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CERTIFICATE OF ANALYSIS FOR

CERTIFIED REFERENCE MATERIAL

OREAS 613

Silver Ore

(Bowdens Silver Project, New South Wales, Australia)

Table 1. Certified Values, Uncertainty & Tolerance Intervals in OREAS 613.

Constituent	Certified Value	95% Expanded Uncertainty		95% Tolerance Limits	
		Low	High	Low	High
Pb Fire Assay					
Au, Gold (ppm)	5.21	5.13	5.29	5.14*	5.28*
Pb Fire Assay (Grav)					
Ag, Silver (ppm)	299	286	311	293	305
Aqua Regia Digestion (sample weights 10-50g)					
Au, Gold (ppm)	5.11	4.99	5.24	5.04*	5.19*
4-Acid Digestion					
Ag, Silver (ppm)	312	305	320	307	318
Al, Aluminium (wt.%)	6.90	6.60	7.19	6.71	7.08
As, Arsenic (ppm)	1157	1124	1189	1135	1179
Be, Beryllium (ppm)	2.34	2.24	2.44	2.27	2.40
Bi, Bismuth (ppm)	64	61	66	62	65
Ca, Calcium (wt.%)	0.904	0.876	0.932	0.883	0.924
Cd, Cadmium (ppm)	12.0	11.6	12.5	11.8	12.3
Ce, Cerium (ppm)	74	71	78	73	76
Co, Cobalt (ppm)	18.5	17.9	19.1	17.9	19.1
Cr, Chromium (ppm)	18.2	16.7	19.6	17.2	19.1
Cs, Caesium (ppm)	5.22	5.03	5.41	5.07	5.36
Cu, Copper (wt.%)	1.03	1.01	1.05	1.02	1.05
Dy, Dysprosium (ppm)	3.56	3.35	3.78	3.46	3.67
Er, Erbium (ppm)	1.33	1.25	1.40	1.28	1.38
Eu, Europium (ppm)	1.20	1.11	1.30	1.15	1.26
Fe, Iron (wt.%)	4.17	4.05	4.29	4.08	4.26
Ga, Gallium (ppm)	20.4	19.7	21.1	19.9	20.9
Gd, Gadolinium (ppm)	5.37	4.86	5.87	5.15	5.58
Hf, Hafnium (ppm)	5.44	5.18	5.71	5.26	5.62
Ho, Holmium (ppm)	0.53	0.49	0.58	0.51	0.56
In, Indium (ppm)	2.19	2.08	2.30	2.13	2.26
K, Potassium (wt.%)	4.01	3.91	4.12	3.94	4.08
La, Lanthanum (ppm)	35.8	34.2	37.5	34.8	36.9
Li, Lithium (ppm)	24.4	22.9	25.9	23.6	25.2
Lu, Lutetium (ppm)	0.14	0.12	0.16	IND	IND
Mg, Magnesium (wt.%)	0.165	0.158	0.172	0.161	0.168
Mn, Manganese (wt.%)	0.035	0.034	0.036	0.034	0.036
Mo, Molybdenum (ppm)	11.9	11.5	12.3	11.6	12.1
Na, Sodium (wt.%)	1.83	1.77	1.89	1.80	1.85
Nb, Niobium (ppm)	14.7	14.2	15.1	14.3	15.1
Nd, Neodymium (ppm)	33.0	31.2	34.7	32.0	34.0
Ni, Nickel (ppm)	5.96	5.49	6.44	5.57	6.35
P, Phosphorus (wt.%)	0.032	0.030	0.033	0.031	0.033

SI unit equivalents: ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

*Gold Tolerance Limits for typical 30 g lead fire assay and 25 g aqua regia digestion are determined from 20 x 85 mg INAA results and the Sampling Constant (Ingamells & Switzer, 1973).

Note: intervals may appear asymmetric due to rounding; IND = indeterminate (due to limited reading resolution of the methods employed).

Table 1 continued.

Constituent	Certified Value	95% Expanded Uncertainty		95% Tolerance Limits	
		Low	High	Low	High
4-Acid Digestion continued					
Pb, Lead (wt.%)	0.146	0.141	0.150	0.143	0.149
Pr, Praseodymium (ppm)	8.67	8.18	9.17	8.51	8.84
Rb, Rubidium (ppm)	187	179	195	183	191
S, Sulphur (wt.%)	2.59	2.53	2.66	2.54	2.65
Sb, Antimony (ppm)	104	100	108	101	107
Sc, Scandium (ppm)	5.37	5.09	5.64	5.17	5.56
Se, Selenium (ppm)	19.1	17.9	20.3	18.2	20.0
Sm, Samarium (ppm)	6.59	6.08	7.09	6.40	6.77
Sn, Tin (ppm)	8.30	7.92	8.67	8.00	8.59
Sr, Strontium (ppm)	219	210	228	215	224
Ta, Tantalum (ppm)	1.06	0.97	1.15	1.02	1.10
Tb, Terbium (ppm)	0.68	0.65	0.72	0.65	0.72
Te, Tellurium (ppm)	15.6	14.8	16.3	15.0	16.1
Th, Thorium (ppm)	11.6	11.0	12.2	11.2	12.0
Ti, Titanium (wt.%)	0.163	0.157	0.169	0.161	0.165
Tl, Thallium (ppm)	3.54	3.40	3.69	3.45	3.63
Tm, Thulium (ppm)	0.17	0.15	0.19	IND	IND
U, Uranium (ppm)	4.09	3.87	4.31	3.93	4.25
V, Vanadium (ppm)	19.6	18.8	20.5	19.1	20.2
W, Tungsten (ppm)	3.92	3.68	4.16	3.76	4.08
Y, Yttrium (ppm)	15.5	15.0	16.1	15.1	16.0
Yb, Ytterbium (ppm)	1.00	0.91	1.10	0.93	1.08
Zn, Zinc (wt.%)	0.245	0.239	0.252	0.241	0.250
Zr, Zirconium (ppm)	204	198	211	200	208
Aqua Regia Digestion					
Ag, Silver (ppm)	307	298	317	303	312
Al, Aluminium (wt.%)	0.800	0.753	0.846	0.782	0.817
As, Arsenic (ppm)	1115	1083	1147	1098	1133
B, Boron (ppm)	< 10	IND	IND	IND	IND
Be, Beryllium (ppm)	0.47	0.42	0.52	0.44	0.49
Bi, Bismuth (ppm)	65	63	66	63	66
Ca, Calcium (wt.%)	0.544	0.527	0.561	0.534	0.555
Cd, Cadmium (ppm)	12.1	11.6	12.5	11.8	12.4
Ce, Cerium (ppm)	41.5	38.7	44.2	39.9	43.0
Co, Cobalt (ppm)	17.6	16.8	18.3	17.2	18.0
Cr, Chromium (ppm)	18.3	17.2	19.4	17.3	19.3
Cs, Caesium (ppm)	1.48	1.37	1.59	1.42	1.53
Cu, Copper (wt.%)	1.04	1.02	1.07	1.03	1.06
Dy, Dysprosium (ppm)	2.10	1.84	2.36	2.00	2.21
Er, Erbium (ppm)	0.69	0.61	0.76	0.65	0.72

SI unit equivalents: ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

Note: intervals may appear asymmetric due to rounding.

IND = indeterminate (due to limited reading resolution of the methods employed. For practical purposes the 95% Expanded Uncertainty can be set between zero and a two times multiple of the upper bound/non-detect limit value).

Table 1 continued.

