.44	0.05	0.40	0.47	0.42	0.46
Te, Tellurium (ppm)	0.065	0.011	0.061	0.069	IND	IND
Th, Thorium (ppm)	8.88	0.705	8.57	9.20	8.60	9.17
Ti, Titanium (wt.%)	0.019	0.003	0.018	0.020	0.018	0.020
Tl, Thallium (ppm)	0.11	0.01	0.11	0.11	IND	IND
Tm, Thulium (ppm)	0.047	0.008	0.038	0.057	IND	IND
U, Uranium (ppm)	2.37	0.194	2.29	2.46	2.27	2.47
V, Vanadium (ppm)	6.05	0.85	5.74	6.37	5.78	6.33

Note: intervals may appear asymmetric due to rounding.

Table 1 continued.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
W, Tungsten (ppm)	< 1	IND	IND	IND	IND	IND
Y, Yttrium (ppm)	7.08	0.492	6.89	7.27	6.78	7.39
Yb, Ytterbium (ppm)	0.27	0.04	0.25	0.29	0.24	0.30
Zn, Zinc (ppm)	67	5.0	65	69	64	70
Zr, Zirconium (ppm)	47.5	5.0	45.2	49.8	45.6	49.4
Sulphuric Acid Leach (5%)						
Cu-Sol, Copper Soluble (ppm)	1272	65	1245	1299	1249	1294
Gas / Liquid Pycnometry						
SG, Specific Gravity (Unity)	2.75	0.042	2.73	2.77	2.73	2.77

Note: intervals may appear asymmetric due to rounding.

Table 2. Indicative Values for OREAS 905.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Pb Fire Assay								
Pd	ppb	*< 1*	Pt	ppb	*< 1*			
4-Acid Digestion								
B	ppm	*4.00*	Hg	ppm	*0.03*			
Ge	ppm	*0.54*	Re	ppm	*< 0.002*			
Borate / Peroxide Fusion ICP								
Ag	ppm	*0.69*	Lu	ppm	*0.08*	Sc	ppm	*4.50*
B	ppm	*19.2*	Mo	ppm	*2.95*	Se	ppm	*< 20*
Cd	ppm	*0.40*	Na	wt.%	*2.41*	Te	ppm	*< 1*
Cr	ppm	*28.2*	Ni	ppm	*12.5*			
Ge	ppm	*1.53*	Re	ppm	*< 0.1*			
Aqua Regia Digestion								
B	ppm	*< 10*	Os	ppm	*< 0.01*	Rh	ppm	*0.07*
Er	ppm	*0.44*	Pd	ppb	*< 10*	Ru	ppm	*2.68*
Ir	ppm	*< 0.01*	Pt	ppb	*< 5*	Ta	ppm	*< 0.01*
Nb	ppm	*0.44*	Re	ppm	*< 0.001*			
Borate Fusion XRF								
Al_2O_3	wt.%	*14.57*	MgO	wt.%	*0.50*	SiO_2	wt.%	*68.25*
CaO	wt.%	*0.86*	MnO	wt.%	*0.05*	SO_3	wt.%	*0.17*
Fe_2O_3	wt.%	*5.88*	Na_2O	wt.%	*3.40*	TiO_2	wt.%	*0.21*
K_2O	wt.%	*3.57*	P_2O_5	wt.%	*0.069*			
Thermogravimetry								
LOI^{1000}	wt.%	*1.86*						
Infrared Combustion								
S	wt.%	*0.05*						

Table 3. Neutron Activation Analysis of Au on 20 x 85mg subsamples of OREAS 905.

Replicate No	NAA 85mg
1	0.380
2	0.410
3	0.420
4	0.430
5	0.400
6	0.417
7	0.424
8	0.391
9	0.418
10	0.423
11	0.379
12	0.386
13	0.394
14	0.402
15	0.413
16	0.371
17	0.380
18	0.399
19	0.416
20	0.390
Mean	0.402
Median	0.401
Std Dev.	0.018
Rel.Std.Dev.	4.41%
PDM[3]	2.88%

Table 4. Performance Gates for OREAS 905.

