

CERTIFICATE OF ANALYSIS FOR

GRANODIORITE LITHOGEOCHEM / BLANK

REFERENCE MATERIAL

OREAS 24b

Summary Statistics for Key Analytes (see Tables 1 to 5 for additional certified values).

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|-------------------------|-----------------|-------|-----------------------|------|----------------------|------|
| | | | Low | High | Low | High |
| Pb Fire Assay | | | | | | |
| Gold, Au (ppb) | < 3 | NA | NA | NA | NA | NA |
| 4-Acid Digestion | | | | | | |
| Copper, Cu (ppm) | 38.0 | 1.59 | 36.9 | 39.0 | 35.8 | 40.2 |
| Lead, Pb (ppm) | 23.1 | 1.38 | 22.1 | 24.2 | 21.9 | 24.3 |
| Molybdenum, Mo (ppm) | 4.03 | 0.357 | 3.73 | 4.34 | 3.71 | 4.35 |
| Nickel, Ni (ppm) | 60 | 4.1 | 57 | 64 | 57 | 63 |
| Uranium, U (ppm) | 3.06 | 0.093 | 2.98 | 3.13 | 2.93 | 3.19 |
| Zinc, Zn (ppm) | 105 | 5.7 | 100 | 109 | 101 | 109 |

Please note: intervals may appear asymmetric due to rounding.

Table 1. Fusion XRF - Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 24b.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|--|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Fusion XRF | | | | | | |
| Aluminium Oxide, Al ₂ O ₃ (wt.%) | 15.15 | 0.094 | 15.09 | 15.20 | 15.07 | 15.23 |
| Barium Oxide, BaO (ppm) | 819 | 45.4 | 780 | 859 | IND | IND |
| Calcium Oxide, CaO (wt.%) | 1.47 | 0.023 | 1.46 | 1.49 | 1.46 | 1.49 |
| Chromium Oxide, Cr ₂ O ₃ (ppm) | 201 | 7.3 | 199 | 203 | IND | IND |
| Iron(III) Oxide, Fe ₂ O ₃ (wt.%) | 6.35 | 0.058 | 6.31 | 6.39 | 6.30 | 6.40 |
| Magnesium Oxide, MgO (wt.%) | 2.75 | 0.029 | 2.73 | 2.78 | 2.74 | 2.77 |
| Manganese Oxide, MnO (wt.%) | 0.059 | 0.002 | 0.057 | 0.061 | IND | IND |
| Phosphorus Oxide, P ₂ O ₅ (wt.%) | 0.161 | 0.005 | 0.156 | 0.166 | 0.158 | 0.163 |
| Potassium Oxide, K ₂ O (wt.%) | 3.39 | 0.026 | 3.37 | 3.41 | 3.37 | 3.41 |
| Silicon Dioxide, SiO ₂ (wt.%) | 66.0 | 0.26 | 65.8 | 66.2 | 65.8 | 66.2 |
| Sodium Oxide, Na ₂ O (wt.%) | 1.15 | 0.024 | 1.13 | 1.17 | 1.13 | 1.17 |
| Titanium Oxide, TiO ₂ (wt.%) | 0.798 | 0.019 | 0.784 | 0.812 | 0.787 | 0.809 |

