

Australian & New Zealand Gold Operations December Quarter 2022

Overview

The average All-in Sustaining Cost (AISC) for Australia and New Zealand was A\$1,827/oz, which is down 9.2% (A\$185/oz) on the previous quarter average AISC of A\$2,012/oz. Evolution Mining's Ernest Henry operations was the lowest cost producer reporting an AISC of **-A\$3,748/oz** followed by Newcrest's Cadia Valley operations with an AISC of A\$49/oz then by Evolution Mining's Cowal mine (A\$1,042/oz). The average gold spot price for the quarter was A\$2,636/oz (US\$1,732/oz). It should be noted that Ernest Henry and Cadia Valley benefit from significant base metal by-products. Aurum Analytics' estimate of these operations AISC on a co-product basis (Co-AISC) is as follows; Ernest Henry Co-AISC of A\$1,292/oz and Cadia Valley Co-AISC of A\$1,163/oz. The lowest cost "gold only" operations were Evolution Mining's Cowal mine with an AISC of A\$1,042/oz, then Capricorn Metals' Karlawinda mine (A\$1,105/oz) and Gold Fields' St Ives mine (A\$1,116/oz).

Newmont's Boddington operation took out top spot as Australia's largest gold producer with 209,000 oz for the quarter, followed by Newcrest's Cadia Valley operations (169,262 oz) and Newmont's Tanami mine (129,000 oz). Of the mines where gold is a by-product, BHP's Olympic Dam produced the most gold 43,280 oz followed by Oz Minerals' Prominent Hill and Carrapateena mines with 29,730 oz and 22,567 oz respectively.

Grade wise for the companies that report AISC, the average reported mill head/feed grade was 2.49 g/t (Open Pit (OP) - 0.99 g/t, Underground (UG) - 3.63 g/t, Open Pit & Underground (OP/UG) - 2.11 g/t) which was up on the previous quarter, 2.41 g/t (3.5%). Mandalay Resources' Costerfield mine took out the honour as the operation with the highest average feed grade with 12.65 g/t, followed by Newmont's Tanami mine 6.46 g/t. The lowest grade mine was Evolution's Mt Rawdon mine processing an average head grade of 0.50 g/t. The high-grade operations that do not report an AISC were Agnico Eagle's Fosterville mine with 20.29 g/t and Kaiser Reef's A1 mine with 10.26 g/t.