Constituent	Certified Value	95% Expanded Uncertainty		95% Tolerance Limits	
		Low	High	Low	High
Aqua Regia Digestion continued					
Eu, Europium (ppm)	0.73	0.62	0.85	0.70	0.76
Fe, Iron (wt.%)	3.77	3.67	3.87	3.71	3.83
Ga, Gallium (ppm)	4.78	4.44	5.12	4.57	4.99
Gd, Gadolinium (ppm)	3.37	3.01	3.72	3.26	3.47
Hf, Hafnium (ppm)	1.52	1.39	1.65	1.44	1.60
Hg, Mercury (ppm)	0.50	0.44	0.56	0.46	0.53
Ho, Holmium (ppm)	0.30	0.26	0.33	0.28	0.31
In, Indium (ppm)	2.11	1.99	2.23	2.04	2.18
K, Potassium (wt.%)	0.448	0.425	0.472	0.437	0.460
La, Lanthanum (ppm)	20.0	18.7	21.3	19.2	20.8
Li, Lithium (ppm)	5.07	4.58	5.55	4.87	5.27
Lu, Lutetium (ppm)	0.066	0.056	0.076	IND	IND
Mg, Magnesium (wt.%)	0.081	0.073	0.089	0.079	0.083
Mn, Manganese (wt.%)	0.028	0.027	0.029	0.028	0.029
Mo, Molybdenum (ppm)	11.1	10.7	11.5	10.8	11.4
Na, Sodium (wt.%)	0.081	0.073	0.089	0.078	0.085
Nb, Niobium (ppm)	1.60	1.36	1.84	1.50	1.70
Nd, Neodymium (ppm)	21.3	18.0	24.6	20.8	21.8
Ni, Nickel (ppm)	5.71	5.29	6.12	5.41	6.01
P, Phosphorus (wt.%)	0.023	0.022	0.024	0.022	0.024
Pb, Lead (wt.%)	0.139	0.135	0.144	0.137	0.142
Pr, Praseodymium (ppm)	5.51	4.59	6.42	5.36	5.65
Rb, Rubidium (ppm)	23.1	21.9	24.4	22.6	23.7
Re, Rhenium (ppm)	0.006	0.005	0.007	IND	IND
S, Sulphur (wt.%)	2.55	2.49	2.62	2.51	2.59
Sb, Antimony (ppm)	79	73	84	77	80
Sc, Scandium (ppm)	2.31	2.11	2.50	2.20	2.41
Se, Selenium (ppm)	19.4	18.3	20.5	18.5	20.3
Sm, Samarium (ppm)	3.80	3.36	4.25	3.64	3.96
Sn, Tin (ppm)	6.48	6.17	6.80	6.30	6.67
Sr, Strontium (ppm)	41.7	39.0	44.4	40.8	42.6
Tb, Terbium (ppm)	0.41	0.37	0.44	0.39	0.42
Te, Tellurium (ppm)	15.4	14.7	16.1	15.0	15.8
Th, Thorium (ppm)	7.01	6.54	7.48	6.79	7.23
Ti, Titanium (wt.%)	0.038	0.034	0.042	0.037	0.039
Tl, Thallium (ppm)	1.18	1.12	1.24	1.14	1.22
Tm, Thulium (ppm)	0.084	0.067	0.101	IND	IND
U, Uranium (ppm)	2.04	1.91	2.17	1.97	2.11
V, Vanadium (ppm)	7.51	6.74	8.29	IND	IND
W, Tungsten (ppm)	1.94	1.72	2.16	1.83	2.05
Y, Yttrium (ppm)	8.06	7.56	8.56	7.84	8.28

SI unit equivalents: ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

Note: intervals may appear asymmetric due to rounding.

IND = indeterminate (due to limited reading resolution of the methods employed).

Table 1 continued.

Constituent	Certified Value	95% Expanded Uncertainty		95% Tolerance Limits	
		Low	High	Low	High
Aqua Regia Digestion continued					
Yb, Ytterbium (ppm)	0.50	0.44	0.55	0.47	0.53
Zn, Zinc (wt.%)	0.240	0.234	0.245	0.235	0.244
Zr, Zirconium (ppm)	57	54	61	55	60
Infrared Combustion					
S, Sulphur (wt.%)	2.57	2.52	2.63	2.54	2.61

SI unit equivalents: ppm (parts per million; 1×10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).
Note: intervals may appear asymmetric due to rounding.

Table 2. Indicative Values for OREAS 613.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
4-Acid Digestion								
B	ppm	*16.2*	Ge	ppm	*0.39*	Re	ppm	*0.006*
Ba	ppm	*1222*	Hg	ppm	*0.22*			
Aqua Regia Digestion								
Ba	ppm	*164*	Pd	ppb	*< 10*	Ta	ppm	*0.024*
Ge	ppm	*0.16*	Pt	ppb	*< 5*			
Infrared Combustion								
C	wt.%	*0.116*						
Borate Fusion XRF								
Al_2O_3	wt.%	*13.67*	MgO	wt.%	*0.305*	S	wt.%	*2.61*
CaO	wt.%	*1.26*	MnO	wt.%	*0.050*	SiO_2	wt.%	*65.43*
Fe_2O_3	wt.%	*6.18*	Na_2O	wt.%	*2.51*	TiO_2	wt.%	*0.290*
K_2O	wt.%	*4.93*	P_2O_5	wt.%	*0.079*			
Thermogravimetry								
LOI^{1000}	wt.%	*3.44*						
Laser Ablation ICP-MS								
Ag	ppm	*302*	Hf	ppm	*6.30*	Sn	ppm	*9.70*
As	ppm	*1105*	Ho	ppm	*0.55*	Sr	ppm	*222*
Ba	ppm	*2200*	In	ppm	*2.05*	Ta	ppm	*1.04*
Be	ppm	*2.50*	La	ppm	*39.8*	Tb	ppm	*0.71*
Bi	ppm	*65*	Lu	ppm	*0.13*	Te	ppm	*15.7*
Cd	ppm	*12.6*	Mn	wt.%	*0.036*	Th	ppm	*12.0*
Ce	ppm	*75*	Mo	ppm	*11.8*	Ti	wt.%	*0.170*
Co	ppm	*19.3*	Nb	ppm	*15.1*	Tl	ppm	*3.20*
Cr	ppm	*23.0*	Nd	ppm	*34.3*	Tm	ppm	*0.17*
Cs	ppm	*5.15*	Ni	ppm	*8.00*	U	ppm	*4.24*
Cu	wt.%	*1.06*	Pb	wt.%	*0.144*	V	ppm	*20.3*
Dy	ppm	*3.59*	Pr	ppm	*9.27*	W	ppm	*4.25*
Er	ppm	*1.29*	Rb	ppm	*182*	Y	ppm	*15.1*
Eu	ppm	*1.24*	Re	ppm	*< 0.01*	Yb	ppm	*1.05*
Ga	ppm	*20.1*	Sb	ppm	*109*	Zn	wt.%	*0.242*
Gd	ppm	*5.05*	Sc	ppm	*4.60*	Zr	ppm	*243*
Ge	ppm	*2.35*	Sm	ppm	*6.69*			

SI unit equivalents: ppb (parts per billion; 1 x 10^{-9}) ≡ µg/kg; ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

Note: the number of significant figures reported is not a reflection of the level of certainty of stated values. They are instead an artefact of ORE's in-house CRM-specific LIMS.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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. OREAS reference materials enable users to successfully achieve process control of these tasks because the observed variance from repeated analysis has its origin almost exclusively in the analytical process rather than the reference material itself. In evaluating laboratory performance with this CRM, the section headed 'Instructions for handling and correct use' should be read carefully.

Table 1 presents the certified values together with their associated 95 % expanded uncertainty and tolerance intervals. Table 2 provides indicative values, including major and trace element characterisation, Table 3 lists indicative physical properties, while Table 4 reports indicative mineralogy determined by semi-quantitative XRD analysis, Gold homogeneity, assessed by INAA, is shown in Table 5 and is further demonstrated through a nested ANOVA (see *Homogeneity Evaluation* section). Finally, Table 6 presents the performance gate intervals for all certified values.

Tabulated results of all analytes together with uncorrected means, medians, standard deviations, relative standard deviations and per cent deviation of laboratory means from the corrected mean of means (PDM^3) are presented in the detailed certification data for this CRM (**OREAS 613-DataPack.1.0.260521_122314.xlsx**). The certified values and uncertainties in this Certificate are the sole authoritative figures. Any additional significant figures in the DataPack are provided for reference only and do not affect the certified results.

Results are also presented in scatter plots for Au and Ag by Pb fire assay and for Ag and Cu by four-acid digestion in Figures 1 to 4 respectively, together with ±3SD (magenta) and ±5 % (yellow) control lines and certified value (green line). Accepted individual results are coloured blue and individual and dataset outliers are identified in red and violet, respectively.

INTENDED USE

OREAS 613 is intended to cover all activities needed to produce a measurement result. This includes extraction, possible separation steps and the actual measurement process (the signal producing step). OREAS 613 may be used to calibrate the entire procedure by producing a pure substance CRM transformed into a calibration solution.

OREAS 613 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/ validation 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. When a value provided in this certificate is used to calibrate a measurement process, the uncertainty associated with that value should be appropriately propagated into the user's uncertainty calculation. Users can determine an approximation of the standard uncertainty by calculating one fourth of

the width of the Expanded Uncertainty interval given in this certificate (Expanded Uncertainty intervals are provided in Table 1).

SOURCE MATERIAL

OREAS 613 was prepared predominantly from a blend of silver ore materials sourced from the Bowdens Silver deposit, New South Wales, Australia, together with barren rhyodacite used as a matrix component. Bowdens silver ore is a low-sulphidation epithermal mineralisation type, containing minor amounts gold, lead, zinc, arsenic and copper. Ag, Cu Au, Zn & Pb sulphide ores were also added to achieve the target grades and high sulphidation matrix characteristics.

MINIMUM SAMPLE SIZE

To relate analytical determinations to the values in this certificate, the minimum mass of sample used should match the typical mass that the laboratories used in the interlaboratory (round robin) certification program. This means that different minimum sample masses should be used depending on the operationally defined methodology as follows:

- Au by lead collection fire assay: ≥ 25 g
- Ag by lead collection fire assay with gravimetric finish ≥ 10 g
- Au by aqua regia digestion ICP finish: ≥ 10 g
- Four-acid digestion with ICP-OES and/or MS finish: ≥ 0.25 g
- Aqua regia digestion with ICP-OES and/or MS finish: ≥ 0.5 g
- Total Sulphur by Infrared combustion furnace/CS analyser: ≥ 0.1 g

INSTRUCTIONS FOR HANDLING, STORAGE & CORRECT USE

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

Pre-homogenisation of the CRM prior to subsampling and analysis is not necessary as there is no particle segregation under transport [12].