Note: intervals may appear asymmetric due to rounding; IND - Indeterminate

Table 2. Fusion ICP - Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 24b.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|--------------------------|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Fusion ICP-OES/MS | | | | | | |
| Aluminium, Al (wt.%) | 7.81 | 0.180 | 7.73 | 7.89 | 7.68 | 7.94 |
| Barium, Ba (ppm) | 739 | 29.5 | 719 | 759 | 723 | 755 |
| Beryllium, Be (ppm) | 2.95 | 0.37 | 2.82 | 3.07 | IND | IND |
| Calcium, Ca (wt.%) | 1.06 | 0.041 | 1.03 | 1.08 | 1.04 | 1.08 |
| Cerium, Ce (ppm) | 86 | 2.5 | 84 | 87 | 84 | 88 |
| Cesium, Cs (ppm) | 10.5 | 0.43 | 10.2 | 10.8 | 10.2 | 10.8 |
| Chromium, Cr (ppm) | 142 | 12.8 | 133 | 151 | 130 | 153 |
| Cobalt, Co (ppm) | 16.9 | 0.83 | 16.3 | 17.6 | 16.5 | 17.4 |
| Dysprosium, Dy (ppm) | 5.83 | 0.250 | 5.71 | 5.96 | 5.54 | 6.13 |
| Erbium, Er (ppm) | 3.41 | 0.130 | 3.35 | 3.48 | 3.26 | 3.56 |
| Europium, Eu (ppm) | 1.39 | 0.086 | 1.35 | 1.44 | 1.35 | 1.44 |
| Gadolinium, Gd (ppm) | 6.27 | 0.374 | 5.97 | 6.56 | 6.00 | 6.53 |
| Gallium, Ga (ppm) | 20.2 | 0.87 | 19.6 | 20.8 | 19.5 | 20.8 |
| Hafnium, Hf (ppm) | 6.15 | 0.461 | 5.84 | 6.45 | 5.88 | 6.41 |
| Holmium, Ho (ppm) | 1.17 | 0.063 | 1.14 | 1.21 | 1.14 | 1.21 |
| Iron, Fe (wt.%) | 4.45 | 0.124 | 4.39 | 4.52 | 4.39 | 4.52 |
| Lanthanum, La (ppm) | 44.0 | 1.54 | 43.1 | 44.9 | 42.7 | 45.3 |
| Lithium, Li (ppm) | 52 | 3.2 | 48 | 56 | 50 | 54 |
| Lutetium, Lu (ppm) | 0.49 | 0.045 | 0.45 | 0.52 | 0.46 | 0.52 |
| Magnesium, Mg (wt.%) | 1.62 | 0.043 | 1.59 | 1.64 | 1.59 | 1.64 |
| Manganese, Mn (wt.%) | 0.046 | 0.000 | 0.046 | 0.047 | 0.045 | 0.047 |
| Neodymium, Nd (ppm) | 38.7 | 0.79 | 38.2 | 39.2 | 37.5 | 39.9 |
| Nickel, Ni (ppm) | 61 | 7 | 57 | 66 | 55 | 68 |
| Niobium, Nb (ppm) | 16.0 | 0.65 | 15.5 | 16.5 | 15.4 | 16.6 |
| Potassium, K (wt.%) | 2.74 | 0.051 | 2.72 | 2.76 | 2.69 | 2.79 |
| Praseodymium, Pr (ppm) | 10.2 | 0.37 | 9.9 | 10.4 | 9.9 | 10.4 |
| Rubidium, Rb (ppm) | 161 | 3.4 | 158 | 164 | 158 | 165 |

Note: intervals may appear asymmetric due to rounding; IND - Indeterminate

Table 2 continued.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|--------------------------|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Fusion ICP-OES/MS | | | | | | |
| Samarium, Sm (ppm) | 7.17 | 0.283 | 7.03 | 7.32 | 6.84 | 7.51 |
| Scandium, Sc (ppm) | 14.1 | 0.71 | 13.2 | 15.0 | IND | IND |
| Silicon, Si (wt.%) | 31.12 | 1.055 | 30.35 | 31.89 | 30.72 | 31.52 |
| Sodium, Na (wt.%) | 0.824 | 0.022 | 0.795 | 0.852 | 0.805 | 0.843 |
| Strontium, Sr (ppm) | 125 | 4.0 | 122 | 127 | 122 | 127 |
| Sulphur, S (wt.%) | 0.203 | 0.034 | 0.167 | 0.240 | IND | IND |
| Tantalum, Ta (ppm) | 1.32 | 0.083 | 1.27 | 1.37 | IND | IND |
| Terbium, Tb (ppm) | 0.98 | 0.045 | 0.95 | 1.01 | 0.94 | 1.02 |
| Thallium, Tl (ppm) | 0.91 | 0.10 | 0.81 | 1.00 | IND | IND |
| Thorium, Th (ppm) | 16.5 | 0.65 | 16.1 | 16.9 | 16.2 | 16.9 |
| Thulium, Tm (ppm) | 0.50 | 0.029 | 0.48 | 0.52 | 0.48 | 0.53 |
| Tin, Sn (ppm) | 4.65 | 0.68 | 4.18 | 5.12 | IND | IND |
| Titanium, Ti (wt.%) | 0.481 | 0.017 | 0.471 | 0.491 | 0.471 | 0.490 |
| Tungsten, W (ppm) | 4.13 | 0.52 | 3.82 | 4.45 | 1.74 | 6.53 |
| Uranium, U (ppm) | 3.31 | 0.136 | 3.23 | 3.40 | 3.18 | 3.44 |
| Vanadium, V (ppm) | 112 | 10.5 | 105 | 119 | 109 | 115 |
| Ytterbium, Yb (ppm) | 3.24 | 0.135 | 3.17 | 3.31 | 3.10 | 3.38 |
| Yttrium, Y (ppm) | 32.5 | 1.53 | 31.5 | 33.5 | 31.6 | 33.4 |
| Zirconium, Zr (ppm) | 213 | 10.5 | 206 | 221 | 207 | 220 |

