

Australian & New Zealand Gold Operations June Quarter 2023

Overview

The average All-in Sustaining Cost (AISC) for Australia and New Zealand was A\$2,027/oz, which is up 8.3% (A\$156/oz) on the previous quarter average AISC of A\$1,871/oz. Newcrest Mining's Cadia Valley operations was the lowest cost producer reporting an AISC of A\$281/oz followed by Evolution Mining's Cowal mine with an AISC of A\$1,117/oz then by Silver Lake Resource's Deflector mine (A\$1,219/oz). The average gold spot price for the quarter was A\$2,961/oz (US\$1,978/oz). It should be noted that Cadia Valley and Deflector benefit from base metal by-products. Aurum Analytics' estimate of these operations AISC on a co-product basis (Co-AISC) is as follows; Cadia Valley Co-AISC of A\$1,476/oz and Deflector Co-AISC of A\$1,320/oz. The lowest cost "gold only" operations were Evolution Mining's Cowal mine with an AISC of A\$1,117/oz, then Capricorn Metals' Karlawinda mine (A\$1,311/oz) and Northern Star's Jundee mine (A\$1,355/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 (151,955 oz) and Newmont's Tanami operations (126,000 oz). Of the mines where gold is a by-product, BHP's Olympic Dam produced the most gold 46,479 oz followed by their Prominent Hill and Carrapateena mines with 17,432 oz and 15,304 oz respectively.

Grade wise for the companies that report AISC, the average reported mill head/feed grade was 2.54 g/t (Open Pit (OP) - 1.11 g/t, Underground (UG) – 3.67 g/t, Open Pit & Underground (OP/UG) - 2.09 g/t) which was down on the previous quarter, 2.31 g/t (8.3%). Silver Lake Resources' Deflector mine took out the honour as the operation with the highest average feed grade with 8.00 g/t, followed by Mandalay Resource's Costerfield mine 7.39 g/t. The lowest grade mine was Evolution's Ernest Henry mine processing an average head grade of 0.33 g/t. The high-grade operations that do not report an AISC were Agnico Eagle's Fosterville mine with 14.77 g/t and Kaiser Reef's A1 mine with 8.13 g/t.

Top 10 Gold Producing Operations

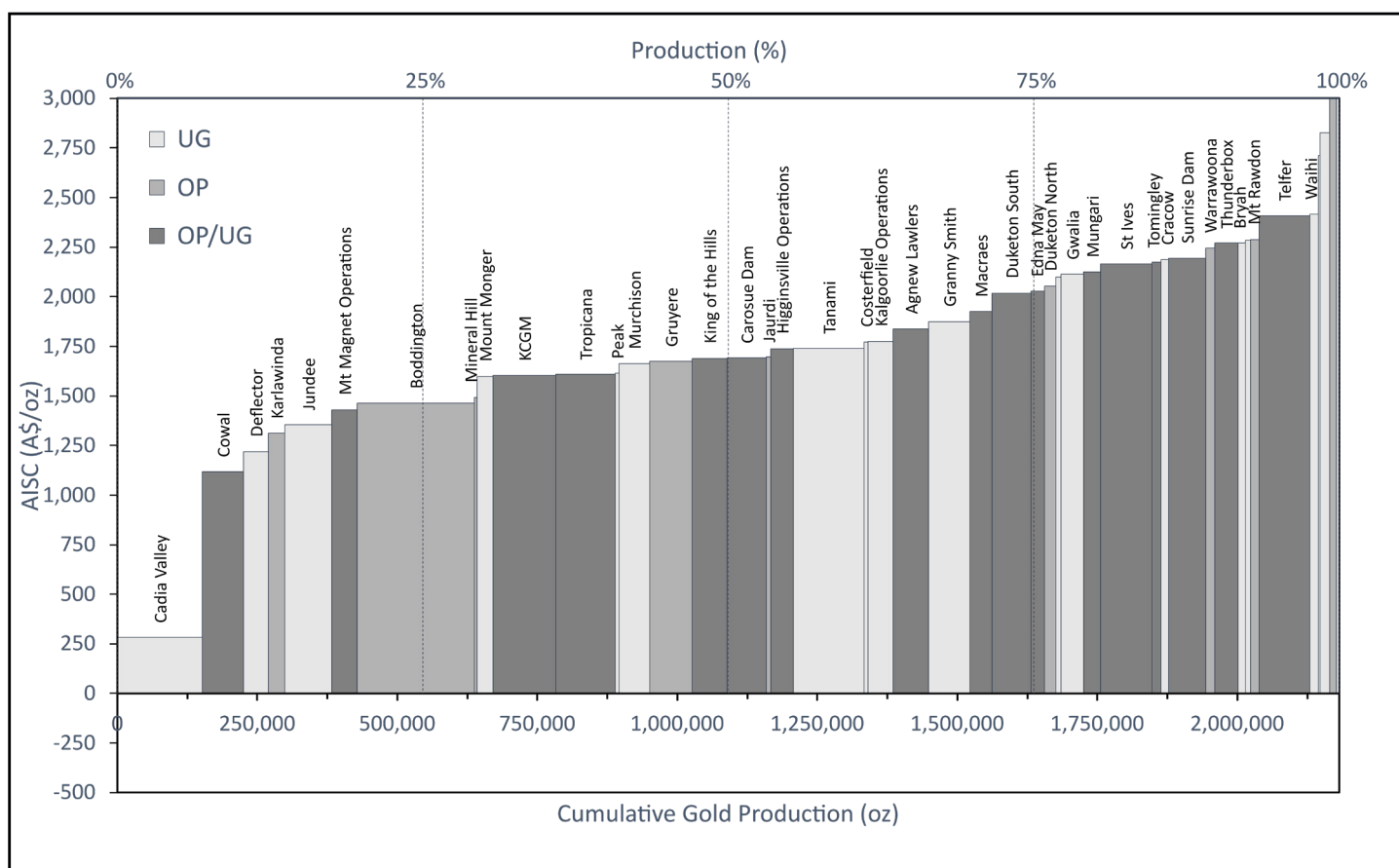
Rank	Operation	Company	Mine Type	Au Produced (oz)
1	Boddington	Newmont Corporation	OP	209,000
2	Cadia Valley	Newcrest Mining Limited	UG	151,955
3	Tanami	Newmont Corporation	UG	126,000
4	KCGM	Northern Star Resources Limited	OP/UG	111,620
5	Tropicana	JV AngloGold Ashanti Limited/Regis Resources Limited	OP/UG	106,373
6	St Ives	Gold Fields Limited	OP/UG	91,500
7	Telfer	Newcrest Mining Limited	OP/UG	91,014
8	Jundee	Northern Star Resources Limited	UG	84,165
9	Fosterville	Agnico Eagle Mines Limited	UG	81,813
10	Gruyere	JV Gold Fields Limited/Gold Road Resources Limited	OP	76,053