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
Pb Fire Assay											
Au, ppm	0.391	0.009	0.372	0.410	0.363	0.419	2.39%	4.79%	7.18%	0.371	0.410
4-Acid Digestion											
Ag, ppm	0.518	0.095	0.327	0.708	0.232	0.803	18.37%	36.74%	55.12%	0.492	0.544
Al, wt.%	7.42	0.266	6.89	7.96	6.63	8.22	3.58%	7.15%	10.73%	7.05	7.80
As, ppm	34.7	1.74	31.2	38.2	29.5	39.9	5.02%	10.03%	15.05%	33.0	36.4
Ba, ppm	2699	126	2448	2951	2322	3077	4.67%	9.33%	14.00%	2564	2834
Be, ppm	3.04	0.32	2.41	3.68	2.09	3.99	10.40%	20.81%	31.21%	2.89	3.20
Bi, ppm	5.72	0.337	5.04	6.39	4.70	6.73	5.89%	11.79%	17.68%	5.43	6.00
Ca, wt.%	0.590	0.028	0.534	0.646	0.507	0.674	4.72%	9.44%	14.16%	0.561	0.620
Cd, ppm	0.36	0.04	0.27	0.45	0.22	0.49	12.55%	25.10%	37.65%	0.34	0.38
Ce, ppm	92	4.3	84	101	79	105	4.68%	9.36%	14.04%	88	97
Co, ppm	14.8	0.80	13.2	16.5	12.4	17.3	5.42%	10.84%	16.26%	14.1	15.6
Cr, ppm	19.2	3.1	12.9	25.5	9.8	28.6	16.37%	32.75%	49.12%	18.2	20.1
Cs, ppm	6.78	0.407	5.96	7.59	5.56	8.00	6.01%	12.01%	18.02%	6.44	7.12

Note: intervals may appear asymmetric due to rounding.