Note: intervals may appear asymmetric due to rounding; IND - Indeterminate

Table 3. 4-Acid ICP - Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 24b.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|---------------------------------------|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Four Acid Digestion ICP-OES/MS | | | | | | |
| Aluminium, Al (wt.%) | 8.02 | 0.484 | 7.55 | 8.48 | 7.70 | 8.34 |
| Antimony, Sb (ppm) | 1.00 | 0.045 | 0.97 | 1.02 | IND | IND |
| Barium, Ba (ppm) | 716 | 32.6 | 690 | 742 | 698 | 734 |
| Beryllium, Be (ppm) | 2.92 | 0.47 | 2.53 | 3.32 | 2.73 | 3.12 |
| Bismuth, Bi (ppm) | 0.68 | 0.063 | 0.64 | 0.72 | IND | IND |
| Calcium, Ca (wt.%) | 1.08 | 0.040 | 1.04 | 1.12 | 1.05 | 1.11 |
| Cerium, Ce (ppm) | 84 | 3.5 | 81 | 87 | 82 | 86 |
| Cesium, Cs (ppm) | 10.7 | 0.41 | 10.3 | 11.1 | 10.3 | 11.0 |
| Chromium, Cr (ppm) | 118 | 9.9 | 109 | 127 | 112 | 125 |
| Cobalt, Co (ppm) | 16.9 | 1.19 | 16.3 | 17.4 | 16.0 | 17.8 |
| Copper, Cu (ppm) | 38.0 | 1.59 | 36.9 | 39.0 | 35.8 | 40.2 |
| Gallium, Ga (ppm) | 20.1 | 0.82 | 19.5 | 20.7 | 19.2 | 21.0 |
| Hafnium, Hf (ppm) | 3.90 | 0.54 | 3.44 | 4.37 | 3.73 | 4.07 |
| Iron, Fe (wt.%) | 4.39 | 0.131 | 4.27 | 4.52 | 4.28 | 4.51 |
| Lanthanum, La (ppm) | 42.4 | 2.34 | 40.4 | 44.3 | 40.8 | 43.9 |
| Lead, Pb (ppm) | 23.1 | 1.38 | 22.1 | 24.2 | 21.9 | 24.3 |
| Lithium, Li (ppm) | 52 | 1.2 | 51 | 52 | 50 | 53 |
| Magnesium, Mg (wt.%) | 1.65 | 0.054 | 1.59 | 1.70 | 1.59 | 1.70 |
| Manganese, Mn (wt.%) | 0.044 | 0.002 | 0.043 | 0.046 | 0.043 | 0.045 |