Top 10 Gold Producing Operations

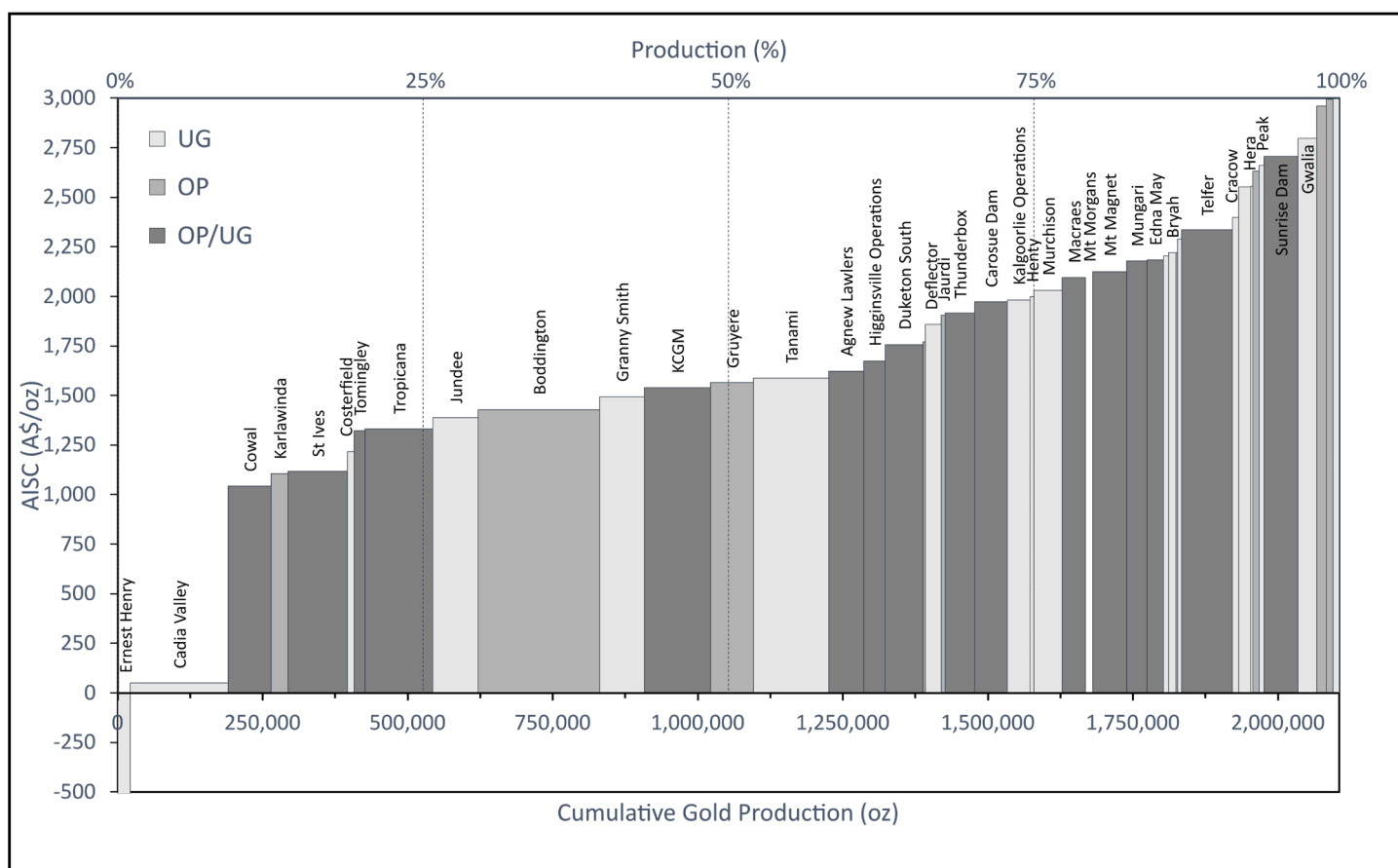
| Rank | Operation | Company | Mine Type | Au Produced (oz) |
|------|--------------|------------------------------------------------------|-----------|------------------|
| 1 | Boddington | Newmont Corporation | OP | 209,000 |
| 2 | Cadia Valley | Newcrest Mining Limited | UG | 169,262 |
| 3 | Tanami | Newmont Corporation | UG | 129,000 |
| 4 | Tropicana | JV AngloGold Ashanti Limited/Regis Resources Limited | OP/UG | 117,422 |
| 5 | KCGM | Northern Star Resources Limited | OP/UG | 114,812 |
| 6 | St Ives | Gold Fields Limited | OP/UG | 101,884 |
| 7 | Fosterville | Agnico Eagle Mines Limited | UG | 88,634 |
| 8 | Telfer | Newcrest Mining Limited | OP/UG | 87,985 |
| 9 | Jundee | Northern Star Resources Limited | UG | 78,061 |
| 10 | Granny Smith | Gold Fields Limited | UG | 76,600 |