All certified values contained within this report refer to the concentration levels in the packaged state. There is no need for drying prior to weighing and analysis.

Single-use sachets sealed under nitrogen

OREAS 613 has a certified Total Sulphur content of 2.57 wt.%, determined by interlaboratory consensus using infrared combustion furnace analysis. As a precaution to mitigate oxidation, the material is packaged under a nitrogen atmosphere in robust laminated foil pouches. Following analysis, any remaining material should be discarded unless the sachet is promptly resealed under vacuum or under nitrogen. It is the user's responsibility to prevent contamination and minimise exposure to air.

Authoritative Source of Information

This Certificate of Analysis constitutes the primary and authoritative document for the certified values, associated expanded uncertainties, and their correct use. While the

accompanying DataPack provides supporting information, including raw data and uncertainty estimates with additional significant figures, these extended figures are provided solely for transparency, convenience and statistical reference. Users must rely exclusively on the values stated in this Certificate, rounded to an appropriate number of significant figures, for all metrological and analytical purposes. Any discrepancy between values presented in the DataPack and those in this Certificate shall be resolved in favour of the information provided herein.

Notice on Certificate Updates

The version of the Certificate of Analysis (COA) available on the OREAS website is considered the official and most current version. As COAs may be revised following periodic reviews, re-evaluation of data, or the availability of new information, users are strongly advised to refer to the latest online version prior to each use.
It is the user's responsibility to ensure that the most recent and applicable certificate is used to support the traceability, validity, and fitness-for-purpose of the certified reference material (CRM).

Any significant changes to the sections of this certificate will be clearly documented in the revised certificate.

QC monitoring using multiples of the Standard Deviation (SD)

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 interlaboratory 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.

The performance gates shown in Table 6 are intended only to be used as a preliminary guide as to what a laboratory may be able to achieve. Over a period of time monitoring your own laboratory's data for this CRM, SD's should be calculated directly from your own laboratory's process. This will enable you to establish more specific performance gates that are fit for purpose for your application as well as the ability to monitor bias. If your long-term trend analysis shows an average value that is within the 95 % expanded uncertainty then generally there is no cause for concern in regard to bias.

For use with the aqua regia digestion method

It is important to note that in the analytical industry there is no standardisation of the aqua regia digestion process. This method is a partial empirical digest and differences in recoveries for various analytes are commonplace. These are caused by variations in the digest conditions and 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 interlaboratory 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.

PERIOD OF VALIDITY

The certification of OREAS 613 remains valid, within the specified measurement uncertainties, until at least September 2040, provided the CRM is handled and stored in accordance with the instructions given below. This certification is nullified if the CRM is any way changed or contaminated.

Store in a clean and cool dry place away from direct sunlight.

Long-term stability will be monitored at appropriate intervals and purchasers notified if any changes are observed. The period of validity may well be indefinite and will be reassessed prior to expiry with the aim of extending the validity if possible.

COMMINUTION AND HOMOGENISATION PROCEDURES

The materials constituting OREAS 613 was prepared in the following manner:

- Drying of ore and barren materials to constant mass at 105° C
- Drying of concentrate materials to constant mass at 85° C
- Crushing and milling of the barren rhyodacite to >98 % minus 75 microns
- Crushing and multi-stage milling of the ores and concentrates to 100 % minus 30 microns
- Preliminary blending and check assaying of ore and concentrate materials
- Blending the ores, concentrates and barren material in appropriate proportions to achieve desired grades
- Homogenisation using OREAS' novel processing technologies
- Packaging in 10 g and 60 g units sealed under nitrogen in laminated foil pouches

PHYSICAL PROPERTIES

OREAS 613 was tested at ORE Research & Exploration Pty Ltd's onsite facility for various physical properties. Table 3 presents these findings that should be used for informational purposes only.

Table 3. Physical properties of OREAS 613.

Bulk Density (kg/m^3)	Moisture (wt.%)	Munsell Notation‡	Munsell Color‡
613	0.58	N6	Medium Light Gray

‡The Munsell Rock Color Chart helps geologists and archeologists communicate with colour more effectively by cross-referencing ISCC-NBS colour names with unique Munsell alpha-numeric colour notations for rock colour samples.

MINERALOGY

The semi-quantitative XRD results shown in Table 4 below were undertaken by ALS Metallurgy in Balcatta, Western Australia. The results have been normalised to 100 % and represent the relative proportion of crystalline material. Totals greater or less than 100 % are due to rounding errors.

Some amorphous material may be present. The 'kandite group' appears to consist predominantly of kaolinite. 'Zeolite group' appears to be mainly chabazite and laumontite. Trace amounts of talc may also be present; if so, they are reported under the zeolite group due to XRD pattern overlap. Similarly, trace rutile may be present and, if detected, is reported under K-feldspar because of pattern overlap. Trace bassanite may also be present.

Table 4. Indicative mineralogy of OREAS 613 by semi-quantitative XRD analysis.

Mineral / Mineral Group	% (mass ratio)
Pyrite	3
Chalcopyrite	3
Magnetite	1
Hematite	< 1
Kandite group	< 1
Chlorite	< 1
Annite - biotite - phlogopite	< 1
Muscovite - illite	9
Garnet	1
Plagioclase	26
K-feldspar	25
Quartz	31
Jarosite group	1

ANALYTICAL PROGRAM

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

- Instrumental neutron activation analysis (INAA) for Au on 20 x 85 mg subsamples to confirm homogeneity (1 laboratory)
- Gold by Pb collection fire assay (25-50g charge weight) with AAS (21 laboratories), ICP-OES (2 laboratories) and gravimetric (1 laboratory) finish
- Silver by fire assay with gravimetric finish (16 laboratories)
- Gold by aqua regia digestion (10-50g sample weight) with AAS (5 laboratories) or ICP-MS (10 laboratory) finish
- Full ICP-OES and ICP-MS elemental suites by four-acid (HNO_3–HF–$HClO_4$–HCl) digestion (up to 22 laboratories depending on the element)
- Full ICP-OES and ICP-MS elemental suites by aqua regia digestion (up to 21 laboratories depending on the element)
- Total Sulphur by IR induction or combustion furnace (22 laboratories)

For the round robin program, twelve 2.5 kg test units were collected at predetermined intervals during the bagging stage, immediately following homogenisation. Each participating laboratory received six test portions. Samples for each laboratory were prepared by taking a 200 g subsample from six different 2.5 kg test units to maximise representativeness (i.e., from either odd or even sampling intervals).

The 20 individual INAA results upon which much of the homogeneity evaluation is based, included paired 10 g samples taken from 10 different sampling units. This format enabled a nested ANOVA treatment of the INAA results to evaluate homogeneity (see 'Homogeneity Evaluation' section below).

PARTICIPATING LABORATORIES

1. Actlabs, Ancaster, Ontario, Canada
2. Alex Stewart International, Mendoza, Argentina
3. ALS, Johannesburg, South Africa
4. ALS, Lima, Peru
5. ALS, Loughrea, Galway, Ireland
6. ALS, Malaga, WA, Australia
7. ALS, Vancouver, BC, Canada
8. American Assay Laboratories, Sparks, Nevada, USA
9. ANSTO, Lucas Heights, NSW, Australia
10. Bureau Veritas Geoanalytical, Perth, WA, Australia
11. CERTIMIN, Lima, Peru
12. Intertek, Perth, WA, Australia
13. Intertek, Townsville, QLD, Australia
14. Intertek Minerals Ltd, Tarkwa, Western Region, Ghana
15. Laboratorio Tecnológico de Metalurgia LTM SA de CV, Hermosillo, Sonora, Mexico
16. PT Geoservices Ltd, Cikarang, Jakarta Raya, Indonesia
17. PT Intertek Utama Services, Jakarta Timur, DKI Jakarta, Indonesia
18. SGS Canada Inc., Vancouver, BC, Canada
19. SGS de Mexico SA de CV, Cd. Industrial, Durango, Mexico
20. SGS del Peru, Lima, Peru
21. SGS Geosol Laboratorios Ltda, Vespasiano, Minas Gerais, Brazil
22. SGS Lakefield Research Ltd, Lakefield, Ontario, Canada
23. SGS Minerals, Santiago, Chile
24. Shiva Analyticals Ltd, Bangalore North, Karnataka, India
25. Skyline Assayers & Laboratories, Tucson, Arizona, USA
26. Stewart Assay & Environmental Laboratories LLC, Kara-Balta, Chüy, Kyrgyzstan

Please note: To maintain anonymity of participating laboratories, the alphabetical list above does not correspond to the Lab ID numbers shown in the scatter plots below.