Note: intervals may appear asymmetric due to rounding; IND – Indeterminate

Table 3 continued.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|---------------------------------------|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Four Acid Digestion ICP-OES/MS | | | | | | |
| Molybdenum, Mo (ppm) | 4.03 | 0.357 | 3.73 | 4.34 | 3.71 | 4.35 |
| Nickel, Ni (ppm) | 60 | 4.1 | 57 | 64 | 57 | 63 |
| Niobium, Nb (ppm) | 14.6 | 1.29 | 13.4 | 15.8 | 14.1 | 15.1 |
| Phosphorus, P (wt.%) | 0.069 | 0.005 | 0.065 | 0.074 | 0.068 | 0.071 |
| Potassium, K (wt.%) | 2.81 | 0.110 | 2.72 | 2.89 | 2.72 | 2.90 |
| Rubidium, Rb (ppm) | 164 | 8.5 | 156 | 171 | 157 | 171 |
| Scandium, Sc (ppm) | 15.3 | 1.43 | 14.1 | 16.4 | IND | IND |
| Sodium, Na (wt.%) | 0.846 | 0.025 | 0.825 | 0.866 | 0.819 | 0.872 |
| Strontium, Sr (ppm) | 124 | 11.4 | 115 | 133 | 120 | 127 |
| Sulphur, S (wt.%) | 0.198 | 0.008 | 0.191 | 0.206 | 0.189 | 0.207 |
| Tantalum, Ta (ppm) | 1.23 | 0.22 | 1.02 | 1.43 | 1.16 | 1.29 |
| Thallium, Tl (ppm) | 0.86 | 0.043 | 0.81 | 0.91 | 0.81 | 0.92 |
| Thorium, Th (ppm) | 16.4 | 1.11 | 15.5 | 17.3 | 15.8 | 17.1 |
| Tin, Sn (ppm) | 4.25 | 0.221 | 4.06 | 4.45 | 4.06 | 4.44 |
| Titanium, Ti (wt.%) | 0.468 | 0.018 | 0.447 | 0.490 | 0.458 | 0.479 |
| Tungsten, W (ppm) | 3.64 | 0.47 | 3.27 | 4.01 | 3.07 | 4.21 |
| Uranium, U (ppm) | 3.06 | 0.093 | 2.98 | 3.13 | 2.93 | 3.19 |
| Vanadium, V (ppm) | 108 | 4.4 | 104 | 112 | 104 | 112 |
| Yttrium, Y (ppm) | 19.9 | 2.0 | 17.9 | 21.8 | 18.8 | 20.9 |
| Zinc, Zn (ppm) | 105 | 5.7 | 100 | 109 | 101 | 109 |
| Zirconium, Zr (ppm) | 134 | 24 | 113 | 156 | 130 | 139 |

Note: intervals may appear asymmetric due to rounding; IND – Indeterminate

Table 4. Aqua Regia ICP - Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 24b.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|--|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Aqua Regia Digestion ICP-OES/MS | | | | | | |
| Aluminium, Al (wt.%) | 3.15 | 0.151 | 3.02 | 3.29 | 3.05 | 3.25 |
| Arsenic, As (ppm) | 7.96 | 0.740 | 7.64 | 8.27 | 7.48 | 8.43 |
| Barium, Ba (ppm) | 146 | 6.1 | 140 | 152 | 140 | 152 |
| Bismuth, Bi (ppm) | 0.73 | 0.071 | 0.68 | 0.79 | 0.67 | 0.80 |
| Calcium, Ca (wt.%) | 0.461 | 0.018 | 0.446 | 0.475 | 0.446 | 0.476 |
| Cesium, Cs (ppm) | 9.15 | 0.610 | 8.38 | 9.92 | 8.87 | 9.43 |
| Chromium, Cr (ppm) | 106 | 2.8 | 105 | 108 | 102 | 111 |
| Cobalt, Co (ppm) | 15.7 | 1.31 | 14.7 | 16.6 | 14.7 | 16.6 |
| Copper, Cu (ppm) | 36.4 | 1.31 | 35.4 | 37.3 | 34.7 | 38.0 |
| Gallium, Ga (ppm) | 10.8 | 1.1 | 9.8 | 11.7 | 10.2 | 11.3 |
| Iron, Fe (wt.%) | 3.93 | 0.254 | 3.71 | 4.14 | 3.82 | 4.03 |
| Lead, Pb (ppm) | 9.23 | 1.01 | 8.56 | 9.91 | 8.59 | 9.88 |
| Lithium, Li (ppm) | 45.6 | 6.3 | 37.5 | 53.8 | 43.9 | 47.4 |
| Magnesium, Mg (wt.%) | 1.36 | 0.071 | 1.31 | 1.42 | 1.33 | 1.40 |