Table 4 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											
Cu, ppm	1533	61	1412	1655	1352	1715	3.95%	7.91%	11.86%	1457	1610
Dy, ppm	3.72	0.216	3.29	4.16	3.08	4.37	5.81%	11.62%	17.43%	3.54	3.91
Er, ppm	1.12	0.046	1.03	1.21	0.98	1.25	4.09%	8.18%	12.28%	1.06	1.17
Eu, ppm	1.42	0.115	1.19	1.65	1.08	1.77	8.07%	16.13%	24.20%	1.35	1.49
Fe, wt.%	4.08	0.156	3.76	4.39	3.61	4.54	3.83%	7.66%	11.49%	3.87	4.28
Ga, ppm	25.1	1.02	23.1	27.2	22.1	28.2	4.05%	8.10%	12.15%	23.9	26.4
Gd, ppm	5.90	0.364	5.17	6.63	4.81	6.99	6.17%	12.34%	18.51%	5.60	6.19
Hf, ppm	6.84	0.377	6.09	7.60	5.71	7.98	5.52%	11.03%	16.55%	6.50	7.19
Ho, ppm	0.50	0.046	0.41	0.59	0.36	0.64	9.24%	18.47%	27.71%	0.47	0.52
In, ppm	0.64	0.047	0.54	0.73	0.49	0.78	7.44%	14.87%	22.31%	0.60	0.67
K, wt.%	2.88	0.116	2.64	3.11	2.53	3.22	4.03%	8.06%	12.09%	2.73	3.02
La, ppm	46.0	2.97	40.0	51.9	37.1	54.9	6.46%	12.92%	19.38%	43.7	48.3
Li, ppm	20.0	1.60	16.8	23.2	15.2	24.8	7.98%	15.96%	23.94%	19.0	21.0
Lu, ppm	0.10	0.01	0.07	0.13	0.06	0.15	14.47%	28.94%	43.41%	0.10	0.11
Mg, wt.%	0.276	0.016	0.245	0.308	0.229	0.324	5.74%	11.48%	17.22%	0.262	0.290
Mn, wt.%	0.038	0.002	0.034	0.041	0.033	0.043	4.32%	8.64%	12.97%	0.036	0.040
Mo, ppm	3.27	0.262	2.75	3.79	2.49	4.06	8.00%	16.01%	24.01%	3.11	3.43
Na, wt.%	2.40	0.112	2.17	2.62	2.06	2.74	4.68%	9.37%	14.05%	2.28	2.52
Nb, ppm	18.1	1.10	15.9	20.3	14.8	21.4	6.05%	12.10%	18.15%	17.2	19.0
Nd, ppm	39.1	1.55	36.0	42.1	34.4	43.7	3.96%	7.92%	11.88%	37.1	41.0
Ni, ppm	9.54	0.844	7.86	11.23	7.01	12.08	8.85%	17.69%	26.54%	9.07	10.02