Gold Operations That Report AISC

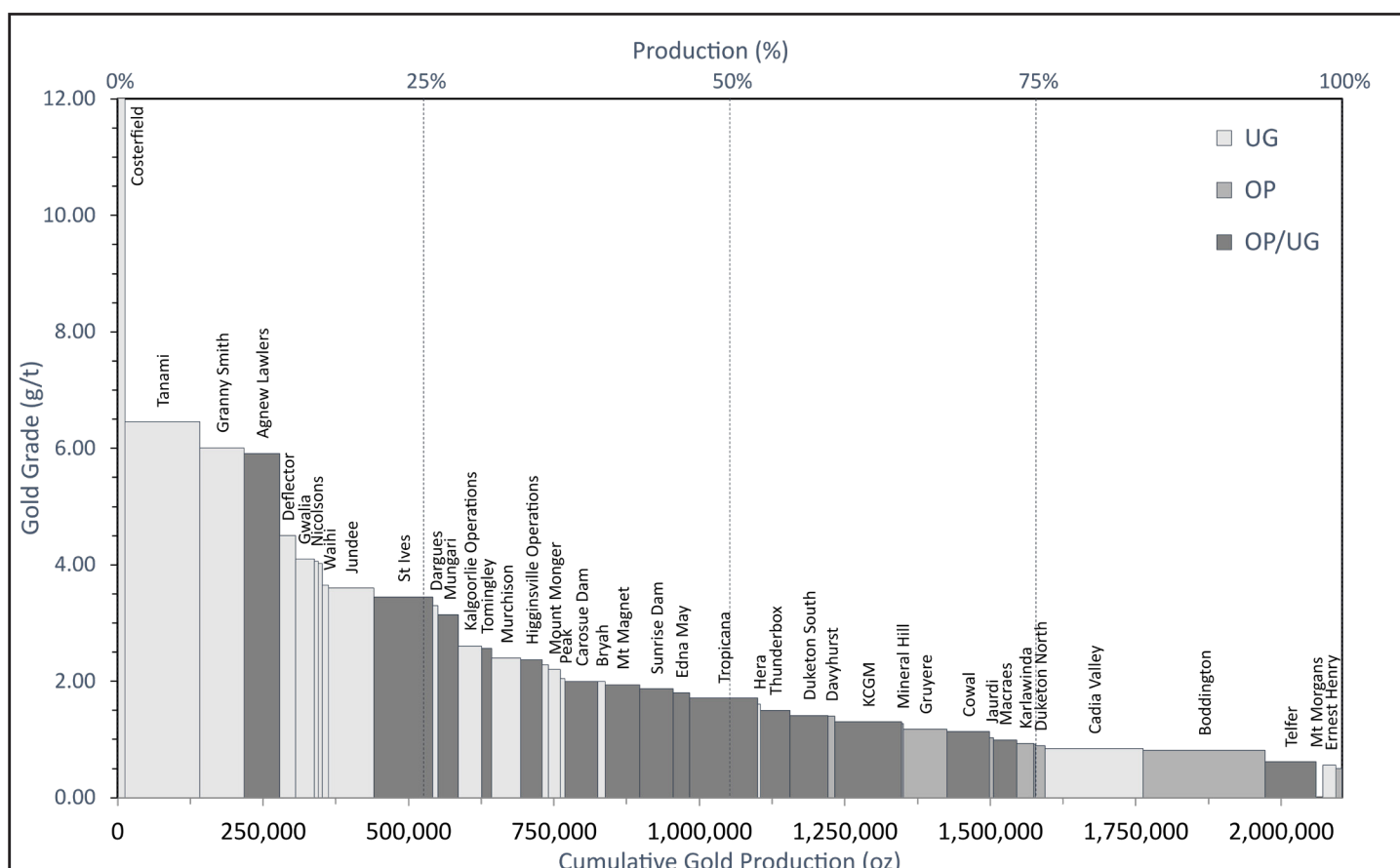
| AISC Rank | Operation | Company | Mine Type | AISC (A\$/oz) | Grade (g/t) | Grade Rank | Au Produced (oz) |
|-----------|------------------|---------------------------------|-----------|---------------|-------------|------------|------------------|
| 1 | Ernest Henry | Evolution Mining Limited | UG | -3,748 | 0.56 | 44 | 21,754 |
| 2 | Cadia Valley | Newcrest Mining Limited | UG | 49 | 0.84 | 40 | 169,262 |
| 3 | Cowal | Evolution Mining Limited | OP/UG | 1,042 | 1.14 | 34 | 73,676 |
| 4 | Karlawinda | Capricorn Metals Limited | OP | 1,105 | 0.93 | 37 | 29,310 |
| 5 | St Ives | Gold Fields Limited | OP/UG | 1,116 | 3.45 | 11 | 101,884 |
| 6 | Costerfield | Mandalay Resources Limited | UG | 1,218 | 12.65 | 1 | 12,085 |
| 7 | Tomingley | Alkane Resources Limited | OP/UG | 1,323 | 2.56 | 15 | 18,301 |
| 8 | Tropicana | JV AngloGold/Regis Resources | OP/UG | 1,332 | 1.71 | 26 | 117,422 |
| 9 | Jundee | Northern Star Resources Limited | UG | 1,387 | 3.60 | 10 | 78,061 |
| 10 | Boddington | Newmont Corporation | OP | 1,429 | 0.81 | 41 | 209,000 |
| 11 | Granny Smith | Gold Fields Limited | UG | 1,494 | 6.01 | 3 | 76,600 |
| 12 | KCGM | Northern Star Resources Limited | OP/UG | 1,538 | 1.30 | 31 | 114,812 |
| 13 | Gruyere | JV Gold Fields/Gold Road | OP | 1,565 | 1.18 | 33 | 74,201 |
| 14 | Tanami | Newmont Corporation | UG | 1,589 | 6.46 | 2 | 129,000 |
| 15 | Agnew Lawlers | Gold Fields Limited | OP/UG | 1,622 | 5.91 | 4 | 60,627 |
| 16 | Higginsville Ops | Karora Resources Inc | OP/UG | 1,674 | 2.37 | 17 | 37,309 |
| 17 | Duketon South | Regis Resources Limited | OP/UG | 1,757 | 1.41 | 29 | 65,334 |
| 18 | Mineral Hill | Kingston Resources Limited | OP | 1,770 | 1.27 | 32 | 3,642 |
| 19 | Deflector | Silver Lake Resources Limited | UG | 1,859 | 4.50 | 5 | 27,495 |
| 20 | Jaurdi | Beacon Minerals Limited | OP | 1,905 | 1.03 | 35 | 6,418 |