Note: intervals may appear asymmetric due to rounding; IND – Indeterminate

Table 4 continued.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|--|-----------------|-------|-----------------------|-------|----------------------|-------|
| | | | Low | High | Low | High |
| Aqua Regia Digestion ICP-OES/MS | | | | | | |
| Manganese, Mn (wt.%) | 0.035 | 0.002 | 0.034 | 0.036 | 0.034 | 0.036 |
| Molybdenum, Mo (ppm) | 3.86 | 0.220 | 3.68 | 4.04 | 3.68 | 4.05 |
| Nickel, Ni (ppm) | 57 | 4.1 | 53 | 60 | 54 | 59 |
| Potassium, K (wt.%) | 1.17 | 0.035 | 1.14 | 1.20 | 1.14 | 1.21 |
| Rubidium, Rb (ppm) | 114 | 10.4 | 101 | 128 | 107 | 122 |
| Scandium, Sc (ppm) | 9.51 | 0.718 | 8.95 | 10.08 | 8.82 | 10.21 |
| Sodium, Na (wt.%) | 0.108 | 0.009 | 0.099 | 0.116 | IND | IND |
| Sulphur, S (wt.%) | 0.200 | 0.010 | 0.190 | 0.210 | 0.190 | 0.210 |
| Thallium, Tl (ppm) | 0.66 | 0.08 | 0.56 | 0.75 | 0.62 | 0.70 |
| Thorium, Th (ppm) | 14.3 | 2.3 | 11.8 | 16.9 | 13.8 | 14.9 |
| Tin, Sn (ppm) | 2.26 | 0.208 | 2.04 | 2.48 | 2.11 | 2.41 |
| Titanium, Ti (wt.%) | 0.198 | 0.011 | 0.186 | 0.211 | 0.190 | 0.207 |
| Uranium, U (ppm) | 1.74 | 0.32 | 1.38 | 2.10 | 1.61 | 1.87 |
| Vanadium, V (ppm) | 79 | 1.7 | 78 | 80 | 76 | 81 |
| Yttrium, Y (ppm) | 12.3 | 1.8 | 10.3 | 14.4 | 11.5 | 13.2 |
| Zinc, Zn (ppm) | 93 | 4.1 | 89 | 96 | 90 | 96 |
| Zirconium, Zr (ppm) | 24.5 | 3.6 | 19.7 | 29.2 | 22.9 | 26.1 |

Note: intervals may appear asymmetric due to rounding; IND – Indeterminate

Table 5. Miscellaneous - Certified Values, SDs, 95% Confidence and Tolerance Limits for OREAS 24b.

| Constituent | Certified Value | 1SD | 95% Confidence Limits | | 95% Tolerance Limits | |
|------------------------------|-----------------|-------|-----------------------|-------|----------------------|------|
| | | | Low | High | Low | High |
| Fire Assay | | | | | | |
| Gold, Au (ppb) | < 3 | IND | IND | IND | IND | IND |
| Palladium, Pd (ppb) | < 1 | IND | IND | IND | IND | IND |
| Platinum, Pt (ppb) | < 1 | IND | IND | IND | IND | IND |
| IR Combustion Furnace | | | | | | |
| Carbon, C (wt.%) | 0.189 | 0.011 | 0.179 | 0.198 | IND | IND |
| Sulphur, S (wt.%) | 0.190 | 0.013 | 0.179 | 0.201 | IND | IND |
| Thermogravimetry | | | | | | |
| Loss On Ignition, LOI (wt.%) | 2.46 | 0.169 | 2.34 | 2.59 | 2.42 | 2.50 |

Note: intervals may appear asymmetric due to rounding; IND – Indeterminate

Table 6. Indicative Values for OREAS 24b.