STATISTICAL ANALYSIS

Certified Values and their uncertainty intervals (Table 1) have been determined for each analyte following removal of individual, laboratory dataset (batch) and 3SD outliers (single iteration). Outlier evaluation was conducted in accordance with ISO 17034:2017 and ISO 33405:2024. While formal statistical tests were applied, professional statistical judgment was also exercised in determining the validity of potential outliers. Assessment of systematic bias and performance using independent control materials (CRMs) was incorporated to ensure compliance with the referenced standards and to establish metrological traceability of the certified values.

95% Expanded Uncertainty provides a 95 % probability that the true value of the analyte under consideration lies between the upper and lower limits and is calculated according to the method outlined in [6] and [15]. All known or suspected sources of bias have been investigated or taken into account.

Indicative (uncertified) values (Table 2) are present where the number of laboratories reporting a particular analyte is insufficient (< 5) to support certification or where interlaboratory consensus is poor. This data is intended for 'informational purposes' only.

Standard Deviation intervals (see Table 6, 'Performance Gates') provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. They take into account errors attributable to measurement uncertainty and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. The Standard Deviation values include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability.

The SD for each analyte's certified value is calculated from the same filtered data set used to determine the certified value, i.e., after removal of all individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e., the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. ***The standard deviation is then calculated for each analyte from the pooled accepted analyses generated from the certification program.***

Homogeneity Evaluation

For analytes other than gold, the tolerance limits (ISO 16269:2014) shown in Table 1 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 Cu by 4-acid digestion, where 99 % of the time (1-α=0.99) at least 95 % of subsamples (ρ=0.95) will have concentrations lying between 1.02 and 1.05 wt.%. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99 % of the tolerance intervals so constructed would cover at least 95 % of the total population, and 1 % of the tolerance intervals would cover less than 95 % of the total population. ***Please note that tolerance limits pertain to the homogeneity of the CRM only and should not be used as control limits for laboratory performance.***

The homogeneity of gold has been determined by INAA at ANSTO using the reduced analytical subsample method which utilises the known relationship between standard deviation and analytical subsample weight (Ingamells and Switzer, 1973 [2]). In this approach the sample aliquot is substantially reduced to a point where most of the variability in replicate assays should be due to inhomogeneity of the reference material and

measurement error becomes negligible. Table 5 below shows the gold INAA data determined on 20 x 85 mg subsamples of OREAS 613. An equivalent scaled version of the results is also provided to demonstrate an appreciation of what this data means if 30 g fire assays were undertaken without the normal measurement error associated with this methodology. In this instance, the 1RSD of 0.41 % calculated for a 30 g fire assay sample (7.74 % at 85 mg weights) confirms the high level of gold homogeneity in OREAS 613.

Table 5. Neutron Activation Analysis of Au (in ppm) on 20 x 85 mg subsamples and showing the equivalent results scaled to a 30 g sample mass typical of fire assay determination.

Replicate No	Au 85 mg actual	Au 30 g equivalent*
1	5.61	5.67
2	5.64	5.67
3	5.66	5.67
4	5.54	5.67
5	5.56	5.67
6	5.75	5.68
7	7.47	5.77
8	5.56	5.67
9	5.67	5.67
10	5.67	5.67
11	5.72	5.68
12	5.58	5.67
13	5.63	5.67
14	5.64	5.67
15	5.55	5.67
16	5.54	5.67
17	5.61	5.67
18	5.43	5.66
19	5.37	5.66
20	5.28	5.65
Mean	5.67	5.67
Median	5.61	5.67
Std Dev.	0.44	0.02
Rel.Std.Dev.	**7.74%**	**0.41%**

*Results calculated for a 30 g equivalent sample mass using the formula: $x^{30g\ Eq} = \frac{(x^{INAA} - \bar{X}) \times RSD@30g}{RSD@85mg} + \bar{X}$

where $x^{30g\ Eq}$ = equivalent result calculated for a 30 g sample mass
(x^{INAA}) = raw INAA result at 85 mg
$\bar{X}$ = mean of 85 mg INAA results

The homogeneity of OREAS 613 was also evaluated using an analysis of variance (ANOVA) of the INAA data. The 20 samples comprised paired samples from 10 of the 12 sampling lot intervals (representative of the prepared batch) and were randomised prior to sample numbering. The duplicate samples enabled ANOVA by comparison of within- and between-unit variances across the 10 pairs. The purpose of the ANOVA is to test whether any statistically significant difference exists between the between-unit and within-unit variances. This allows an assessment of homogeneity across the entire prepared batch of OREAS 613. The test was performed using the following parameters:

- Gold INAA – 20 results (1 laboratory providing duplicate analyses on 10 samples where each sample can be viewed as a 'unit')

- 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

The data were not filtered for outliers before p-value calculation, which yielded 0.41—statistically insignificant, so the Null Hypothesis is accepted. ANOVA does not measure absolute homogeneity; it evaluates whether analytes are similarly distributed across the packaging run and whether variance between subsamples from the same unit differs from that between separate units. A reference material may show poor absolute homogeneity yet still meet a relative homogeneity (ANOVA) criterion if within-unit heterogeneity is substantial and consistent. Based on ANOVA and interlaboratory certification results, OREAS 612 is fit-for-purpose as a certified reference material (see 'Intended Use' above).

METROLOGICAL TRACEABILITY

The interlaboratory results that underpin the certified values are metrologically traceable to the international measurement scale (SI) of mass (either as a % mass fraction or as milligrams per kilogram (mg/kg)) [14]. In line with popular use, all data within tables in this certificate are expressed as the mass fraction in either weight percent (wt.%) or parts per million (ppm).

The analytical samples sent to participating laboratories were selected in a manner to be representative of the entire prepared batch of CRM. This representativeness 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. The systematic sampling method was chosen due to the low risk of overlooking repetitive effects or trends in the batch due to the way the CRM was processed. In line with ISO 17025 [8], each analytical data set received from the participating laboratories has been validated by its assayer through the inclusion of internal reference materials and QC checks during and post analysis.

Participating laboratories were selected based on demonstrated analytical competence, including prior performance in interlaboratory comparison programs conducted by ORE Pty Ltd, with consideration given to their expertise in relevant analytical methods, measurands, and sample matrices. For the measurands reported in this certificate (Table 1), data were sourced from laboratories accredited to ISO/IEC 17025.

Where formal accreditation was not held for specific operationally defined measurands, metrological traceability was verified using previously certified OREAS reference materials, certified under a prior program and included in the current program as independent control samples. In accordance with ISO 33405:2024-05 [5], clause 9.2.5, and ISO 17034:2016 [9], clause 7.12.4 b), the use of such control samples is considered an acceptable approach for supporting traceability in the absence of formal accreditation. In this certification program, traceability was further supported by agreement between measured and certified values for the control samples, providing additional confirmation of calibration integrity and interlaboratory measurement consistency.

Operationally Defined Measurands

In accordance with ISO 33405:2024-05, Clause 9.2.4, measurands (analytes) may be certified as operationally defined. For these measurands, traceability to the SI may not be achievable because the analytical procedure involves sample transformations (e.g., leaching or extraction). While instrument calibration can be traceable to appropriate units,

the transformation steps themselves are not directly traceable and can only be evaluated through reference comparisons or harmonized procedures.

Accordingly, characterisation of these measurands has been based on the concordance of results obtained from multiple laboratories using a common, well-defined procedure. This approach ensures fitness-for-purpose and fulfils the requirements for metrological traceability as specified in ISO 17034 and ISO 33405 for operationally defined measurands.

COMMUTABILITY

The certified values reported herein are derived from measurements performed using analytical methods involving sample pre-treatment steps, such as fusion or acid digestion. These processes convert the sample matrix into a chemically simplified and stable form, facilitating calibration traceable to primary standards via solution-based calibration protocols. Due to the established robustness and effectiveness of these pre-treatment methods, issues related to commutability are not expected to impact the suitability of this Certified Reference Material (CRM) for its intended use.

OREAS CRMs are prepared from natural ore materials, ensuring the presence of matrix and mineralogical characteristics representative of typical exploration, mine and process samples. Consistent with ISO 17034:2016 and ISO Guide 30, users are advised to select CRMs with matrix and mineralisation styles closely matching those of their routine samples to minimize matrix effects and enhance analytical comparability. Detailed descriptions of the CRM's source material and mineralogical characteristics are provided in the 'Source Material' section to guide appropriate CRM selection.

PERFORMANCE GATES

Table 6 below shows intervals 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 (also see 'Intended Use' section below). Westgard Rules extend the basics of single-rule QC monitoring using multi-rules (for more information visit www.westgard.com/mltirule.htm). 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. One approach used at commercial laboratories is to set the acceptance criteria at twice the detection level (DL) ± 10 %.

i.e., Certified Value ±10 % ±2DL [1].

Table 6. Performance Gates for OREAS 613.