P, wt.%	0.028	0.002	0.023	0.032	0.021	0.034	8.19%	16.37%	24.56%	0.026	0.029
Pb, ppm	30.4	2.10	26.2	34.6	24.1	36.7	6.89%	13.78%	20.67%	28.9	32.0
Pr, ppm	10.5	0.64	9.3	11.8	8.6	12.4	6.04%	12.07%	18.11%	10.0	11.1
Rb, ppm	138	6	126	151	119	157	4.60%	9.21%	13.81%	131	145
S, wt.%	0.066	0.006	0.053	0.079	0.047	0.085	9.80%	19.60%	29.40%	0.063	0.069
Sb, ppm	1.95	0.128	1.70	2.21	1.57	2.34	6.57%	13.13%	19.70%	1.85	2.05
Sc, ppm	4.90	0.459	3.98	5.81	3.52	6.27	9.38%	18.77%	28.15%	4.65	5.14
Se, ppm	2.84	0.32	2.20	3.49	1.87	3.81	11.34%	22.68%	34.02%	2.70	2.98
Sm, ppm	7.40	0.506	6.39	8.41	5.88	8.92	6.84%	13.69%	20.53%	7.03	7.77
Sn, ppm	3.96	0.271	3.41	4.50	3.14	4.77	6.84%	13.69%	20.53%	3.76	4.15
Sr, ppm	157	7	144	170	137	176	4.15%	8.30%	12.45%	149	165
Ta, ppm	1.34	0.083	1.18	1.51	1.10	1.59	6.16%	12.32%	18.48%	1.28	1.41
Tb, ppm	0.77	0.070	0.63	0.91	0.56	0.98	9.03%	18.07%	27.10%	0.73	0.81
Te, ppm	0.088	0.017	0.054	0.122	0.037	0.139	19.43%	38.87%	58.30%	0.083	0.092
Th, ppm	14.6	0.76	13.1	16.2	12.4	16.9	5.19%	10.38%	15.57%	13.9	15.4
Ti, wt.%	0.122	0.006	0.109	0.134	0.103	0.141	5.12%	10.24%	15.36%	0.116	0.128
Tl, ppm	0.72	0.055	0.61	0.83	0.56	0.89	7.62%	15.24%	22.86%	0.69	0.76
Tm, ppm	0.11	0.01	0.08	0.14	0.07	0.15	12.85%	25.70%	38.55%	0.10	0.11
U, ppm	4.97	0.306	4.36	5.59	4.06	5.89	6.15%	12.30%	18.45%	4.73	5.22
V, ppm	10.1	0.97	8.2	12.1	7.2	13.0	9.53%	19.07%	28.60%	9.6	10.7
W, ppm	2.78	0.174	2.43	3.12	2.26	3.30	6.26%	12.52%	18.78%	2.64	2.92
Y, ppm	15.7	0.81	14.1	17.3	13.3	18.1	5.13%	10.26%	15.40%	14.9	16.5

Note: intervals may appear asymmetric due to rounding.