| Constituent | Unit | Value | Constituent | Unit | Value | Constituent | Unit | Value |
|--|------|-------|-------------|------|---------|-------------|------|--------|
| Fusion XRF | | | | | | | | |
| As | ppm | 10.0 | Ni | ppm | 59 | V2O5 | ppm | 184 |
| Cl | ppm | < 10 | S | wt.% | 0.195 | Zn | ppm | 113 |
| Co | ppm | 28.3 | Sr | ppm | 134 | | | |
| Fusion ICP-OES/MS | | | | | | | | |
| Ag | ppm | 2.17 | Ge | ppm | 1.64 | Sb | ppm | 1.33 |
| As | ppm | 9.74 | In | ppm | < 0.2 | Se | ppm | < 10 |
| B | ppm | 69 | Mo | ppm | 4.91 | Te | ppm | < 6 |
| Bi | ppm | 1.03 | P | wt.% | 0.073 | Zn | ppm | 103 |
| Cd | ppm | < 2 | Pb | ppm | 22.9 | | | |
| Cu | ppm | 35.1 | Re | ppm | < 0.1 | | | |
| Four Acid Digestion ICP-OES/MS | | | | | | | | |
| Ag | ppm | 0.127 | Ge | ppm | 0.83 | Se | ppm | 0.66 |
| As | ppm | 8.35 | Ho | ppm | 0.80 | Sm | ppm | 7.06 |
| Cd | ppm | 0.049 | In | ppm | 0.077 | Tb | ppm | 0.87 |
| Dy | ppm | 4.47 | Lu | ppm | 0.32 | Te | ppm | < 0.1 |
| Er | ppm | 2.54 | Nd | ppm | 36.2 | Tm | ppm | 0.31 |
| Eu | ppm | 1.36 | Pr | ppm | 9.86 | Yb | ppm | 2.17 |
| Gd | ppm | 6.02 | Re | ppm | 0.002 | | | |
| Aqua Regia Digestion ICP-OES/MS | | | | | | | | |
| Ag | ppm | 0.058 | Hg | ppm | < 0.01 | Sb | ppm | 0.48 |
| Au | ppm | 0.002 | Ho | ppm | 0.46 | Se | ppm | 0.42 |
| B | ppm | 6.23 | In | ppm | 0.048 | Sm | ppm | 4.68 |
| Be | ppm | 1.65 | La | ppm | 29.2 | Sr | ppm | 29.0 |
| Cd | ppm | 0.046 | Lu | ppm | 0.20 | Ta | ppm | < 0.05 |
| Ce | ppm | 61 | Nb | ppm | 0.31 | Tb | ppm | 0.54 |
| Dy | ppm | 2.65 | Nd | ppm | 24.6 | Te | ppm | < 0.02 |
| Er | ppm | 1.21 | P | wt.% | 0.062 | Tm | ppm | 0.17 |
| Eu | ppm | 0.66 | Pd | ppm | < 0.01 | W | ppm | 1.19 |
| Gd | ppm | 3.96 | Pr | ppm | 6.87 | Yb | ppm | 1.15 |
| Ge | ppm | 0.26 | Pt | ppm | 0.001 | | | |
| Hf | ppm | 0.52 | Re | ppm | < 0.001 | | | |

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

OREAS 24b has been prepared from barren I-type hornblende-bearing granodiorite sourced from the Late Devonian Lysterfield granodiorite complex located in the Melbourne Province of Australia. It is characterised by very low background gold of less than 3 parts per billion.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 24b was prepared in the following manner:

- drying to constant mass at 105°C;
- crushing and multi stage milling;
- homogenisation;
- packaging in 10g and 60g units into laminated foil pouches and in 1kg units into plastic jars.

ANALYTICAL PROGRAM

Ten commercial analytical laboratories participated in the program to characterise the elements reported in Tables 1 to 6. The following methods were employed:

- Lithium borate fusion for full suite X-ray fluorescence (9 laboratories)
- Sodium peroxide fusion or lithium borate fusion for full suite ICP-OES and ICP-MS (10 laboratories)
- Four acid digestion for full suite ICP-OES and ICP-MS (9 laboratories)
- Aqua regia digestion for full suite ICP-OES and ICP-MS (9 laboratories)
- Fire assay with ICP-OES and ICP-MS for Au, Pd and Pt (9 laboratories)
- Infra-red combustion furnace for C and S (9 laboratories)
- Thermogravimetry for LOI (10 laboratories)

For the round robin program eleven 700g test units 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 700g test units. This format enabled nested ANOVA treatment of the results to evaluate homogeneity.