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	5.21	0.172	4.86	5.55	4.69	5.73	3.31%	6.62%	9.93%	4.95	5.47
Pb Fire Assay (Grav)											
Ag, ppm	299	13	272	325	259	338	4.42%	8.83%	13.25%	284	313
Aqua Regia Digestion (sample weights 10-50g)											
Au, ppm	5.11	0.204	4.71	5.52	4.50	5.72	3.98%	7.96%	11.94%	4.86	5.37
4-Acid Digestion											
Ag, ppm	312	6	301	324	295	330	1.82%	3.64%	5.45%	297	328
Al, wt.%	6.90	0.231	6.43	7.36	6.20	7.59	3.36%	6.71%	10.07%	6.55	7.24
As, ppm	1157	29	1099	1215	1070	1244	2.51%	5.01%	7.52%	1099	1215
Be, ppm	2.34	0.097	2.14	2.53	2.05	2.63	4.15%	8.31%	12.46%	2.22	2.45
Bi, ppm	64	3.2	57	70	54	73	5.06%	10.13%	15.19%	61	67
Ca, wt.%	0.904	0.035	0.834	0.974	0.799	1.009	3.88%	7.77%	11.65%	0.859	0.949
Cd, ppm	12.0	0.36	11.3	12.8	11.0	13.1	2.99%	5.98%	8.97%	11.4	12.6
Ce, ppm	74	3.5	67	81	64	85	4.73%	9.46%	14.18%	71	78
Co, ppm	18.5	0.86	16.8	20.3	15.9	21.1	4.65%	9.29%	13.94%	17.6	19.5
Cr, ppm	18.2	1.81	14.6	21.8	12.8	23.6	9.93%	19.87%	29.80%	17.3	19.1
Cs, ppm	5.22	0.184	4.85	5.59	4.67	5.77	3.53%	7.06%	10.59%	4.96	5.48
Cu, wt.%	1.03	0.019	1.00	1.07	0.98	1.09	1.83%	3.66%	5.48%	0.98	1.08
Dy, ppm	3.56	0.149	3.26	3.86	3.12	4.01	4.18%	8.35%	12.53%	3.38	3.74
Er, ppm	1.33	0.063	1.20	1.46	1.14	1.52	4.74%	9.49%	14.23%	1.26	1.40
Eu, ppm	1.20	0.070	1.06	1.34	0.99	1.41	5.83%	11.67%	17.50%	1.14	1.26
Fe, wt.%	4.17	0.112	3.95	4.39	3.83	4.51	2.68%	5.37%	8.05%	3.96	4.38
Ga, ppm	20.4	0.69	19.0	21.8	18.3	22.4	3.37%	6.74%	10.12%	19.4	21.4
Gd, ppm	5.37	0.444	4.48	6.25	4.03	6.70	8.28%	16.55%	24.83%	5.10	5.63
Hf, ppm	5.44	0.188	5.07	5.82	4.88	6.01	3.45%	6.91%	10.36%	5.17	5.71
Ho, ppm	0.53	0.022	0.49	0.58	0.47	0.60	4.21%	8.41%	12.62%	0.51	0.56
In, ppm	2.19	0.080	2.03	2.35	1.95	2.43	3.67%	7.34%	11.00%	2.08	2.30
K, wt.%	4.01	0.148	3.72	4.31	3.57	4.46	3.69%	7.38%	11.07%	3.81	4.21
La, ppm	35.8	1.68	32.5	39.2	30.8	40.9	4.68%	9.36%	14.04%	34.1	37.6
Li, ppm	24.4	1.73	20.9	27.8	19.2	29.6	7.08%	14.16%	21.24%	23.2	25.6
Lu, ppm	0.14	0.01	0.11	0.17	0.10	0.18	10.50%	20.99%	31.49%	0.13	0.15
Mg, wt.%	0.165	0.007	0.151	0.179	0.144	0.186	4.22%	8.44%	12.67%	0.157	0.173
Mn, wt.%	0.035	0.001	0.033	0.038	0.032	0.039	3.28%	6.56%	9.84%	0.033	0.037
Mo, ppm	11.9	0.38	11.1	12.6	10.7	13.0	3.20%	6.39%	9.59%	11.3	12.5
Na, wt.%	1.83	0.055	1.72	1.94	1.66	1.99	3.00%	6.00%	9.01%	1.74	1.92
Nb, ppm	14.7	0.55	13.6	15.8	13.0	16.3	3.78%	7.56%	11.34%	13.9	15.4
Nd, ppm	33.0	1.32	30.3	35.6	29.0	36.9	4.00%	8.00%	11.99%	31.3	34.6
Ni, ppm	5.96	0.417	5.13	6.80	4.71	7.22	6.99%	13.99%	20.98%	5.67	6.26
P, wt.%	0.032	0.001	0.029	0.035	0.028	0.036	4.44%	8.89%	13.33%	0.030	0.033
Pb, wt.%	0.146	0.004	0.137	0.154	0.133	0.159	2.92%	5.85%	8.77%	0.139	0.153
Pr, ppm	8.67	0.424	7.83	9.52	7.40	9.95	4.89%	9.78%	14.66%	8.24	9.11
Rb, ppm	187	8	171	204	162	213	4.48%	8.97%	13.45%	178	197
S, wt.%	2.59	0.051	2.49	2.70	2.44	2.75	1.98%	3.95%	5.93%	2.46	2.72

SI unit equivalents: ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

Note 1: intervals may appear asymmetric due to rounding.

Note 2: the number of decimal places quoted does not imply accuracy of the certified value to this level but are given to minimise rounding errors when calculating 2SD and 3SD windows.

Table 6 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											
Sb, ppm	104	4	95	113	91	117	4.23%	8.47%	12.70%	99	109
Sc, ppm	5.37	0.321	4.72	6.01	4.40	6.33	5.99%	11.98%	17.97%	5.10	5.64
Se, ppm	19.1	1.09	16.9	21.3	15.8	22.4	5.70%	11.39%	17.09%	18.1	20.0
Sm, ppm	6.59	0.496	5.59	7.58	5.10	8.07	7.53%	15.05%	22.58%	6.26	6.92
Sn, ppm	8.30	0.421	7.45	9.14	7.03	9.56	5.07%	10.14%	15.21%	7.88	8.71
Sr, ppm	219	9	202	236	193	245	3.92%	7.84%	11.76%	208	230
Ta, ppm	1.06	0.067	0.92	1.19	0.86	1.26	6.37%	12.73%	19.10%	1.00	1.11
Tb, ppm	0.68	0.019	0.65	0.72	0.63	0.74	2.75%	5.49%	8.24%	0.65	0.72
Te, ppm	15.6	0.84	13.9	17.2	13.0	18.1	5.41%	10.82%	16.23%	14.8	16.3
Th, ppm	11.6	0.54	10.5	12.7	10.0	13.2	4.67%	9.34%	14.01%	11.0	12.2
Ti, wt.%	0.163	0.006	0.150	0.176	0.144	0.182	3.95%	7.90%	11.86%	0.155	0.171
Tl, ppm	3.54	0.123	3.30	3.79	3.18	3.91	3.46%	6.92%	10.38%	3.37	3.72
Tm, ppm	0.17	0.015	0.14	0.20	0.13	0.22	8.76%	17.52%	26.28%	0.16	0.18
U, ppm	4.09	0.214	3.66	4.51	3.45	4.73	5.23%	10.45%	15.68%	3.88	4.29
V, ppm	19.6	0.65	18.3	20.9	17.7	21.6	3.31%	6.63%	9.94%	18.6	20.6
W, ppm	3.92	0.203	3.52	4.33	3.31	4.53	5.17%	10.34%	15.51%	3.72	4.12
Y, ppm	15.5	0.70	14.1	16.9	13.4	17.6	4.50%	8.99%	13.49%	14.8	16.3
Yb, ppm	1.00	0.081	0.84	1.16	0.76	1.25	8.09%	16.19%	24.28%	0.95	1.05
Zn, wt.%	0.245	0.007	0.231	0.260	0.224	0.267	2.97%	5.94%	8.91%	0.233	0.258
Zr, ppm	204	4	197	212	193	215	1.80%	3.61%	5.41%	194	215
Aqua Regia Digestion											
Ag, ppm	307	8	291	324	283	332	2.60%	5.20%	7.80%	292	323
Al, wt.%	0.800	0.067	0.666	0.934	0.599	1.001	8.38%	16.75%	25.13%	0.760	0.840
As, ppm	1115	44	1027	1203	983	1247	3.94%	7.88%	11.82%	1059	1171
B, ppm	< 10	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Be, ppm	0.47	0.06	0.34	0.60	0.28	0.66	13.77%	27.54%	41.31%	0.45	0.49
Bi, ppm	65	1.7	61	68	59	70	2.68%	5.36%	8.04%	61	68
Ca, wt.%	0.544	0.022	0.501	0.588	0.480	0.609	3.96%	7.92%	11.89%	0.517	0.572
Cd, ppm	12.1	0.39	11.3	12.9	10.9	13.3	3.24%	6.48%	9.73%	11.5	12.7
Ce, ppm	41.5	3.05	35.4	47.6	32.3	50.6	7.35%	14.70%	22.05%	39.4	43.5
Co, ppm	17.6	0.90	15.8	19.4	14.9	20.3	5.13%	10.26%	15.40%	16.7	18.4
Cr, ppm	18.3	1.43	15.4	21.1	14.0	22.6	7.82%	15.65%	23.47%	17.4	19.2
Cs, ppm	1.48	0.16	1.17	1.79	1.01	1.94	10.53%	21.06%	31.59%	1.40	1.55
Cu, wt.%	1.04	0.018	1.01	1.08	0.99	1.10	1.75%	3.51%	5.26%	0.99	1.09
Dy, ppm	2.10	0.26	1.58	2.62	1.33	2.88	12.32%	24.64%	36.96%	2.00	2.21
Er, ppm	0.69	0.061	0.56	0.81	0.50	0.87	8.83%	17.66%	26.48%	0.65	0.72
Eu, ppm	0.73	0.10	0.53	0.93	0.44	1.03	13.43%	26.86%	40.30%	0.69	0.77
Fe, wt.%	3.77	0.154	3.46	4.08	3.31	4.23	4.09%	8.18%	12.27%	3.58	3.96
Ga, ppm	4.78	0.340	4.10	5.46	3.76	5.80	7.12%	14.24%	21.35%	4.54	5.02
Gd, ppm	3.37	0.323	2.72	4.01	2.40	4.33	9.60%	19.20%	28.80%	3.20	3.53
Hf, ppm	1.52	0.16	1.20	1.84	1.04	2.00	10.59%	21.18%	31.77%	1.44	1.60
Hg, ppm	0.50	0.030	0.44	0.56	0.41	0.59	6.04%	12.07%	18.11%	0.47	0.52
Ho, ppm	0.30	0.03	0.23	0.36	0.20	0.39	10.58%	21.16%	31.74%	0.28	0.31