Gold Operations That Report AISC

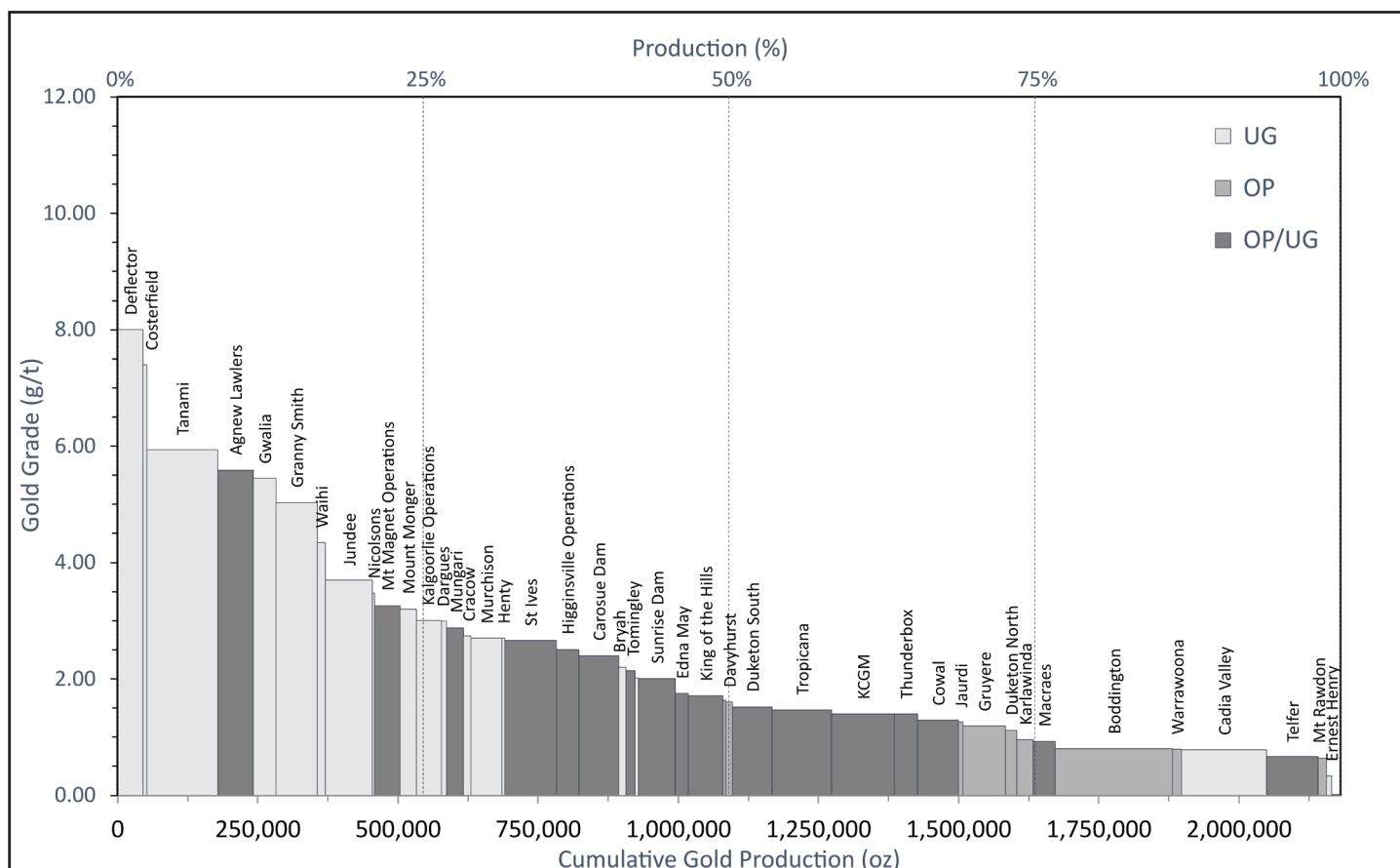
AISC Rank	Operation	Company	Mine Type	AISC (A\$/oz)	Grade (g/t)	Grade Rank	Au Produced (oz)
1	Cadia Valley	Newcrest Mining Limited	UG	281	0.78	41	151,955
2	Cowal	Evolution Mining Limited	OP/UG	1,117	1.29	33	73,412
3	Deflector	Silver Lake Resources Limited	UG	1,219	8.00	1	44,614
4	Karlawinda	Capricorn Metals Limited	OP	1,311	0.96	37	28,859
5	Jundee	Northern Star Resources Limited	UG	1,355	3.70	8	84,165
6	Mt Magnet Operations	Rameliuss Resources Limited	OP/UG	1,429	3.26	10	45,380
7	Boddington	Newmont Corporation	OP	1,462	0.80	39	209,000
8	Mineral Hill	Kingston Resources Limited	OP	1,493	1.63	27	4,944
9	Mount Monger	Silver Lake Resources Limited	UG	1,598	3.20	11	28,847
10	KCGM	Northern Star Resources Limited	OP/UG	1,604	1.40	31=	111,620
11	Tropicana	JV AngloGold/Regis Resources	OP/UG	1,608	1.47	30	106,373
12	Peak	Aurelia Metals Limited	UG	1,614	2.02	23	6,417
13	Murchison	Westgold Resources Limited	UG	1,662	2.70	16=	55,165
14	Gruyere	JV Gold Fields/Gold Road	OP	1,674	1.19	35	76,053
15	King of the Hills	Red 5 Limited	OP/UG	1,690	1.71	26	61,705
16	Carosue Dam	Northern Star Resources Limited	OP/UG	1,691	2.40	20	70,651
17	Jaurdi	Beacon Minerals Limited	OP	1,698	1.26	34	7,596
18	Higginsville Operations	Karora Resources Inc	OP/UG	1,736	2.50	19	40,823
19	Tanami	Newmont Corporation	UG	1,739	5.94	3	126,000
20	Costerfield	Mandalay Resources Limited	UG	1,772	7.39	2	7,296
21	Kalgoorlie Operations	Northern Star Resources Limited	UG	1,775	3.00	12	44,556