Table 4 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											
Yb, ppm	0.68	0.048	0.58	0.77	0.53	0.82	7.05%	14.10%	21.16%	0.64	0.71
Zn, ppm	138	7	125	151	118	158	4.83%	9.65%	14.48%	131	145
Zr, ppm	252	12	229	275	217	287	4.58%	9.16%	13.75%	240	265
Borate / Peroxide Fusion ICP											
Al, wt.%	7.59	0.175	7.25	7.94	7.07	8.12	2.30%	4.60%	6.89%	7.22	7.97
As, ppm	36.2	4.6	26.9	45.5	22.2	50.1	12.84%	25.69%	38.53%	34.4	38.0
Ba, ppm	2795	105	2584	3006	2479	3112	3.77%	7.55%	11.32%	2656	2935
Be, ppm	3.08	0.52	2.04	4.13	1.51	4.65	16.96%	33.91%	50.87%	2.93	3.24
Bi, ppm	6.20	0.357	5.48	6.91	5.13	7.27	5.76%	11.53%	17.29%	5.89	6.51
Ca, wt.%	0.608	0.029	0.551	0.666	0.522	0.694	4.71%	9.43%	14.14%	0.578	0.639
Ce, ppm	96	5.9	84	108	78	114	6.16%	12.32%	18.48%	91	101
Co, ppm	15.3	2.1	11.0	19.5	8.9	21.7	13.93%	27.85%	41.78%	14.5	16.0
Cs, ppm	7.10	0.439	6.22	7.98	5.78	8.42	6.19%	12.37%	18.56%	6.74	7.45
Cu, ppm	1571	53	1466	1677	1413	1730	3.35%	6.71%	10.06%	1493	1650
Dy, ppm	3.78	0.340	3.10	4.46	2.76	4.80	8.99%	17.98%	26.97%	3.59	3.97
Er, ppm	1.14	0.12	0.90	1.37	0.79	1.49	10.25%	20.49%	30.74%	1.08	1.19
Eu, ppm	1.46	0.089	1.28	1.64	1.19	1.72	6.08%	12.15%	18.23%	1.38	1.53
Fe, wt.%	4.23	0.094	4.04	4.41	3.94	4.51	2.23%	4.45%	6.68%	4.02	4.44
Ga, ppm	25.8	1.42	23.0	28.7	21.6	30.1	5.50%	11.00%	16.50%	24.5	27.1
Gd, ppm	6.43	0.75	4.94	7.92	4.19	8.66	11.60%	23.20%	34.80%	6.10	6.75
Hf, ppm	7.26	0.74	5.78	8.73	5.05	9.47	10.16%	20.32%	30.47%	6.90	7.62
Ho, ppm	0.53	0.07	0.39	0.67	0.32	0.74	13.14%	26.27%	39.41%	0.51	0.56
In, ppm	0.62	0.08	0.47	0.77	0.39	0.85	12.22%	24.44%	36.66%	0.59	0.65
K, wt.%	2.94	0.122	2.69	3.18	2.57	3.31	4.17%	8.33%	12.50%	2.79	3.09
La, ppm	48.0	2.72	42.5	53.4	39.8	56.1	5.66%	11.33%	16.99%	45.6	50.4
Li, ppm	20.6	3.1	14.4	26.8	11.3	29.9	15.08%	30.16%	45.24%	19.6	21.6
Mg, wt.%	0.288	0.015	0.258	0.318	0.242	0.333	5.27%	10.54%	15.81%	0.273	0.302
Mn, wt.%	0.039	0.001	0.037	0.042	0.036	0.043	3.17%	6.35%	9.52%	0.038	0.041
Nb, ppm	18.5	2.7	13.1	23.9	10.3	26.7	14.70%	29.39%	44.09%	17.6	19.4
Nd, ppm	40.5	1.82	36.8	44.1	35.0	45.9	4.49%	8.98%	13.48%	38.5	42.5
P, wt.%	0.028	0.003	0.023	0.034	0.020	0.037	10.15%	20.30%	30.45%	0.027	0.030
Pb, ppm	30.8	3.3	24.2	37.4	20.9	40.7	10.71%	21.43%	32.14%	29.3	32.3
Pr, ppm	10.9	0.73	9.4	12.4	8.7	13.1	6.72%	13.43%	20.15%	10.3	11.4
Rb, ppm	137	5	128	146	124	151	3.29%	6.57%	9.86%	131	144
S, wt.%	0.071	0.013	0.045	0.098	0.032	0.111	18.41%	36.83%	55.24%	0.068	0.075
Sb, ppm	1.96	0.32	1.31	2.60	0.99	2.92	16.47%	32.95%	49.42%	1.86	2.05
Si, wt.%	32.33	1.133	30.06	34.60	28.93	35.73	3.51%	7.01%	10.52%	30.71	33.95
Sm, ppm	7.64	0.286	7.06	8.21	6.78	8.49	3.75%	7.49%	11.24%	7.25	8.02
Sn, ppm	7.49	1.19	5.12	9.86	3.93	11.05	15.84%	31.67%	47.51%	7.11	7.86
Sr, ppm	159	6	146	172	139	178	4.09%	8.19%	12.28%	151	167
Ta, ppm	1.38	0.14	1.09	1.66	0.94	1.81	10.46%	20.91%	31.37%	1.31	1.44
Tb, ppm	0.81	0.10	0.61	1.01	0.51	1.12	12.34%	24.69%	37.03%	0.77	0.85
Th, ppm	14.7	0.64	13.4	16.0	12.8	16.6	4.36%	8.72%	13.08%	14.0	15.4