SI unit equivalents: ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

Note 1: intervals may appear asymmetric due to rounding; IND = indeterminate.

Note 2: the number of decimal places quoted does not imply accuracy of the certified value to this level but are given to minimise rounding errors when calculating 2SD and 3SD windows.

Table 6 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											
In, ppm	2.11	0.074	1.96	2.26	1.88	2.33	3.53%	7.06%	10.59%	2.00	2.21
K, wt.%	0.448	0.032	0.384	0.512	0.353	0.544	7.10%	14.20%	21.30%	0.426	0.471
La, ppm	20.0	1.61	16.8	23.2	15.2	24.8	8.07%	16.14%	24.20%	19.0	21.0
Li, ppm	5.07	0.66	3.76	6.38	3.10	7.04	12.95%	25.89%	38.84%	4.82	5.32
Lu, ppm	0.066	0.009	0.048	0.084	0.039	0.093	13.68%	27.35%	41.03%	0.062	0.069
Mg, wt.%	0.081	0.010	0.061	0.101	0.051	0.111	12.27%	24.53%	36.80%	0.077	0.085
Mn, wt.%	0.028	0.001	0.026	0.031	0.025	0.032	4.51%	9.02%	13.53%	0.027	0.030
Mo, ppm	11.1	0.43	10.2	12.0	9.8	12.4	3.86%	7.72%	11.57%	10.5	11.7
Na, wt.%	0.081	0.008	0.066	0.096	0.058	0.104	9.50%	18.99%	28.49%	0.077	0.085
Nb, ppm	1.60	0.30	1.00	2.20	0.70	2.50	18.84%	37.68%	56.53%	1.52	1.68
Nd, ppm	21.3	3.3	14.7	27.9	11.4	31.2	15.47%	30.93%	46.40%	20.3	22.4
Ni, ppm	5.71	0.434	4.84	6.58	4.40	7.01	7.61%	15.21%	22.82%	5.42	5.99
P, wt.%	0.023	0.002	0.020	0.026	0.018	0.028	7.44%	14.88%	22.32%	0.022	0.024
Pb, wt.%	0.139	0.005	0.130	0.149	0.125	0.154	3.49%	6.98%	10.48%	0.132	0.146
Pr, ppm	5.51	0.91	3.69	7.33	2.78	8.24	16.53%	33.07%	49.60%	5.23	5.78
Rb, ppm	23.1	1.17	20.8	25.5	19.6	26.7	5.06%	10.13%	15.19%	22.0	24.3
Re, ppm	0.006	0.001	0.005	0.007	0.004	0.008	9.69%	19.39%	29.08%	0.006	0.006
S, wt.%	2.55	0.061	2.43	2.67	2.37	2.74	2.40%	4.80%	7.20%	2.42	2.68
Sb, ppm	79	9	61	96	52	105	11.14%	22.27%	33.41%	75	82
Sc, ppm	2.31	0.26	1.79	2.82	1.54	3.08	11.12%	22.24%	33.36%	2.19	2.42
Se, ppm	19.4	0.82	17.8	21.0	16.9	21.8	4.22%	8.45%	12.67%	18.4	20.4
Sm, ppm	3.80	0.368	3.07	4.54	2.70	4.91	9.66%	19.33%	28.99%	3.61	3.99
Sn, ppm	6.48	0.300	5.88	7.08	5.58	7.38	4.62%	9.25%	13.87%	6.16	6.81
Sr, ppm	41.7	3.01	35.7	47.7	32.7	50.7	7.21%	14.42%	21.64%	39.6	43.8
Tb, ppm	0.41	0.032	0.34	0.47	0.31	0.50	7.89%	15.78%	23.67%	0.39	0.43
Te, ppm	15.4	0.69	14.0	16.8	13.3	17.5	4.50%	9.00%	13.50%	14.6	16.2
Th, ppm	7.01	0.501	6.01	8.01	5.51	8.51	7.14%	14.28%	21.43%	6.66	7.36
Ti, wt.%	0.038	0.007	0.025	0.051	0.018	0.058	17.54%	35.07%	52.61%	0.036	0.040
Tl, ppm	1.18	0.048	1.08	1.28	1.04	1.33	4.10%	8.19%	12.29%	1.12	1.24
Tm, ppm	0.084	0.011	0.062	0.107	0.050	0.118	13.48%	26.95%	40.43%	0.080	0.089
U, ppm	2.04	0.136	1.77	2.31	1.63	2.45	6.65%	13.30%	19.95%	1.94	2.14
V, ppm	7.51	0.86	5.80	9.23	4.95	10.08	11.38%	22.77%	34.15%	7.14	7.89
W, ppm	1.94	0.28	1.38	2.50	1.09	2.79	14.53%	29.07%	43.60%	1.84	2.04
Y, ppm	8.06	0.729	6.60	9.52	5.88	10.25	9.04%	18.08%	27.12%	7.66	8.46
Yb, ppm	0.50	0.049	0.40	0.60	0.35	0.65	9.91%	19.82%	29.73%	0.47	0.52
Zn, wt.%	0.240	0.006	0.229	0.251	0.223	0.256	2.33%	4.66%	6.99%	0.228	0.252
Zr, ppm	57	4.3	49	66	44	70	7.54%	15.07%	22.61%	55	60
Infrared Combustion											
S, wt.%	2.57	0.059	2.45	2.69	2.39	2.75	2.30%	4.60%	6.91%	2.44	2.70

SI unit equivalents: ppm (parts per million; 1 x 10^{-6}) ≡ mg/kg; wt.% (weight per cent) ≡ % (mass fraction).

Note 1: intervals may appear asymmetric due to rounding.

Note 2: the number of decimal places quoted does not imply accuracy of the certified value to this level but are given to minimise rounding errors when calculating 2SD and 3SD windows.