| 21 | Thunderbox | Northern Star Resources Limited | OP/UG | 1,915 | 1.50 | 28 | 50,659 |
| 22 | Carosue Dam | Northern Star Resources Limited | OP/UG | 1,972 | 2.00 | 21= | 56,286 |
| 23 | Kalgoorlie Ops | Northern Star Resources Limited | UG | 1,981 | 2.60 | 14 | 39,304 |
| 24 | Henty | Catalyst Metals Limited | UG | 1,997 | 4.02 | 8 | 6,763 |
| 25 | Murchison | Westgold Resources Limited | UG | 2,031 | 2.40 | 16 | 49,280 |
| 26 | Macraes | OceanaGold Corporation | OP/UG | 2,094 | 0.99 | 36 | 39,815 |
| 27 | Mt Morgans | Dacian Gold Limited | NM | 2,099 | 0.60 | 43 | 12,039 |
| 28 | Mt Magnet Ops | Ramellus Resources Limited | OP/UG | 2,125 | 1.94 | 23 | 58,908 |
| 29 | Mungari | Evolution Mining Limited | OP/UG | 2,178 | 3.14 | 13 | 35,011 |
| 30 | Edna May | Ramellus Resources Limited | OP/UG | 2,184 | 1.80 | 25 | 27,848 |
| 31 | Dargues | Aurelia Metals Limited | UG | 2,204 | 3.30 | 12 | 8,748 |
| 32= | Bryah | Westgold Resources Limited | UG | 2,222 | 2.00 | 21= | 12,900 |
| 32= | Mt Carlton | Navarre Minerals Limited | OP | 2,222 | 0.92 | 38 | 2,873 |
| 34 | Nicolsons | Pantoro Limited | UG | 2,290 | 4.06 | 7 | 6,891 |
| 35 | Telfer | Newcrest Mining Limited | OP/UG | 2,335 | 0.62 | 42 | 87,985 |
| 36 | Cracow | Aeris Resources Limited | UG | 2,397 | 2.28 | 18 | 11,000 |
| 37 | Mount Monger | Silver Lake Resources Limited | UG | 2,553 | 2.20 | 19 | 19,583 |
| 38 | Hera | Aurelia Metals Limited | UG | 2,556 | 1.61 | 27 | 4,491 |
| 39 | Mt Rawdon | Evolution Mining Limited | OP | 2,633 | 0.50 | 45 | 11,003 |
| 40 | Peak | Aurelia Metals Limited | UG | 2,659 | 2.05 | 20 | 8,404 |
| 41 | Sunrise Dam | AngloGold Ashanti Limited | OP/UG | 2,705 | 1.87 | 24 | 58,000 |
| 42 | Gwalia | St Barbara Limited | UG | 2,796 | 4.10 | 6 | 32,175 |
| 43 | Duketon North | Regis Resources Limited | OP | 2,959 | 0.89 | 39 | 16,560 |
| 44 | Davyhurst | Ora Banda Mining Limited | OP | 2,993 | 1.40 | 30 | 11,803 |
| 45 | Waihi | OceanaGold Corporation | UG | 3,097 | 3.65 | 9 | 10,466 |