22	Agnew Lawlers	Gold Fields Limited	OP/UG	1,837	5.59	4	63,700
23	Granny Smith	Gold Fields Limited	UG	1,875	5.03	6	73,200
24	Macraes	OceanaGold Corporation	OP/UG	1,926	0.93	38	39,500
25	Duketon South	Regis Resources Limited	OP/UG	2,018	1.52	29	70,144
26	Edna May	Rameliuss Resources Limited	OP/UG	2,027	1.75	25	23,372
27	Duketon North	Regis Resources Limited	OP	2,055	1.12	36	20,422
28	Dargues	Aurelia Metals Limited	UG	2,100	2.99	13	9,084
29	Gwalia	St Barbara Limited	UG	2,113	5.45	5	40,855
30	Mungari	Evolution Mining Limited	OP/UG	2,126	2.88	14	30,369
31	St Ives	Gold Fields Limited	OP/UG	2,166	2.66	18	91,500
32	Tomingley	Alkane Resources Limited	OP/UG	2,174	2.14	22	15,822
33	Cracow	Aeris Resources Limited	UG	2,187	2.74	15	13,800
34	Sunrise Dam	AngloGold Ashanti Limited	OP/UG	2,195	2.01	24	66,000
35	Warrawoona	Calidus Resources Limited	OP	2,245	0.79	40	16,177
36	Thunderbox	Northern Star Resources Limited	OP/UG	2,270	1.40	31=	41,482
37	Bryah	Westgold Resources Limited	UG	2,271	2.20	21	13,212
38	Ernest Henry	Evolution Mining Limited	UG	2,286	0.33	44	9,122
39	Mt Rawdon	Evolution Mining Limited	OP	2,289	0.64	43	15,278
40	Telfer	Newcrest Mining Limited	OP/UG	2,409	0.67	42	91,014
41	Waihi	OceanaGold Corporation	UG	2,415	4.34	7	14,800
42	Nicolsons	Pantoro Limited	UG	2,712	3.47	9	3,732
43	Plutonic	Superior Gold Inc	UG	2,828	NA		16,423
44	Davyhurst	Ora Banda Mining Limited	OP	3,107	1.60	28	12,190
45	Henty	Catalyst Metals Limited	UG	3,210	2.70	16=	4,895
46	Hera	Aurelia Metals Limited	NM	6,895	NA		464