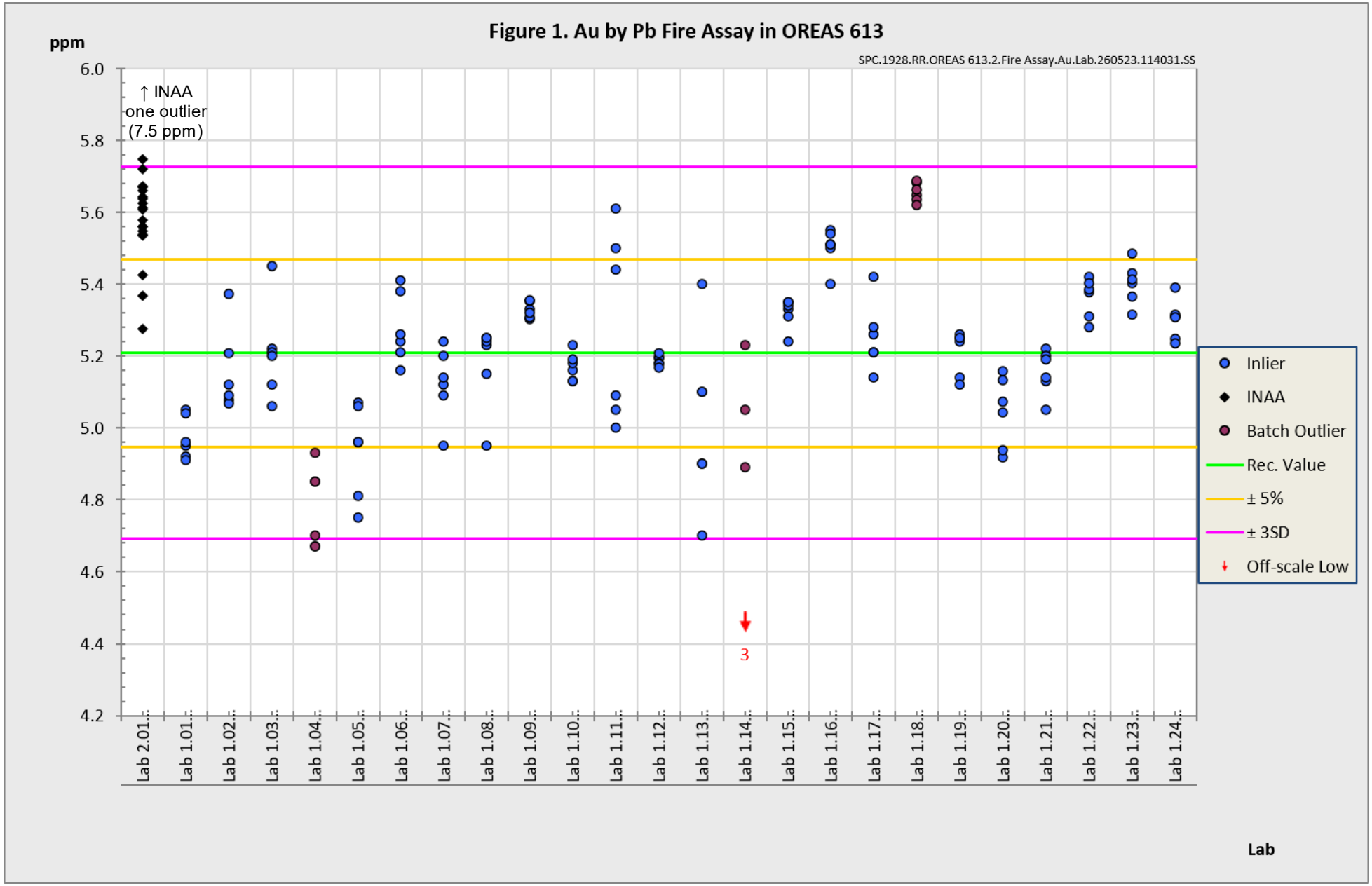
Figure 1. Au by Pb Fire Assay in OREAS 613
ppm
SPC.1928.RR.OREAS 613.2.Fire Assay.Au.Lab.260523.114031.SS
↑ INAA
one outlier
(7.5 ppm)
6.0
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
3
Lab 2.01...
Lab 1.01...
Lab 1.02...
Lab 1.03...
Lab 1.04...
Lab 1.05...
Lab 1.06...
Lab 1.07...
Lab 1.08...
Lab 1.09...
Lab 1.10...
Lab 1.11...
Lab 1.12...
Lab 1.13...
Lab 1.14...
Lab 1.15...
Lab 1.16...
Lab 1.17...
Lab 1.18...
Lab 1.19...
Lab 1.20...
Lab 1.21...
Lab 1.22...
Lab 1.23...
Lab 1.24...
Inlier
INAA
Batch Outlier
Rec. Value
± 5%
± 3SD
Off-scale Low
Lab

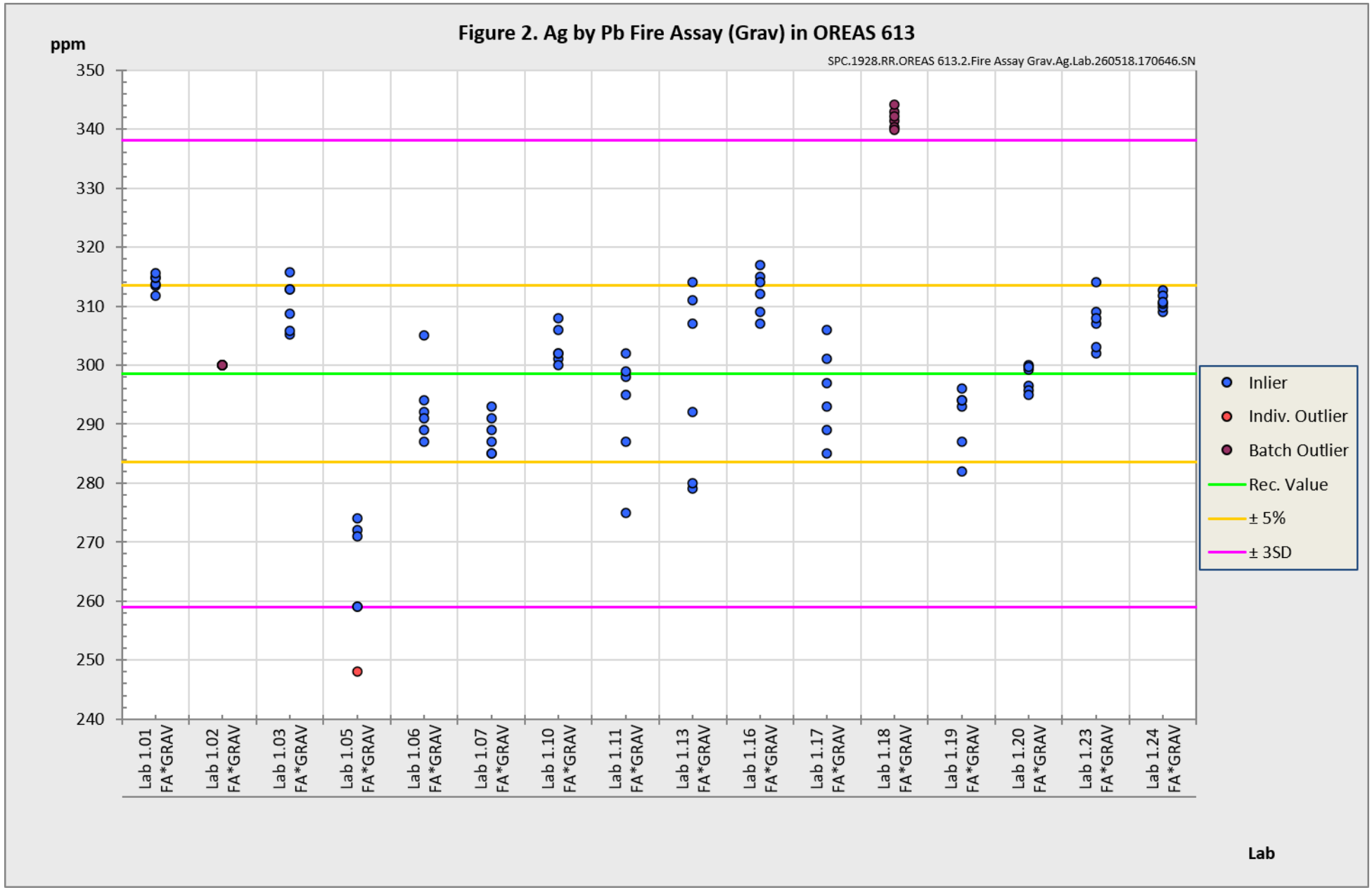
Figure 2. Ag by Pb Fire Assay (Grav) in OREAS 613
ppm
SPC.1928.RR.OREAS 613.2.Fire Assay Grav.Ag.Lab.260518.170646.SN
350
340
330
320
310
300
290
280
270
260
250
240
Lab 1.01 FA*GRAV
Lab 1.02 FA*GRAV
Lab 1.03 FA*GRAV
Lab 1.05 FA*GRAV
Lab 1.06 FA*GRAV
Lab 1.07 FA*GRAV
Lab 1.10 FA*GRAV
Lab 1.11 FA*GRAV
Lab 1.13 FA*GRAV
Lab 1.16 FA*GRAV
Lab 1.17 FA*GRAV
Lab 1.18 FA*GRAV
Lab 1.19 FA*GRAV
Lab 1.20 FA*GRAV
Lab 1.23 FA*GRAV
Lab 1.24 FA*GRAV
Lab
Inlier
Indiv. Outlier
Batch Outlier
Rec. Value
± 5%
± 3SD