Notes: Operations shown on a 100% basis.

Gold Production Cost Curve Ranked By Reported AISC



Gold Production Grade Curve Ranked By Average Mill Feed/Head Grade



Gold Mines That Did Not Report All-in Sustaining Costs

| Rank | Operation | Company | Mine Type | Grade (g/t) | Au Produced (oz) |
|------|----------------|--------------------------------------------------|-----------|-------------|------------------|
| 1 | Fosterville | Agnico Eagle Mines Limited ¹ | UG | 20.29 | 88,634 |
| 2 | KOTH | Red 5 Limited | OP/UG | 1.14 | 36,260 |
| 3 | Matilda-Wiluna | Wiluna Mining Corporation Limited ² | UG | 3.71 | 20,775 |
| 4 | Plutonic | Superior Gold Inc | UG | 1.46 | 14,448 |
| 5 | Warrawoona | Calidus Resources Limited | OP | 0.79 | 12,544 |
| 6 | Kundana EKJV | JV Tribune Resources Limited/Rand Mining Limited | UG | 4.25 | 8,641 |
| 7 | Norseman | JV Pantoro Limited/Tulla Resources Plc | OP/UG | NA | 7,220 |
| 8 | Dalgaranga | Gascoyne Resources Limited | OP | 0.75 | 7,104 |
| 9 | A1 | Kaiser Reef Limited | UG | 10.26 | 2,391 |
| NR | Darlot | Red 5 Limited ³ | UG | NA | NA |
| NR | Marvel Loch | Minjar Gold Pty Ltd ³ | OP/UG | NA | NA |
| NR | Paddington | Zijin Mining Group Company Limited ³ | OP/UG | NA | NA |
| NR | Pajingo | Minjar Gold Pty Ltd ³ | UG | NA | NA |
| NR | Ravenswood | EMR Capital ³ | OP/UG | NA | NA |
| NR | Ballarat | Shen Yao Holdings Limited ³ | UG | NA | NA |

1. Agnico Eagle Mines Limited does not report quarterly AISC values for individual mines.

2. Wiluna Mining Corporation Limited is in administration.

3. These companies do not provide detailed quarterly production statistics.

Mines Where Gold Is A By-Product

| Rank | Operation | Company | Mine Type | Au Produced (oz) |
|------|---------------------------|--------------------------|-----------|------------------|
| 1 | Olympic Dam | BHP Group Limited | UG | 43,280 |
| 2 | Prominent Hill | OZ Minerals Limited | UG | 29,730 |
| 3 | Carrapateena | OZ Minerals Limited | UG | 22,567 |
| 4 | Ernest Henry | Evolution Mining Limited | UG | 21,754 |
| 5 | Golden Grove | 29Metals Limited | UG | 8,117 |
| 6 | Rosebery | MMG Limited | UG | 5,908 |
| 7 | North Parkes ¹ | JV China Moly/Sumitomo | UG | 4,781 |
| 8 | DeGrussa | Sandfire Resources NL | UG | 4,562 |
| 9 | Eloise | AIC Mines Limited | UG | 1,263 |
| 10 | Jaguar | Aeris Resources Limited | UG | 1,100 |
| 11 | Tritton | Aeris Resources Limited | UG | 1,100 |
| 12 | Mt Colin | Aeris Resources Limited | UG | 1,000 |
| 13 | Wonawinta | Manuka Resources Limited | OP | 243 |

1. North Parkes is a joint venture between China Molybdenum Co Ltd (80%) and Sumitomo Australia Pty Ltd (20%).

Quarter on Quarter Change in AISC and Grade

| Statistic | AISC (A\$/oz) | Change (%) | Grade (g/t) | Change (%) |
|---------------------------------|---------------|------------|-------------|------------|
| Average (Simple) ¹ | 1,827 | -9.2% | 2.49 | 3.5% |
| Average (Weighted) ² | 1,741 | 7.2% | 1.50 | 12.0% |
| Minimum | -3,748 | -120.3% | 0.50 | -2.0% |
| First Quartile ³ | 1332 | 4.3% | 0.89 | -3.3% |
| Median ³ | 1565 | 1.9% | 1.71 | -1.7% |
| Third Quartile ³ | 1997 | -4.7% | 3.45 | 17.7% |
| Maximum | 3,097 | -51.0% | 12.65 | 6.2% |

Notes: This table of statistics is only based on mines that report an AISC.