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	14.77	81,813
2	Norseman	Pantoro Limited	OP/UG	1.50	10,345
3	Kundana EKJV	JV Tribune Resources Limited/Rand Mining Limited	UG	5.84	8,351
4	Matilda-Wiluna	Wiluna Mining Corporation Limited ²	NM	0.70	3,345
5	A1	Kaiser Reef Limited	UG	8.13	2,075
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

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	46,479
2	Prominent Hill ¹	BHP Group Limited	UG	17,432
3	Carrapateena ¹	BHP Group Limited	UG	15,304
4	Ernest Henry	Evolution Mining Limited	UG	9,122
5	Rosebery	MMG Limited	UG	6,386
6	North Parkes ²	JV China Molybdenum Co Ltd/Sumitomo Australia Pty Ltd	UG	6,237
7	Golden Grove	29Metals Limited	UG	3,288
8	Eloise	AIC Mines Limited	UG	1,515
9	Tritton	Aeris Resources Limited	UG	1,400
10	DeGrussa	Sandfire Resources Limited	NM	1,234
11	Mt Colin	Aeris Resources Limited	UG	900
12	Jaguar	Aeris Resources Limited	UG	400

1. The gold production only represents the two months BHP Group Limited had control of Prominent Hill and Carrapateena mines.

2. 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	2,027	8.3%	2.54	9.9%
Average (Weighted) ²	1,661	0.5%	1.41	5.4%
Minimum	281	107.4%	0.33	-31.3%
First Quartile ³	1,462	-1.7%	0.93	10.7%
Median ³	1,691	-1.7%	1.60	21.2%
Third Quartile ³	2,027	-0.2%	3.00	3.1%
Maximum	6,895	111.7%	8.00	3.8%

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	281
2	Cadia Valley	151,955	2	Jundee	1,355
3	Tanami	126,000	3	Boddington	1,462
4	KCGM	111,620	4	KCGM	1,604
5	St Ives	91,500	5	Carosue Dam	1,691

Top 5 Gold Operations - Mid-Tier Gold Miners

Gold Production (Attributable)			All-in Sustaining Costs		
Rank	Operation	oz	Rank	Operation	A\$/oz
1	Cowal	73,412	1	Cowal	1,117
2	Duketon South	70,144	2	Deflector	1,219
3	King of the Hills	61,705	3	Tropicana (30% Regis Resources Limited) ¹	1,259
4	Murchison	55,165	4	Mt Magnet Operations	1,429
5	Mt Magnet Operations	45,380	5	Mount Monger	1,598

1. 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 Operations	40,823	1	Karlawinda	1,311
2	Gruyere (50% Gold Road Resources Limited) ¹	38,027	2	Mineral Hill	1,493
3	Karlawinda	28,859	3	Peak	1,614
4	Plutonic	16,423	4	Gruyere (50% Gold Road Resources Limited) ¹	1,620
5	Warrawoona	16,177	5	Jaurdi	1,698

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	126,000	1	Cowal	1,117
2	KCGM	111,620	2	Karlawinda	1,311
3	Tropicana ¹	106,373	3	Jundee	1,355
4	St Ives	91,500	4	Mt Magnet Operations	1,429
5	Jundee	84,165	5	Mount Monger	1,598

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 (0.6683) 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."

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