Note: intervals may appear asymmetric due to rounding.

Table 4 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
Borate / Peroxide Fusion ICP continued											
Ti, wt.%	0.128	0.005	0.117	0.138	0.112	0.143	3.98%	7.95%	11.93%	0.121	0.134
Tl, ppm	0.74	0.044	0.66	0.83	0.61	0.87	5.87%	11.73%	17.60%	0.71	0.78
Tm, ppm	0.14	0.03	0.09	0.19	0.06	0.22	18.29%	36.57%	54.86%	0.13	0.15
U, ppm	5.00	0.411	4.18	5.83	3.77	6.24	8.22%	16.44%	24.66%	4.75	5.25
V, ppm	11.3	1.6	8.2	14.4	6.6	16.0	13.91%	27.83%	41.74%	10.7	11.9
W, ppm	3.02	0.46	2.11	3.93	1.65	4.39	15.12%	30.23%	45.35%	2.87	3.17
Y, ppm	16.6	1.42	13.7	19.4	12.3	20.8	8.57%	17.13%	25.70%	15.7	17.4
Yb, ppm	0.76	0.073	0.61	0.90	0.54	0.97	9.63%	19.26%	28.89%	0.72	0.79
Zn, ppm	139	10	119	159	109	169	7.17%	14.35%	21.52%	132	146
Zr, ppm	270	19	233	307	214	326	6.89%	13.78%	20.67%	257	284
Aqua Regia Digestion											
Ag, ppm	0.516	0.049	0.419	0.614	0.371	0.662	9.41%	18.82%	28.23%	0.491	0.542
Al, wt.%	0.817	0.049	0.719	0.916	0.669	0.965	6.03%	12.05%	18.08%	0.776	0.858
As, ppm	31.7	1.82	28.1	35.3	26.2	37.1	5.74%	11.47%	17.21%	30.1	33.3
Au, ppm	0.395	0.019	0.357	0.433	0.338	0.452	4.78%	9.56%	14.34%	0.375	0.415
Ba, ppm	249	15	218	280	203	295	6.22%	12.43%	18.65%	237	261
Be, ppm	0.93	0.079	0.78	1.09	0.70	1.17	8.46%	16.93%	25.39%	0.89	0.98
Bi, ppm	5.74	0.353	5.04	6.45	4.69	6.80	6.15%	12.29%	18.44%	5.46	6.03
Ca, wt.%	0.337	0.018	0.301	0.372	0.283	0.390	5.27%	10.55%	15.82%	0.320	0.354
Cd, ppm	0.34	0.029	0.28	0.40	0.26	0.43	8.39%	16.79%	25.18%	0.33	0.36
Ce, ppm	80	5.3	69	90	64	95	6.60%	13.21%	19.81%	76	84
Co, ppm	13.9	0.91	12.1	15.7	11.2	16.6	6.52%	13.04%	19.56%	13.2	14.6
Cr, ppm	17.6	1.8	14.0	21.2	12.2	23.1	10.29%	20.58%	30.87%	16.7	18.5
Cs, ppm	1.32	0.16	0.99	1.64	0.83	1.81	12.41%	24.82%	37.23%	1.25	1.38
Cu, ppm	1562	47	1468	1656	1420	1703	3.02%	6.04%	9.05%	1484	1640
Dy, ppm	1.73	0.32	1.08	2.38	0.76	2.70	18.75%	37.49%	56.24%	1.64	1.82
Eu, ppm	0.92	0.092	0.73	1.10	0.64	1.19	9.97%	19.95%	29.92%	0.87	0.96
Fe, wt.%	3.50	0.149	3.20	3.79	3.05	3.94	4.27%	8.54%	12.81%	3.32	3.67
Ga, ppm	6.43	0.66	5.11	7.75	4.45	8.41	10.27%	20.54%	30.81%	6.11	6.75
Gd, ppm	3.59	0.344	2.90	4.27	2.55	4.62	9.59%	19.18%	28.77%	3.41	3.76
Ge, ppm	< 1	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Hf, ppm	1.22	0.22	0.78	1.67	0.56	1.89	18.14%	36.27%	54.41%	1.16	1.28
Hg, ppm	< 0.05	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Ho, ppm	0.22	0.04	0.15	0.30	0.11	0.33	16.43%	32.87%	49.30%	0.21	0.23
In, ppm	0.58	0.042	0.49	0.66	0.45	0.71	7.33%	14.65%	21.98%	0.55	0.61
K, wt.%	0.322	0.023	0.276	0.368	0.253	0.391	7.18%	14.36%	21.54%	0.306	0.338
La, ppm	39.8	2.46	34.9	44.7	32.4	47.2	6.17%	12.34%	18.52%	37.8	41.8
Li, ppm	4.87	0.67	3.54	6.21	2.87	6.88	13.71%	27.43%	41.14%	4.63	5.12
Lu, ppm	0.034	0.005	0.023	0.045	0.018	0.050	15.69%	31.38%	47.07%	0.032	0.036
Mg, wt.%	0.158	0.012	0.135	0.182	0.123	0.194	7.49%	14.98%	22.48%	0.150	0.166
Mn, wt.%	0.035	0.001	0.033	0.038	0.032	0.039	3.30%	6.59%	9.89%	0.034	0.037
Mo, ppm	3.02	0.173	2.68	3.37	2.51	3.54	5.72%	11.43%	17.15%	2.87	3.18
Na, wt.%	0.092	0.009	0.073	0.111	0.064	0.120	10.20%	20.39%	30.59%	0.087	0.097