1. Simple averages done by number of mining operations.

2. AISC weighted by gold ounces produced, Au grade weighted by ore tonnes milled.

3. First Quartile, Median and Third Quartile values are based on production in the AISC Cost Curve and Grade Curve.

Top 5 Gold Operations - Major Gold Miners

| Gold Production (Attributable) | | | All-in Sustaining Costs | | |
|--------------------------------|--------------|---------|-------------------------|--------------------------------------------------------|--------|
| Rank | Operation | oz | Rank | Operation | A\$/oz |
| 1 | Boddington | 209,000 | 1 | Cadia Valley | 49 |
| 2 | Cadia Valley | 169,262 | 2 | St Ives | 1,116 |
| 3 | Tanami | 129,000 | 3 | Jundee | 1,387 |
| 4 | Tropicana | 117,422 | 4 | Tropicana (70% AngloGold Ashanti Limited) ¹ | 1,423 |
| 5 | KCGM | 114,812 | 5 | Boddington | 1,429 |

1. Tropicana AISC represents AngloGold Ashanti Limited's 70% attributable interest.

Top 5 Gold Operations - Mid-Tier Gold Miners

| Gold Production (Attributable) | | | All-in Sustaining Costs | | |
|--------------------------------|------------------------|--------|-------------------------|------------------------------------------------------|--------|
| Rank | Operation | oz | Rank | Operation | A\$/oz |
| 1 | Cowal | 73,676 | 1 | Ernest Henry | -3,748 |
| 2 | Duketon South | 65,334 | 2 | Cowal | 1,042 |
| 3 | Mt Magnet Operations | 58,908 | 3 | Tropicana (30% Regis Resources Limited) ² | 1,119 |
| 4 | Murchison ¹ | 49,280 | 4 | Duketon South | 1,757 |
| 5 | Macraes | 39,815 | 5 | Deflector | 1,859 |

1. The Murchison operations also now include the Cue gold mine, which was reported separately previously.

2. Tropicana's gold produced and AISC represents Regis Resources Limited's 30% attributable interest.

Top 5 Gold Operations - Junior Gold Miners

| Gold Production (Attributable) | | | All-in Sustaining Costs | | |
|--------------------------------|----------------------------------------------------|--------|-------------------------|----------------------------------------------------|--------|
| Rank | Operation | oz | Rank | Operation | A\$/oz |
| 1 | Higginsville Ops | 37,309 | 1 | Karlawinda | 1,105 |
| 2 | Gruyere (Gold Road Resources Limited) ¹ | 37,101 | 2 | Costerfield | 1,218 |
| 3 | KOTH | 36,260 | 3 | Tomingley | 1,323 |
| 4 | Karlawinda | 29,310 | 4 | Gruyere (Gold Road Resources Limited) ¹ | 1,622 |
| 5 | Tomingley | 20,775 | 5 | Higginsville Ops | 1,674 |

1. Gruyere's gold produced and AISC represents Gold Road Resources Limited's 50% attributable interest.

Top 5 Pure Gold Operations (No Base Metal By or Co-Products)

| Gold Production (Total) | | | All-in Sustaining Costs | | |
|-------------------------|------------------------|---------|-------------------------|------------------------|--------|
| Rank | Operation | oz | Rank | Operation | A\$/oz |
| 1 | Tanami | 129,000 | 1 | Cowal | 1,042 |
| 2 | Tropicana ¹ | 117,422 | 2 | Karlawinda | 1,105 |
| 3 | KCGM | 114,812 | 3 | St Ives | 1,116 |
| 4 | St Ives | 101,884 | 4 | Tomingley | 1,323 |
| 5 | Fosterville | 88,634 | 5 | Tropicana ¹ | 1,332 |

1. Tropicana is a joint venture between AngloGold Ashanti Limited (70%) and Regis Resources Limited (30%).

General Notes

Data was sourced from company quarterly reports. Aurum Analytics created the cost and grade curves. Mine Type reflects the source of the ore mined for the quarter, OP - Open Pit, UG - Underground, OP/UG - Open Pit and Underground and NM - No Mining.

For operations in joint venture such as Gruyere and Tropicana AISC values were apportioned by equity ownership percentages.

Where AISC values were reported in US\$ and no A\$ equivalent provided, the quarterly average US\$/A\$ exchange rate (0.6570) from the Reserve Bank of Australia was used.

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About Aurum Analytics

Aurum Analytics is an independent business providing information and analysis on the Australian and New Zealand gold industry. The information and analysis given is a by-product of Sam Ulrich's PhD research at The University of Western Australia's Centre for Exploration Targeting titled "Insights into the Economic Cost Structure of Gold Mining: From All-in Sustaining Costs to Quantifying Externalities."

Contact

Sam Ulrich

Aurum Analytics

E sam@aurumanalytics.com.au
W www.aurumanalytics.com.au
T +61 439 997 814

Liam Twigger

Argonaut Group

E ltwigger@argonaut.com
W www.argonaut.com
T +61 8 9224 6888