Tabulated results, together with uncorrected means, medians, standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM³) are available upon request for this CRM (**OREAS 24b Datapack.xlsx**).

STATISTICAL ANALYSIS

Certified Values, Standard Deviations, Confidence and Tolerance Limits have been determined for each analytical method following removal of individual and laboratory outliers (see Tables 1-5). Certified Values are the mean of means after outlier filtering. The 95% Confidence Limit is a measure of the reliability of the certified value, i.e. the narrower the Confidence Interval the greater the certainty in the Certified Value. It should not be used as a control limit for laboratory performance.

Indicative values (Table 6) are provided where i) the number of laboratories reporting a particular analyte is insufficient (< 5) to support certification; ii) interlaboratory consensus is poor; or iii) a significant proportion of results are outlying or reported as less than detection limits.

Standard Deviation values (1SDs) are reported in Tables 1-5 and provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. They take into account errors attributable to measurement uncertainty and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. The Standard Deviation values include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability. The SD for each analyte's certified value is calculated from the same filtered data set used to determine the certified value, i.e. after removal of all individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. The standard deviation is then calculated for each analyte from the pooled accepted analyses generated from the certification program.

As a guide two or more analytical results lying outside the 2SD window may be regarded as warning or rejection, and rejection for single results lying outside the 3SD window in QC monitoring, although their precise application should be at the discretion of the QC manager concerned.

Tolerance Limits (ISO Guide 3207) were determined using an analysis of precision errors method and are considered a conservative estimate of true homogeneity. The meaning of tolerance limits may be illustrated for copper by 4-acid digestion, where 99% of the time ($1-\alpha=0.99$) at least 95% of subsamples ($\rho=0.95$) will have concentrations lying between 35.8 and 40.2 ppm. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (ISO Guide 35).

The homogeneity of OREAS 24b has also been evaluated in an ANOVA study for all certified analytes. This study indicates no evidence that between-unit variance is greater than within-unit variance.

Based on the statistical analysis of the results of the interlaboratory certification program it can be concluded that OREAS 24b is fit-for-purpose as a certified reference material (see 'Intended Use' below).

PARTICIPATING LABORATORIES

1. Acme Analytical Laboratories, Vancouver, BC, Canada
2. Activation Laboratories, Ancaster, Ontario, Canada
3. ALS, Brisbane, QLD, Australia
4. ALS, Callao, Lima, Peru
5. ALS, Vancouver, BC, Canada
6. BV Amdel, Adelaide, SA, Australia
7. BV Ultra Trace, Perth, WA, Australia
8. Intertek Genalysis, Perth, WA, Australia
9. SGS Mineral Services, Booyens, Gauteng, South Africa
10. SGS Mineral Services, Toronto, Ontario, Canada

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Reference material OREAS 24b has been prepared, certified and is supplied by:

ORE Research & Exploration Pty Ltd
37A Hosie Street
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AUSTRALIA

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Fax: +613-9729 8338
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Email: info@ore.com.au

It is available in unit sizes of 10g, 60g (single-use laminated foil pouches) and 1kg (plastic jars).

INTENDED USE

OREAS 24b is intended for the following uses:

- for the monitoring of laboratory performance in the analysis of analytes reported in Tables 1-5 in geological samples
- for the verification of analytical methods for analytes reported in Tables 1-5
- for the calibration of instruments used in the determination of the concentration of analytes reported in Tables 1-5

STABILITY AND STORAGE INSTRUCTIONS

OREAS 24b was sourced from barren I-type hornblende-bearing granodiorite from the Late Devonian Lysterfield granodiorite complex located in the Melbourne Province of Australia. 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 lithium borate fusion XRF and for LOI are on a dry basis whilst all other certified values are reported on an “as received” basis.

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.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

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

A handwritten signature in blue ink, appearing to read 'S.H.', is positioned above a horizontal line.

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

REFERENCES

- Ingamells, C. O. and Switzer, P. (1973), *Talanta* 20, 547-568.
- ISO Guide 30 (1992), Terms and definitions used in connection with reference materials.
- ISO Guide 31 (2000), Reference materials – Contents of certificates and labels.
- ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.
- ISO Guide 35 (2006), Certification of reference materials - General and statistical principals.