Note: intervals may appear asymmetric due to rounding.

Table 4 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											
Nd, ppm	30.5	3.5	23.5	37.5	19.9	41.0	11.53%	23.06%	34.59%	29.0	32.0
Ni, ppm	8.90	0.637	7.63	10.18	6.99	10.82	7.16%	14.32%	21.48%	8.46	9.35
P, wt.%	0.023	0.002	0.020	0.027	0.018	0.028	7.23%	14.46%	21.68%	0.022	0.025
Pb, ppm	17.1	1.67	13.7	20.4	12.1	22.1	9.76%	19.53%	29.29%	16.2	17.9
Pr, ppm	8.42	0.698	7.02	9.82	6.33	10.51	8.29%	16.58%	24.87%	8.00	8.84
Rb, ppm	19.3	1.41	16.4	22.1	15.0	23.5	7.32%	14.64%	21.97%	18.3	20.2
S, wt.%	0.065	0.007	0.052	0.078	0.045	0.085	10.11%	20.22%	30.34%	0.062	0.068
Sb, ppm	1.12	0.16	0.80	1.45	0.63	1.61	14.51%	29.03%	43.54%	1.07	1.18
Sc, ppm	1.89	0.19	1.50	2.28	1.31	2.47	10.28%	20.57%	30.85%	1.80	1.98
Se, ppm	2.32	0.44	1.45	3.19	1.01	3.62	18.78%	37.55%	56.33%	2.20	2.43
Sm, ppm	5.05	0.455	4.14	5.96	3.69	6.42	9.00%	18.00%	27.00%	4.80	5.31
Sn, ppm	1.27	0.14	1.00	1.55	0.86	1.68	10.81%	21.63%	32.44%	1.21	1.34
Sr, ppm	12.3	1.17	10.0	14.7	8.8	15.8	9.49%	18.97%	28.46%	11.7	12.9
Tb, ppm	0.44	0.05	0.33	0.54	0.28	0.60	11.89%	23.79%	35.68%	0.42	0.46
Te, ppm	0.065	0.011	0.042	0.088	0.031	0.099	17.47%	34.94%	52.41%	0.062	0.068
Th, ppm	8.88	0.705	7.47	10.29	6.77	11.00	7.94%	15.87%	23.81%	8.44	9.33
Ti, wt.%	0.019	0.003	0.014	0.025	0.011	0.027	14.18%	28.37%	42.55%	0.018	0.020
Tl, ppm	0.11	0.01	0.09	0.13	0.08	0.14	10.32%	20.64%	30.97%	0.10	0.12
Tm, ppm	0.047	0.008	0.032	0.063	0.024	0.071	16.49%	32.99%	49.48%	0.045	0.050
U, ppm	2.37	0.194	1.98	2.76	1.79	2.96	8.20%	16.39%	24.59%	2.25	2.49
V, ppm	6.05	0.85	4.36	7.75	3.51	8.59	13.98%	27.97%	41.95%	5.75	6.36
W, ppm	< 1	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Y, ppm	7.08	0.492	6.10	8.07	5.60	8.56	6.95%	13.90%	20.85%	6.73	7.44
Yb, ppm	0.27	0.04	0.19	0.35	0.14	0.39	15.32%	30.63%	45.95%	0.25	0.28
Zn, ppm	67	5.0	57	77	52	82	7.49%	14.99%	22.48%	64	71
Zr, ppm	47.5	5.0	37.6	57.4	32.6	62.4	10.43%	20.86%	31.29%	45.1	49.9
Sulphuric Acid Leach											
Cu-Sol, ppm	1272	65	1141	1403	1076	1468	5.14%	10.29%	15.43%	1208	1336
Gas / Liquid Pycnometry											
SG, Unity	2.75	0.042	2.66	2.83	2.62	2.87	1.52%	3.03%	4.55%	2.61	2.88

Note: intervals may appear asymmetric due to rounding.

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Reference material OREAS 905 has been prepared, certified and is supplied by:

ORE Research & Exploration Pty Ltd
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AUSTRALIA

Tel: +613-9729 0333
Fax: +613-9729 8338
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It is available in unit sizes of 10g, 60g and 100g (single-use laminated foil pouches) and 500g (plastic jars).

INTENDED USE

OREAS 905 is intended for the following uses:

- for the monitoring of laboratory performance in the analysis of analytes reported in Table 1 in geological samples;
- 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 905 has been sourced from oxide copper ore and blended with weathered rhyodacite. In its unopened state and under normal conditions of storage it has a shelf life beyond ten years. Its stability will be monitored at regular intervals and purchasers notified if any changes are observed.

INSTRUCTIONS FOR CORRECT USE

The certified values for OREAS 905 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.

TRACEABILITY

The analytical samples were selected in a manner to represent the entire batch of prepared CRM. This 'representivity' was maintained in each submitted laboratory sample batch and ensures the user that the data is traceable from sample selection through to the analytical results that underlie the consensus values. Each analytical data set has been validated by its assayer through the inclusion of internal reference materials and QC checks during analysis. The laboratories were chosen on the basis of their competence (from past performance in inter-laboratory programs) for a particular analytical method, analyte or analyte suite, and sample matrix. Most of these laboratories have and maintain ISO 17025 accreditation. The certified values presented in this report are calculated from the means of accepted data following robust statistical treatment as detailed in this report.

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QMS ACCREDITED

ORE Pty Ltd is accredited to ISO 9001:2008 by Lloyd's Register Quality Assurance Ltd for its quality management system including development, manufacturing, certification and supply of CRMs.

CERTIFYING OFFICER

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

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