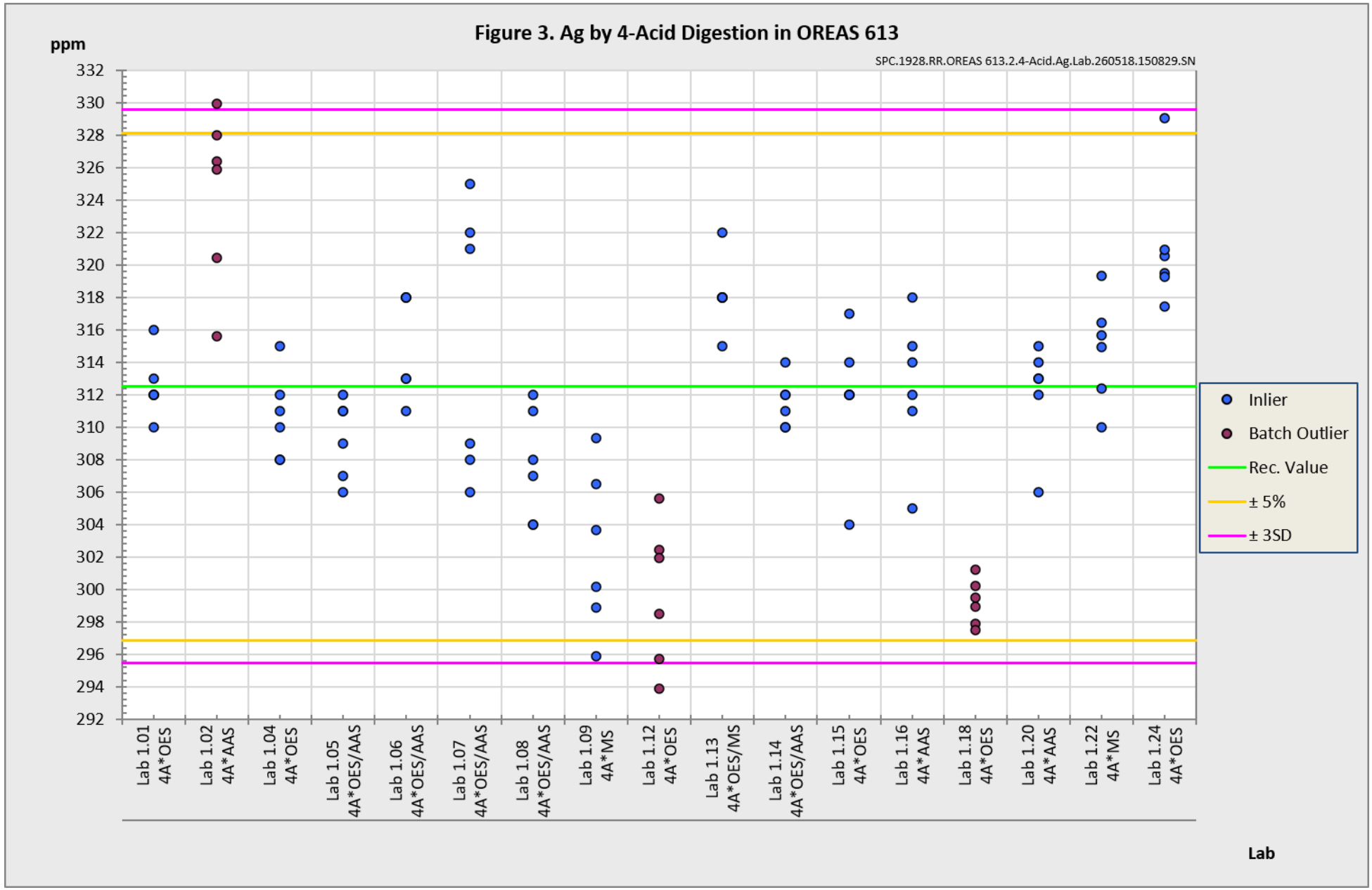
Figure 3. Ag by 4-Acid Digestion in OREAS 613
ppm
SPC.1928.RR.OREAS 613.2.4-Acid.Ag.Lab.260518.150829.SN
332
330
328
326
324
322
320
318
316
314
312
310
308
306
304
302
300
298
296
294
292
Lab 1.01 4A*OES
Lab 1.02 4A*AAS
Lab 1.04 4A*OES
Lab 1.05 4A*OES/AAS
Lab 1.06 4A*OES/AAS
Lab 1.07 4A*OES/AAS
Lab 1.08 4A*OES/AAS
Lab 1.09 4A*MS
Lab 1.12 4A*OES
Lab 1.13 4A*OES/MS
Lab 1.14 4A*OES/AAS
Lab 1.15 4A*OES
Lab 1.16 4A*AAS
Lab 1.18 4A*OES
Lab 1.20 4A*AAS
Lab 1.22 4A*MS
Lab 1.24 4A*OES
Lab
Inlier
Batch Outlier
Rec. Value
± 5%
± 3SD

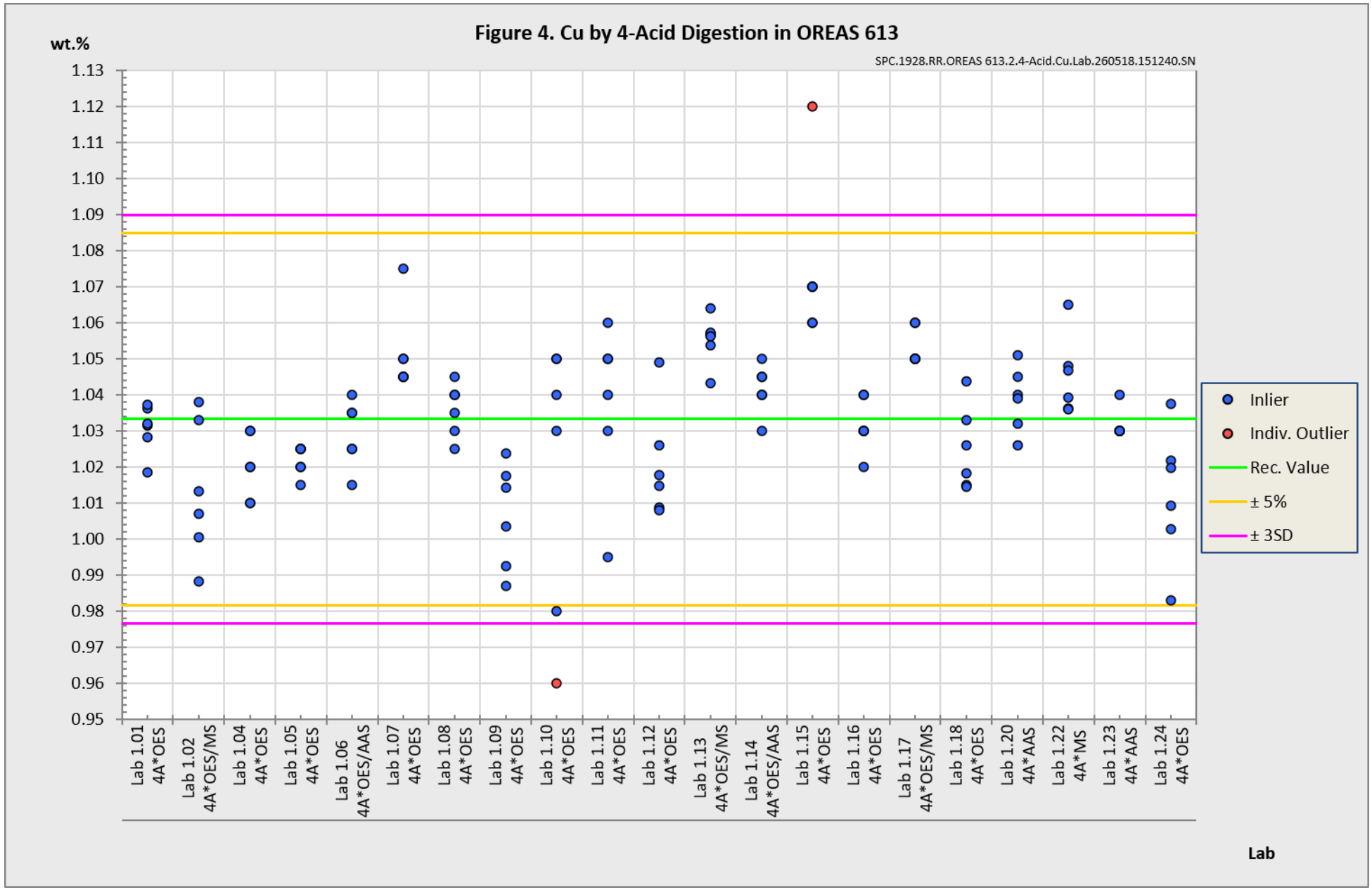
Figure 4. Cu by 4-Acid Digestion in OREAS 613
wt.%
SPC.1928.RR.OREAS 613.2.4-Acid.Cu.Lab.260518.151240.SN
1.13
1.12
1.11
1.10
1.09
1.08
1.07
1.06
1.05
1.04
1.03
1.02
1.01
1.00
0.99
0.98
0.97
0.96
0.95
Lab 1.01 4A*OES
Lab 1.02 4A*OES/MS
Lab 1.04 4A*OES
Lab 1.05 4A*OES
Lab 1.06 4A*OES/AAS
Lab 1.07 4A*OES
Lab 1.08 4A*OES
Lab 1.09 4A*OES
Lab 1.10 4A*OES
Lab 1.11 4A*OES
Lab 1.12 4A*OES
Lab 1.13 4A*OES/MS
Lab 1.14 4A*OES/AAS
Lab 1.15 4A*OES
Lab 1.16 4A*OES
Lab 1.17 4A*OES/MS
Lab 1.18 4A*OES
Lab 1.20 4A*AAS
Lab 1.22 4A*MS
Lab 1.23 4A*AAS
Lab 1.24 4A*OES
Lab
Inlier
Indiv. Outlier
Rec. Value
± 5%
± 3SD

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QMS CERTIFICATION

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DOCUMENT HISTORY

Revision No.	Date	Changes applied
1	3rd June 2026	Revised source material description.
0	25th May 2026	First publication.

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